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Perceived value of faculty-developed course websites: A student-faculty comparison

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Perceived Value of Faculty-Developed Course Websites:

A Student-Faculty Comparison

by

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To my friend, Sandy:

You always believed in me, pushed me along, and you wouldn't let me quit.

Thank you for never giving up.

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Abstract

This study is a case-study examination of faculty-developed course websites and their usage within a single midwestern community college environment. Its purpose is to develop an understanding of the perceived value of selected course websites from both student and faculty perspectives based on website design and use. The study analyzes course websites from instructional and technological theoretical perspectives, drawing from literature in the fields of education and technology studies.

To understand course websites within the context of their usage, three selected course websites were paired with the instructor and a subset of students to form a case study unit. The case study methodology offered an opportunity for in-depth qualitative data collection through theory-driven examination of website features, observation of website use, and in-depth interviews with students and faculty.

Study findings indicate that perceived value is strengthened by the amount and quality of course-specific content while lessened by irrelevant content and/or lack of significant content. Because constructivist strategies embody interactive learning styles, web-enabling interactive content on course websites has the potential to create constructivist learning opportunities. Several factors influence course websites design and perceived value perspectives. Included among these are student involvement in the design process, professional development opportunities that support faculty development of course websites, faculty members technical abilities, and institutional support.

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Chapter 1: Introduction

Overview

This study began with my own interest in course websites. Soon after I began teaching in 2002, I found that I was spending an increasing amount of time keeping track of lecture notes, assignments, projects, quizzes, and other course materials. To help me get organized, I developed my own course website. Over the years since then, I've added features and content and spent a considerable amount of time revising and updating the website. Because of this investment in time and effort, my course website is an indispensible tool that helps keep me organized and extends my educational reach. Often, students have shared positive comments about my website and wished that other teachers provided them as well. The student interest was the precursor that led to the following, in-depth examination of faculty-developed course websites.

The use of instructional technology has become an integral part of teaching and learning at the postsecondary levels (Less, 2003; Jones & Madden, 2002). Personal computers and small hand-held devices such as cell phones and personal digital assistants (PDAs) are used increasingly for information delivery by students and instructors alike (Cain, 2005; Witt, 2003), particularly when utilized to access the Internet and the World Wide Web. Many students attending colleges and universities were introduced at an early age to computers and networked technologies (Jones & Madden, 2002) and are therefore comfortable with the use of instructional technology. The use of such technologies to enable and support information dissemination between instructors and college students potentially alters the ways in which instructors conduct their courses (Friedman, 2006).

Prior research indicates a need exists for practices that foster responsive course website design strategies that enable purposive information sharing and student/instructor interactions (Ballard, Stapleton, & Carroll, 2004; Leung & Ivy, 2003). To address this need, course websites must be studied within the educational settings for which they are developed, in order to understand contextual factors relating to website usage and perceived educational value (Cook & Owston, 2001). A related phenomenon, drawn from the interdisciplinary field of technology studies, is the need to design technology in relation to user needs where the users in this case are the students. This study is an examination of faculty-developed course websites and their use within a midwestern community college environment. Its purpose is to develop an understanding of the perceived value of selected course websites from both student and faculty perspectives based on website design and use.

Context and the Need for the Study

Increased use of advanced communications and information technologies is changing instructional practice in both traditional and non-traditional classrooms (Roblyer & Edwards, 2000; Green, 2000, 2006; Cain, 2005; Bonds-Raacke, 2006; Ballard, Stapleton, & Carroll, 2004). Of particular interest to this study is the usage of the Internet and the World Wide Web (WWW) -- tools characterized as "the future of teaching and learning" that can have "far-reaching benefits" for both students and instructors (Friedman, 2006; Leung & Ivy, 2003; Selim, 2002).

A common application of these technologies in higher education is the use of course-specific websites for face-to-face courses (Leung & Ivy, 2003; Washenberger, 2001). As an extension of the traditional classroom, course websites can provide surrogate functionality

for distributing syllabi and assignments, enable hypertext or graphical links to external resources, support email or other communications capabilities, or support the delivery of multimedia content (Leung & Ivy, 2003; Rice, 1998). In either case, instructors are using course websites in a range of ways that vary from providing static information to being "a virtual adjunct that supplements a face-to-face course" (Ballard, Stapleton, & Carroll, 2004).

From an educational theoretical perspective, course websites can be linked with constructivism (McKnight & Demers, 2003). Constructivism, one of the distinguished theories of learning and teaching in educational research, has been a dominant part of the theoretical landscape since the late 1970s (Applefield, Huber, & Moallem, 2000; Ewing, Dowling, & Coutts, 1999; Stage, Muller, & Kinzie, 1998; Vygotsky, 1978). The emphasis in constructivism is based on the students' active agency in the creation of knowledge by exposing them to new and challenging situations and ideas, promoting student instructor interactions that encourage learning (Cain, 2005). Course websites used in a didactic manner can passively support knowledge discovery and provide the learner opportunities for engagement via collaborative mechanisms (McKnight & Demers, 2003). Moreover, instructor use of Web-based course information correlates positively with students' future web use, which, in turn, influences student learning through the Web and support constructivist activities such as self-initiated learning (Sanders & Morrison-Shetlar, 2001; Chandler & Maddux, 1998; Jiang & Ting, 1998).

When learning theory is integrated with technology design theory as discussed in Chapter 2, it becomes clear that course websites can enable constructivist learning. Cain (2005) suggests that digital interfaces act as constructivist environments by aiding learners in gaining access to "acquire a better understanding of concepts and ideas" (p. 7). This is most

likely to occur when faculty members who design the course website consciously employ technical features intended to meet the usability and instructional needs of students.

There appears to be general agreement in the research that supporting web access to course information and creating a course website is a significant undertaking (Heines, 2000; Leung & Ivy, 2003; Witt, 2003), and instructors should consider the purpose of a site prior to development (Ballard, Stapleton, & Carroll, 2004; Hazzan, 2001; Horton, 2000). The effort involved is moderated by an instructor's technical ability, access to resources, and available time. According to Witt (2003), though some college instructors have the technical ability to create course websites, they do so without realizing the time commitment required to keep the site content current. Heines (2000) warns that site design and creation are followed by maintenance cycles that flow throughout a semester, also echoing the need for continued investments of time and resources. Though current research supports the general assumption that the instructor's investment of time and energy spent developing course websites is reflected in the value students derive from their use (Leung & Ivy, 2003; Witt, 2003), most of this research is student-centered and not focused on the challenges faced by faculty in developing and enabling this form of functionality and instructional support.

Research indicates that students rate daily use of course websites as helpful (Frey, Faul, & Yankelov, 2003; Heines, 2000; Sanders & Morrison-Shetlar, 2001), reporting that web-enabled access to course information is an important complement to traditional classroom lectures (Bonds-Raacke, 2006). Students generally agree that access to posted grades, syllabi, assignments and other information on course websites is strategically important (Frey, Faul, & Yankelov, 2003), allowing them access to that information when needed. Other studies indicate positive student support of course websites echoed in hopes

for site adoption by instructors teaching other courses (Althaus, 1997; Leung & Ivy, 2003; Witt, 2003). Students generally perceive course websites positively and project positive attitudes toward their use (Ballard, Stapleton, & Carroll, 2004; Bonds-Raacke, 2006; Leung & Ivy, 2003; Witt, 2003). However, none of the existing studies considers the students' usage of web-enabled course resources in relation to the intent of the providers. Further, few of the existing studies support the rich observational understandings that would be derived from the students' concrete and verbatim descriptions of their interactions with course websites.

A consistent thread running through most current studies involves a lack of understanding regarding the derived benefit provided by course websites (Ballard, Stapleton, & Carroll, 2004; Leung & Ivy, 2003; Witt, 2003 & 2004). Witt (2003) points to a "need for systematic research into the specific goals and uses of course web sites in classroom courses, as well as possible effects on the attitudes, perceptions, or learning outcomes of students in these classes" (p. 430). Selim (2002) highlights a need for instructors to investigate how instructional technologies can be integrated and utilized in order to assess student's perceptions of course website usefulness. Last, Murphy (2002) asserts that if instructors are to effect positive change in their teaching in these new [web-enabled] settings, more research into the nature of effective and efficient learning and teaching in these new environments will be necessary.

Course websites offer instructors appealing new opportunities to enhance their courses and improve the usefulness of the education and information that they provide (Comunale, Sexton, & Voss, 2002). Yet as stated above, current research on course websites is predominantly student-centered, with little attention given to faculty perceptions of the instructional intent of web-enabled course resources. Further, there is a lack of current

research on course websites that examines and compares the attitudinal perceptions of both students and instructors in the context of their respective roles. According to Leung and Ivy (2003), instructors develop course websites with an assumption that students will derive some benefit from their use. How can we know whether this assumption is justified in practice without understanding the intent of the provider compared with the perceived value to the recipient? Also, of the existing studies, none could be found that utilized a qualitative, case study approach in evaluating student and faculty perceptions regarding the perceived value of course websites. Developing rich contextual understandings, inherent to qualitative methods, supports a well-developed understanding of course website usage by the community college students and instructors involved in the study. The intent of this study is to address these deficiencies and to add to the existing body of faculty-developed course website research, framed by a unique integration of educational and technological theories.

Purpose of the Study

Purpose

The purpose of this study is to examine and compare student and instructor experiences with three specific course websites at a midwestern community college. Using a case study approach, this research provides a descriptive narrative of the student and instructor digital relationship within the context of students' course website usage and instructors' course website development, supporting a comparison of how students and instructors rate perceived value of the same course website.

Research Questions

To inform a more complete understanding and to support rich descriptions of participants' course website experience, the nature of the qualitative case study design supports an open-ended strategy for developing thematic understanding of the data collected through review of websites, observation, and interviews. Still, case study research begins with the articulation of research questions (Yin, 1994). The central question in this study is: how do instructors and students, respectively, perceive the value provided by faculty-developed course websites? Additional research questions are:

1. What are the dimensions of "perceived value" as pertains to course websites?
2. What features of course websites do instructors deem to be the most important?
3. What features of course websites do instructors deem to be the least important?
4. What features of course websites provide the most benefit to students?
5. What features of course websites provide the least benefits to students?
6. What are some of the challenges involved with course website development?
7. What are some of the challenges experienced by students when using course websites?

Significance of the Study

As the use of computing technology within education continues to evolve, it is important to identify technological interactions that have positive effects on students' educational experiences. The intent of this study is to gather and report information that exposes areas of intersection and disconnection between instructors' and students' expectations for faculty-developed course websites. The findings of this study will help

instructors identify aspects of site design that assist them in providing meaningful course information and augmenting traditional course experiences.

Examining faculty-developed course websites as viewed by both the instructor and the student will provide a multi-layered comparison contributing to greater understanding of site development and usage. At one level, findings will contribute to site development understandings and support the work of consultants, administrators, and instructors to design better training materials or conduct workshops. By identifying critical areas of overlap between instructors' and students' determinations of perceived value, individual instructors should benefit from understanding what students perceive as the course website features that best augment course objectives. Such feedback may assist faculty in emphasizing important design features and minimizing aspects that provide little instructional value.

Limitations of the Study

The scope of this study involves the course websites and the experiences of specific students and instructors at a single community college. It is not within the study design to consider interactions involving course management systems typically used in distance learning, personal biography pages web pages provided by the instructor's institution, or other digital interfaces and software unless linked and incorporated into a specific instructor's site. It is also not within the purpose of this study to imply that results specific to the participants are statistically generalizable to the broad population of students and faculty at other community colleges; however, the study findings are anticipated to have relevant implications for community colleges.

Chapter Organization

The dissertation consists of five chapters. Chapter 1, the Introduction, provides an overview and background information to support the research problem. This chapter also highlights the research questions, the significance of the study, and the limitations of the study. Chapter 2, the Review of the Literature, provides a detailed analysis of the constructivist and technology theories relevant to this study in relation to faculty developed course websites, and a dissection of prior empirical research on course website use. Chapter 3, the Methods chapter, describes the study population and sample, the study design, data collection, and data analysis procedures. Chapter 4, the Findings, discusses specific cases based on the participants, the website setting, areas of thematic interest, and constructivist linkages. Finally, Chapter 5, the Discussion, Recommendations, and Conclusions, presents the research results based on perceived value, theoretical and technological linkages, and the broader implications for course website usage.

Chapter 2: Review of the Literature

Overview

This chapter provides a review of the relevant theoretical and empirical research literature on faculty-developed course web sites. The research literature examines the development of two theoretical frameworks guiding this study: one focused on student learning based on constructivism, which influences educational design strategies in faculty-developed instructional websites, and one focused on a technological framework that exposes course website functionality. Faculty-developed course websites provide fertile development opportunities for those educators who wish to incorporate constructivist strategies into their students' digital experiences and master the technological skills needed to design such websites.

Relevant Educational Theories

Constructivist Learning

Constructivism, originally based on Jean Piaget's research about the genesis of learning and the development of cognitive structures, is one of the learning theories shaping educational research today (Gros, 2002). Cain (2005) states the emphasis of constructivism differs from the traditional face-to-face "lecture" model where teachers directly convey knowledge to learners by employing a strategy of collaborative interaction involving active student participation, peer interaction, critical thinking, and reflection. Piaget theorized that the acquisition of cognitive structures occurred through a process of cognitive disequilibrium. Tam (2000) points to a problematic situation or context as the focus of the learning process in constructivism. Chung (1991) viewed constructivist learning environments as guided

instruction settings where small groups of students share knowledge, authority and responsibility with their teachers. Taken together, constructivism embraces a strategy, context, and environment where teachers and students are actively engaged and working together in the learning process. As opposed to educational models where the instructors instruct and the students learn, constructivist environments exhibit collaborative linkages among participants.

Referred to as a psychological theory of learning, constructivism is generally viewed from either dual or dialectic perspectives. Oxford (1997) discusses these two predominant schools of constructivist thought: "those considering the knower or knowledge constructor to be the individual (these are the individual/psychological constructivists), and those viewing the knower of knowledge constructor as the whole society or group or as the individual as firmly embedded in the group (the social/cultural constructivists)" (p. 45). The former group, sometimes called cognitive constructivists, align themselves with a belief that knowledge is acquired actively and is learner constructed. Cognitive constructivists are most often linked to Jean Piaget and his belief that the growth and formation of knowledge is a developmental process involving the "formation, elaboration, organization, and functioning of operational structures" (Piaget, 1964, p. 9). The social constructivists point to the effects of social interactions and culture as arbiters of knowledge construction and are influenced by the work of Lev Vygotsky, among others. According to Oxford (1997), "Vygotsky's social-cognitive constructivism recognized that constructs have social origins; they are learned through interaction with others" (p. 43).

Generally viewed as the progenitor of cognitive constructivists, Piaget focused less on social context, emphasizing the individual learner and how the learner created his or her own

sense of the world (Oxford, 1997, p. 39). Piaget believed knowledge is constructed in the mind of the learner in interaction with objects and subjects in the environment and not received from an external source or from innate understandings. He also believed that development explained learning, as exemplified in his statement: "Development is the essential process and each element of learning occurs as a function of total development, rather than being an element which explains development" (Piaget, 1964, p. 8). According to Gros (2002), Piaget viewed "all learning as the result of interaction between the person that discovers and the object of knowledge, based on an imbalance between knowledge that a person has and the new information he/she receives" (p. 328). Piaget viewed this as an assimilation-accommodation process where new information interacts with prior knowledge, creating disequilibrium that results in the correlation of new cognitive structures, resulting in learning.

Though Piaget's version of cognitive constructivism remains largely accepted, critics take exception with some of his views. Oxford (1997) points to Piaget's acknowledgement of development and learning happening within a social context, highlighting the fact that Piaget was not particularly concerned about the inter-subjectivity that Vygotsky emphasized (p. 39). This perspective is also echoed by Fluery (1998) concerning Piaget's schema theory and how "its emphasis on the individual's active learning process omits consideration of the social context of learning and leaves unchallenged the assumption that an objective social reality exists about which to actively learn" (p. 169). Other critics point to issues with Piaget's research methods and the "lack of attention to individual differences and cultural influences" (Oxford, 1997, p. 39). In defense of Piaget, he did acknowledge the role of societal and cultural influences by stating, "there is no longer any need to choose between the primacy of

the social or that of the intellect: collective intellect is the social equilibrium resulting from the interplay of the operations that enter into all cooperation" (Piaget, 1970, p. 114). Lev Vygotsky (1978), working independently, viewed constructivism as developing understanding through a process of building, shaping and configuring meaning within a social context. He believed that students interact with their world from a culture-influenced social perspective incorporating perceptions, ideas, and experiences to develop new understandings, and argued that cognitive functions originate in social interactions and that learning was more than simple assimilation and accommodation of new knowledge (Vygotsky, 1978). Complementing Piaget's belief that development is the umbrella that incorporates learning, Vygotsky observed that learning processes lead development (Moll, 1990, p. 50). In support of this perspective, Vygotsky pointed to a developmental ordering that started with internalization of social relations that supported the student's construction of knowledge. This is an important consideration that serves to position the learner as an individual interacting within a cultural context. Vygotsky maintained that "learning occurs through social interaction and language and is a necessary and universal aspect of the process of developing culturally organized, specifically human, psychological functions" (1978, p. 90). Elaborating on this point, he postulated that:

> All higher mental functions are internalized social relationships. Their composition, genetic structure, and means of action - in a word, their whole nature - is social. Even when we turn to mental processes, their nature remains quasi-social. In their own private sphere, human beings retain the functions of social interaction (Vygotsky, 1981, p.164).

Cognitive constructivism and social constructivism are complementary approaches that attempt to explain knowledge development and learning though viewed from different perspectives. Despite their differing approaches to explaining knowledge construction, both

Piaget and Vygotsky acknowledged the co-mingled role that intellect and societal/cultural influences have upon knowledge construction. Also important to understanding their individual perspectives are the cultural influences that were in play at the time they were developing their theories. Vygotsky was culturally informed by the communist revolution in Russia. Piaget was influenced by an emphasis in western psychology. Both were shaped by their respective cultures.

Contemporary Constructivist Strategies

Extending the work of Piaget and Vygotsky, contemporary constructivists have developed several new learning theories that focus on knowledge construction. Though many of these theories were proposed with a traditional classroom focus, technological advances have created opportunities for practical implementation that were previously unavailable. Consistent with the growth of computer utilization in education, many of these theories have found practical application reflected in student interactions with various technologies that support knowledge construction. This marriage of constructivism and computing technology is creating new opportunities for educators and students alike to construct new learning. Faculty-developed course websites provide an opportunity to enable these types of interactions.

To fully explore all of the variations and nuances of constructivist theory and thought is outside the scope of this dissertation; however, it is important to consider constructivist theory that has technological implications. Of the constructivist learning theories proposed by contemporary educators and technologists, several have found usage and are supported by computing technology. Three such primary constructivist learning theories that support

application in a technological context include collaborative learning, student-centered learning, and problem-based learning. Graphically (Figure 2.1), these strategies have been represented with an overlapping design to indicate how each of the strategies often employs features of the others. The following discussion is designed to provide some background information about these specific learning theories to support the subsequent technical discussion that occurs later in this chapter.

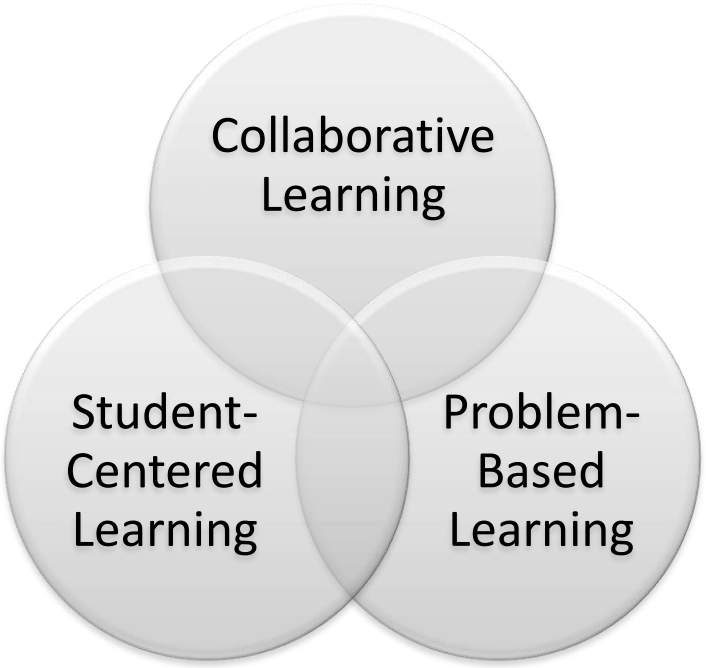

Figure 1. Contemporary Constructivist Strategies

Constructing Knowledge through Collaborative Learning

Directly influenced by the social aspect of Vygotsky's constructivist ideas and John Dewey's experience-centered education, collaborative learning is a broadly interpreted educational approach that involves students working together with each other and/or the instructor in some group dynamic. According to Smith and MacGregor (1992), "Collaborative learning activities vary widely, but most center on students' exploration or

application of the course material, not simply the teacher's presentation or explication of it." One of the best ways to get students actively involved with their learning is to provide collaborative learning opportunities that support social interactions with peers where students "work toward a common goal or vision" (Saltiel, 1998, p. 7). Collaborative learning activities often provide more challenging tasks or problems than other types of learning. Through collaboration, students become practitioners rather than observers, marshalling facts and ideas while developing "higher order reasoning and problem solving skills" (Smith & MacGregor, 1992). The essential dynamic is that interdependent groups of students become teammates in the learning process (Klemm & Snell, 1996). Farahani (2003) describes constructive teachers as those who foster collaborative environments where "students are encouraged to share their ideas, reflect, and value others" (p. 15). Teachers become guides, helping to focus the learner's attention and providing support and guidance when needed. Collaborative learning approaches vary depending on types of activities or duration, involving traditional and non-traditional classroom interfaces. Technology advances involving networked computers and the Internet are creating new opportunities for applying collaborative learning theory using digital resources. Digital interfaces among teachers and students can support constructivist learning through deeper understandings of subject material and knowledge (Farahani, 2003; Anderson & Haddad, 2005). As another example, Klemm and Snell (1996) point to the use of synchronous chat and hypertext-based conferencing to support collaborative learning within a networked environment. In further support of social interaction and learning, other research is exploring the use of Computer Supported Collaborative Learning (CSCL) tools to enable electronic messaging, delayed collaboration, brainstorming, real-time writing, and other multimedia or hypermedia

interactions (Bonk, Medury, & Reynolds, 1994). While, in other research, newer collaborative interactions are being explored. Among these, one of the most intriguing is occurring in immersive environments, such as Second Life, where students create "virtual representations of themselves that interact in real-time within a three-dimensional virtual world" (Segfl, 2008).

Constructing Knowledge through Student-Centered Learning

When defining constructivism, Klemm and Snell (1996) state that it "is the idea that a student is an active learner who constructs a personal base of knowledge and understanding." Consistent with Piaget's, Vygotsky's, and Dewey's perspective regarding active participants, this idea places the student at the center of the learning activity and establishes a personal context in which the learner interacts with learning experiences. Gibbs (1992) defines student-centered learning as "a process by which students are given greater autonomy and control over the choice of subject matter, the pace of learning, and the learning methods used." This student-centered approach meets constructivist objectives and involves the learner in knowledge construction as compared to a teacher-centered approach that relies on transmission of knowledge.

Weimer (2002) identifies five changes in teaching practice that are critical in supporting student-centered learning environments. These five changes include

- changing the power dynamic by shifting the power from the teacher to student;
- re-thinking the function of content and how it is used by the learner to construct knowledge;

- changing the role of the teacher to one of facilitator and contributor, rather than knowledge expert;
- making students responsible for learning by helping them develop the "intellectual maturity, learning skills, and awareness necessary to function as independent, autonomous learners";
- using effective assessment that promotes learning.

Though these five changes were proposed for traditional classroom integration, they are also applicable to the digitally-enabled learning environment. When the classroom shifts to an online interface, a power shifts occurs transferring control from the teacher to the user interacting with the technology. Also important, the function of content and the role of the teacher change as well, with teacher becoming the technical facilitator of content delivery. The interactive nature of the interface serves to transfer the responsibility for learning from the teacher to the student. Finally, the technology provides the means for effective assessment that contributes to additional learning.

Constructing Knowledge through Problem-Based Learning

Combining aspects of collaborative learning and student-centered learning, problem-based learning (PBL) is a social constructivist strategy involving active learning where group members often work together to develop solutions for complex problems. At the foundation of problem-based learning is the problem itself. Barrows (2000) defines problem-based learning as an active learning method that utilizes ill-structured problems that stimulate learning. Students are challenged by problems that "have no single correct answer but require learners to consider alternatives and to provide a reasoned argument to support the

solution that they generate" (Hmelo-Silver & Barrows, 2006, p. 24). According to Dunlap (2005), "PBL's learner-centered approach engages students in an iterative, continuous process of building and reshaping understanding as a natural consequence of their experiences and interactions with problems of practice" (p. 66).

Enabling problem-based learning requires investments of a teacher's skill and time to design problems that are relevant to course content and devise strategies to assist students with independently locating information that will help them arrive at a well-conceived solution to the particular problem. Very similar to student-centered learning, the problem-based teacher facilitates student learning by purposely diminishing his/her role in the learning process as the students take on increasing responsibility for their own learning. Teachers "guide students in the learning process, pushing them to think deeply, and model the kind of questions that students need to be asking themselves" (Hmelo-Siler & Barrow, 2006, p. 24). Though enabling problem-based learning requires more effort than traditional teaching methods, studies indicate that students are better able to apply their knowledge, implement cooperative learning skills, and develop leadership abilities (Oberlander & Talbert-Johnson, 2004, p. 48)

Problem-based learning and Barrow's phases fit well with computer-enabled learning environments due to the ease of information access provided by Internet connectivity to online databases. Supporting this perspective, Jonassen, Peck, and Wilson (1999) highlight a need for technology and software that play a role in helping the learner find solutions to problems in constructivist learning environments. The primary consideration is that the technology takes a backseat to the learning, providing the means by which the student develops understandings that can be employed to solve "ill-structured" problems. As an

example, Choi (2003) documents the successful delivery of problem-based learning to nursing students using online technology. In this example, Barrow's phases are facilitated by technology as the computer is used by students to collaborate, gather information, and test their ability to identify problems from a real-world perspective, eventually leading them to an effective problem resolution. The technology facilitates the learning by supplying digital tools that help the student organize ideas, search for information, communicate with others, and present their ideas and revelations.

The Technological Context – Internet Usage in Higher Education

According to Less (2003), "technology enhancement in the classroom is the educational genre of the 21st century." Validating this focus, the Campus Computing Project conducts annual surveys of two-year and four-year public and private institutions providing the longest continuous study of the role of information technology and e-learning in American higher education. With the exception of network security, survey respondents, since 2000, have consistently identified "assisting faculty with the instructional integration of technology" as the top IT challenge for their respective institutions (Green, 2006). Among the various types of technology used for instruction integration, often discussed are those that enable information-sharing and those that support communications between students and faculty (Less, 2003; Green, 2000). Included among the more common applications of technology used within traditional courses are the creation of course websites and the use of the Internet to enable information-sharing and communications functionality (Grasha & Yangarber-Hicks, 2000). Jafari (1999) maintained that traditional courses, augmented with Internet components such as course websites, enhanced teaching and learning.

Faculty-developed course websites exist within a technical domain that involves Internet delivery of course website content. Supporting course website functionality requires networked personal computers, larger computers that house and serve web resources to users, software applications that assist with web page design and display, and Internet connectivity. The usage of computers in education, distance learning strategies, and technology supporting this functionality enjoys a long history and is well documented in the research. To narrow the scope of this part of the literature review, the following discussion is designed to frame this technical domain from a web-enabled learning perspective and provide an in-depth review of the empirical literature involving faculty-developed course websites.

The advent of the World Wide Web (WWW) combined with student access to Internet resources has created opportunities for extending educational reach in non-traditional ways. According to Madden (2006) of the Pew Internet and American Life Project, a recent survey indicates that more than 73% (about 147 million) of American adults now have access to the Internet, with 42% of those using high-speed broadband connections. For the predominant college age groups, 18-29 years and 30-39, these numbers increase to 88% and 84%, respectively (Madden, 2006). Many of these adults are using their Internet connections as educational interfaces that provide access to distance learning, resources used in traditional classes, and for collaboration and communication. Educational usage of the Internet and the WWW is a logical outgrowth of a viral technology that is growing at an epidemic rate and changing not only education and learning, but society itself.

Faculty-developed course websites are generally used to provide course and instructor information and augment traditional face-to-face classes. Lightfoot (2005) describes several

benefits that can be derived by employing electronic components that augment the traditional classroom. Lightfoot explains:

> The intent is to show that web enhanced education and high quality education are not mutually exclusive concepts. On the contrary, by carefully incorporating electronic components where they are best suited, a tremendous educational synergy can be achieved. The result is a learning environment that is better than either a traditional lecture-based course or a fully on-line course. (Lightfoot, 2005, p. 210)

Lightfoot's research provides an illuminating perspective on how web enabled technologies, such as course websites, can be used to address concerns with pedagogy. Specifically, Lightfoot highlights seven principles developed by Chickering and Gamson (1997) that he used to clarify subsequent goals of technology integration. Table 1 illustrates how technology additions can be used to augment traditional approaches and address the seven principles.

Table 1

Summary of Traditional and Technology Based Components (Lightfoot, 2005, p. 217)

Pedagogic Principle	Traditional Approach	Technology Addition
Student Cooperation	• Group projects • Class discussion • Peer review • Study Groups	• Threaded discussion groups • PC based video conferences • Email
Student-Faculty Interaction	• Class lecture • Office hours • Student clubs • Sponsored social events	• Email • Virtual office hours • FAQ web page • Archive digital video to web

Active Learning	• Projects
	• Homework
	• Library research
	• Learner-centric classes
		• Use web to bring in outside resources
		  ○ Library resources
		  ○ Live data feeds
		  ○ Simulation sites
		  ○ Industry contacts
		  ○ Inter-university contacts
		  ○ Textbook website
		• Electronic tutor and quiz system

Prompt Feedback	• Class time interaction • Office hours • Written comments on work • Grades on work	• Email communication • Virtual office hours • Computer-aided instruction systems • Quiz systems

		• Peer review via threaded discussion tools • Web-enabled grade lookup

Time on Task	• Setting schedules
	• Project milestones
	• Due dates
	• Homework
	• Projects
		• Class web site for scheduling info
		  o Syllabus
		  o Project handouts
		  o Notes, slides
		  o Project Assignments
		• Last minute announcements via web site
		• Email distribution lists
		• Computer-aided instruction

High Expectation	• Written policies (syllabus) • Verbal instructions • Clearly written assignments with deliverables • Showcasing "excellent" peer work	• Class web site o Syllabus, Project handouts • Web pages for excellent peer work • Voice explanations and instructions • AV multimedia demonstrations • Simulations systems

Diverse Learning	• Cover material using various methods
	  o Lecture
	  o Hands-on problems
	  o Drill and Practice
	  o Textbook reading
	  o Group work
	  o Library Research
		• Archive AV lecture for web distrib.
		• Hands-on work via web site
		• Computer-aided drill and practice
		• On-line lectures summary printouts
		• Threaded discussion groups
		• Hyperlinks for outside content
		  o Library websites
		  o Commercial websites
		  o Textbook website
		  o Web-based training

Lightfoot's comparison of traditional and technical approaches point to several opportunities for technical integration that are often addressed by faculty-developed course websites. Particularly relevant from a constructivist perspective, the pedagogical principle specific to active learning and diverse learning highlight web-enabled functionality that can be used to help the learner construct knowledge. Also important, the pedagogical principle specific to student cooperation and student-faculty interaction are addressed by collaborative web-based interaction that is also important from a constructivist perspective. Finally, the pedagogical principles specific to prompt feedback, time on task, and high expectations are addressed by web-enabled functionality that supports information dissemination, computer-aided instruction, and feedback mechanisms that support the learner.

Collectively, the course website technology additions described by Lightfoot augment traditional practices and provide benefits to both students and instructors; students have access to additional resources and instructors are able to facilitate information delivery and learning via an interactive interface. Increasing use of the web-enabled technology is changing the educational landscape and expanding the opportunities for instructors utilizing faculty-developed course websites.

Prior Research on Faculty-Developed Course Websites

The focus of this section is a review of the current research that addresses faculty-developed course websites. Compared with numerous studies involving other technological enhancements such as online learning or distant learning, faculty-developed websites have limited, though valid, exposure from a research perspective. A thorough review of the research highlights a range of studies dealing with course websites from a variety of relevant perspectives. Among these, relevant topics include website creation (Brown, 1997; Hazzan, 2001; Jensen-Lee & Falahey, 2002; Robin & McNeil, 1997), website evaluation (Heines, 2000; Yilmaz & Tuzun, 2001; Zaner & Wilson, 2003), attitudinal studies (Huff, 1997; Frey, Faul, & Yankelov, 2003; Sanders & Morrison-Shetlar, 2001; Selim, 2002; Witt, 2004), website effectiveness (Comunale, Sexton, & Pedagano-Voss, 2002; Heffler & Cohen, 2005), technology acceptance (Ignatius & Ramayah, 2005; Selim, 2002), gender and race (Ramayah & Mohamad, n.d.), and perceived benefits (Ballard, Stapleton, & Caroll, 2004; Debevec & Shih, 2006; Friedman, 2006; Leung & Ivy, 2003; Murphy, 2002; Witt, 2003). It is expected that exploration of course websites will be ongoing as digital technologies continue to be used in educational contexts. Existing research studies involving course website usage are

primarily student-centered, with a few studies taking a faculty-centered, design-centered, or a combined approach with elements of each.

Student-Centered Focus

A consistent thread running through the existing research is the student expectations regarding course websites and the online availability of course information (Robin & McNeil, 1997; Sanders & Morrison-Shetlar, 2001). Several studies report that students view web-enhanced courses positively, preferring the addition of web-enhanced components in their courses (Frey, Faul, & Yankelov, 2003; Heines, 2000; Sanders & Morrison-Shetlar, 2001). However, research differs on how students value specific course website features. According to Huff (1997), students viewed web access to current readings, greater access to data collection, and virtual field trips centered on learning objectives as the most helpful. According to Frey, Faul, and Yankelov (2003), students perceived course information as most important though used the least often. Leung and Ivy (2003) asserts that students make most use of web components related to their grades, finding these the most useful when accessing a course website. Findings from Sanders and Morrison-Shetlar's (2001) study support student preferences for instructional resource access, quiz taking, and viewing grades. Similar findings are also echoed by Ballard, Stapleton, and Carroll (2004). Students in their study ranked announcements, grade access, and access to assignments and documents as the most commonly used features. Findings from Bonds-Raacke (2006) indicate positive acceptance of course websites, particularly completing course assignments online. Likewise, students in Heffler and Cohen's (2005) study rate the use of and access to the course website highly. Finally, Debevec and Shih (2006) indicate that a majority of students in their study

appear to be integrating course site access and activities into their course preparation and study routines. Taken together, research support is consistent in regards to what is perceived as valuable content on course websites.

Other findings indicate that students may have difficulties utilizing course websites or find little value in some course website content (Yilmaz & Tuzun, 2001). Of the content that is typical of most course websites, students found web-assisted strategies designed to facilitate communication such as discussion groups, student contact lists, and instant messaging activities as least valuable (Comunale, Sexton, & Pedagano-Voss, 2002; Frey, Faul, & Yankelov, 2003; Murphy, 2002; Sanders & Morrison-Shetlar, 2001). Further, students disagree on the usefulness of links to other research sources (Murphy, 2002), with few students taking advantage of resource links provided by instructors (Leung & Ivy, 2003). In some cases, students have difficulty locating course websites and accomplishing navigation tasks once online (Bonds-Raacke, 2006; Jensen-Lee & Falahey, 2002). Also, students cite issues with home Internet access and having to use college resources (Jensen-Lee & Falahey, 2002), defeating some of the convenience intended by course website design. Ballard et al. (2004) posits that instructors requiring the use of course websites could present difficulties for some students, expressing a need for assessing students' computer skills and providing initial guidance for course website usage.

Faculty-Centered Focus

Witt (2003) points to a variety of reasons why instructors create course websites, including facilitating communications, enabling interactions with course materials, providing content not covered in class, enhancing their own credibility among students, or some other

reason not directly related to teaching. Brown (1997) suggests the use of course websites to improve communication, support testing functionality, and as a platform to present substantive reading, listening, and viewing resources. Regardless of the reasons, there appears to be general agreement in the research that creating a course website is a significant undertaking (Heines, 2000; Leung & Ivy, 2003; Witt, 2003) and instructors should consider the purpose of a site prior to development (Ballard, Stapleton, & Carroll, 2004; Hazzan, 2001; Horton, 2000). In most cases, this work is perceived favorably by students as indicated in the prior discussion. However, "some instructors believe that the benefits of a course web site are overstated relative to the effort require to create and maintain a high quality, effective site" (Comunale, Sexton, & Pedagan-Voss, 2002). Nevertheless, there is general support in the research that the instructor's investment of time and energy spent developing course websites is compensated by the value students derive from their use (Ballard, Stapleton, & Carroll, 2004; Frey, Faul, & Yankelov, 2003; Leung & Ivy, 2003; Murphy, 2002; Sanders & Morrison-Shetlar, 2001; Witt, 2003).

Of the few studies that focused on faculty development of course websites, opinions generally agree regarding what is considered most beneficial. Faculty, responding to Murphy's (2002) study, when asked what aspects of course websites were most beneficial, ranked efficient and effective communication, increased awareness of technology, and the practical experienced gained by working with current technology the highest. Instructors in Ballard, Stapleton, and Carroll's (2004) study indicated that document posting and communications functionality provided the most benefit. Last, when asked why they created their websites, instructors in Witt's (2003) study cited course information access, promotion of communication with teachers and classmates, helping students learn online, and aiding the

teacher in delivering classroom instruction as the primary reasons. Taken together, the research validates an implied consensus that course websites are designed to augment traditional information-sharing in the classroom and streamline interactions.

There is general agreement in the research that course website development requires a significant investment of instructor time and effort and a comfort level with web development technology (Heines, 2000). However, research also indicates there is an underlying reluctance to implementation, underscoring a need for additional research that validates the worth of course websites (Heffner & Cohen, 2005; Witt, 2003). In some cases, the technological requirements are viewed as obstacles contributing to an avoidance of development activity (Heffner & Cohen, 2005). In other cases, instructors cite the overhead of reorganizing current materials as obstacles along with the effort of responding to students who use the Web for extended office hours (Comunale, Sexton, Pedagano-Voss, 2002). For those who overcome these obstacles, research indicates that instructors put more time, effort, and thought into site development because course websites are generally public interfaces accessible by anyone (Hazzan, 2001). Of the instructors who implement course websites, most agree that the sites have increased their ability to provide information to their students (Hazzan, 2001; Jensen-Lee & Falahey, 2002; Murphy, 2002), justifying the investment made in site development activities. A large majority of those involved in Witt's (2003) study reported a "substantial reliance" on their course website, viewing their efforts as time well spent when compared with the perceived "effectiveness of the teaching/learning experience."

Technology's Role in Enabling Constructivist Learning

The web environment is conducive to constructivist activities, allowing learners to work individually or in groups. Easy access to the Internet and the WWW supports the students' ability to research subjects, organize information, and collaborate with their instructors or other students. An abundance of easily accessible resources supports the instructors' ability to convey information and craft lessons that extend learning beyond traditional means in non-linear fashion by using hyperlinks and hypermedia. Both the students and instructors become participants in a technological outreach that supports constructivist learning that is mediated by a socio-cultural interface.

Commenting on the WWW's capabilities for information access, sharing resources, and hypermedia foundation, Ibrahim and Franklin (1995) anticipated that pedagogical uses of the WWW would evolve along two major axes:

1. "use of the technology on a closed corpus of educational material, for the hypermedia and distance delivery capabilities of the web, on one hand, and"
2. "use of this technology on an organized structure of links for an open corpus of material that was not necessarily meant initially for pedagogical use, but which can be 'redirected' and exploited in guided educational explorations."

The closed corpus strategy involved developing "hyper-courses" that relied on instructor-created content or licensed course management applications and simply used the web to provide distant access to the material. The open corpus strategy was designed to "exploit the enormous amount of information that is accessible via the Internet, whether it has been put there for educational purposes or not" (Ibrahim & Franklin, 1995). Though written long before today's prevalence of distance learning and blended classes, Ibrahim and

Franklin's perspective proved to be prescient from a functional perspective. Faculty-developed course websites that deliver only instructor-provided content fall within the closed corpus strategy, while those that utilize external information such as provided by web-quests and news sites are more aligned with the open corpus strategy. As Ibrahim and Franklin (1995) indicated, the two strategies "are not antagonistic but can be alternatively or complementarily followed."

One of the areas where the Internet and the WWW have been used extensively in education is Web-Assisted Instruction (WAI), Web-Based Instruction (WBI), or Web-Based Learning Environments (WBLE). Typically Web-Assisted Instruction is used to augment traditional face-to-face classes, by using the Internet to deliver course content and course-related materials to students. Web-Based Instruction is another term for distance learning or online learning and involves using the Internet to provide an online course application or "shell" that becomes the virtual analog of the traditional classroom. Web-Based Learning Environments are designed to address a variety of purposes and vary based on the originators' identities, the goals, the target population, pedagogical concepts, or technological considerations (Mioduser, Nachmias, Lahav, & Oren, 2000). WAI, WBI, and WBLEs can all be used to take advantage of web technology that links students to learning objects and collaborative tools such as discussion boards, instant messaging, and listservs. Of the three, faculty-developed course websites would fit best within the Web-Assisted Instruction niche.

Relevant Technology Design Theories

The interdisciplinary field of technology studies contributes a great deal to our understanding of the factors that influence technology design. Literature on science, technology, and society (STS) has produced two theories of relevance to this study: *social constructivism* and *appropriate technology*. Those subscribing to the former view believe that technology is not developed purely as a result of scientific, rational principles; rather, social, political, and economic/business factors play a role in technology design (MacKenzie & Wajcman, 1999; Pool, 1997; Pacey, 1983). A related philosophy goes a step further, conveying the need to design technologies that are *appropriate* to end-users in complexity and scale (Hazeltine and Bull, 1999) and that serve human needs (Pacey, 1999).

Engineering and technology management literatures also contribute to our understanding of the need to design technological products for *usability* and processes for *manufacturability* (Norman, 1993; Haddad, 1996, 2002; Mayhew, 1999). This concept of usability applies very directly to the design of websites (Buckingham Shum & McKnight, 1997).

Constructivist Course Design Strategies

According to Gros (2002), "In traditional approaches to teaching, it is the designers that make the decisions regarding what students have to learn, in what contexts they should learn, what strategies they should use to attain this knowledge, and how this acquisition should be evaluated. The constructivists exchange a traditional educational approach for a more flexible concept of learning, in which the learning process is not so prespecified. Design is an iterative problem-solving process that should be modified according to the

results obtained" (p. 338). To support this more flexible learning, constructivists employ problem-solving that mirrors real life situations and oppose educational styles that stresses memorization and knowledge acquisition in an isolated and out-of-context manner. To enable this alternative, constructivists "place greater emphasis on learning contexts that enable knowledge to be constructed, organizing the contexts with activities that are closer to the real world, and which normally involve discussion groups" (p. 339).

As discussed earlier in this chapter, the core of constructivism involves the user actively constructing knowledge and meaning based on their experiences (Fosnet, 1996) and understanding "that while reality may exist separate from experience, it can only be known through experience, resulting in a personally unique reality" (Doolittle & Camp, 1999). Important to the learner's construction of this reality are the interactive and collaborative strategies employed to assist with knowledge creation (Cain, 2005; Farahani, 2003). Supporting constructivist design, various researchers have developed guiding principles and models that serve to focus discussion and build a framework that helps define learning objectives. To develop a model that would help define faculty-developed course websites from a constructivist perspective requires an exploration of some of these guiding principles and design models.

Starting with the basics of constructivist learning, Doolittle and Camp's (1999) interpretation of Von Glaserfeld's tenets of constructivism yields the following list:

- Knowledge is not passively accumulated, but rather is the result of active cognizing by the individual;
- Cognition is an adaptive process that functions to make an individual's behavior more viable given a particular environment;

- Cognition organizes and makes sense of one's experience and is not a process to render an accurate representation of reality; and
- Knowing has roots both in biological/neurological construction and in social, cultural, and language-based interactions (Doolittle & Camp, 1999).

Doolittle and Camp's four premises provide the basis for knowledge construction and acquisition. By recognizing the role of the learner in knowledge construction and the active cognition that is required to accumulate knowledge, adapt to one's environment, and organize knowledge, these tenets place the learner at the center of the learning. By acknowledging the role of biological, neurological, social, cultural, and language-mediated learning, these tenets provide logical linkage to Piagetian and Vygotskian constructivist roots. Finally, these principles inform guiding constructivist objectives that can be used to model technological interactions reflected in the web-based environment.

From a design perspective, enabling the constructivist learning environments involves supporting collaboration, learner autonomy, reflexivity, and active engagement (Duffy & Jonassen, 1991). Generally considered one of the leaders in developing constructivist learning models, David Jonassen is actively involved in contemporary research on constructivist environments that exhibit learner-centered, collaborative, and active learning features. Related to Doolittle and Camp's guiding assumptions, Jonassen, Davidson, Collins, Campbell, and Haag (1995) proposed four essential features that are necessary to support constructivist learning environments: context, construction, collaboration, and conversation.

The context feature is designed to link the learner to the real world by enforcing learning with tasks that actually translate to legitimate productive activities. The construction feature acknowledges the constructivist role of knowledge building that occurs

as a learner interacts with a learning activity. Kwon (2004) equates this to the "physical, organizational, cultural, social, political, and power issues related to the application of the knowledge being learned" (p. 128). The collaboration feature supports the sharing of thoughts and strategies between learner peers and the instructor, enabling interactions that help knowledge creation and modification. Finally, the conversation feature recognizes the role of language in mediating knowledge construction and supports reflective activities with other learners.

Expanding on their previous work, Jonassen et al. (1999) developed a conceptual model that is directly relevant to constructivist design specific to web-based environments. The model (see Figure 2.2) is based on a layered approach that reinforces the learner's ability to arrive at a problem solution and reinforces the usage of context, construction, collaboration, and conversation. At the core of the model is the problem itself and the problem space or context that the user interacts with to understand the problem, perform simulations, and manipulate parameters. Contextually, the problem is defined by social, cultural or physical parameters that ideally have some basis in real-life situations. Supporting this problem space context, Jonassen envisions student interactions via simulations that provide opportunities for experimenting and manipulating the project space.

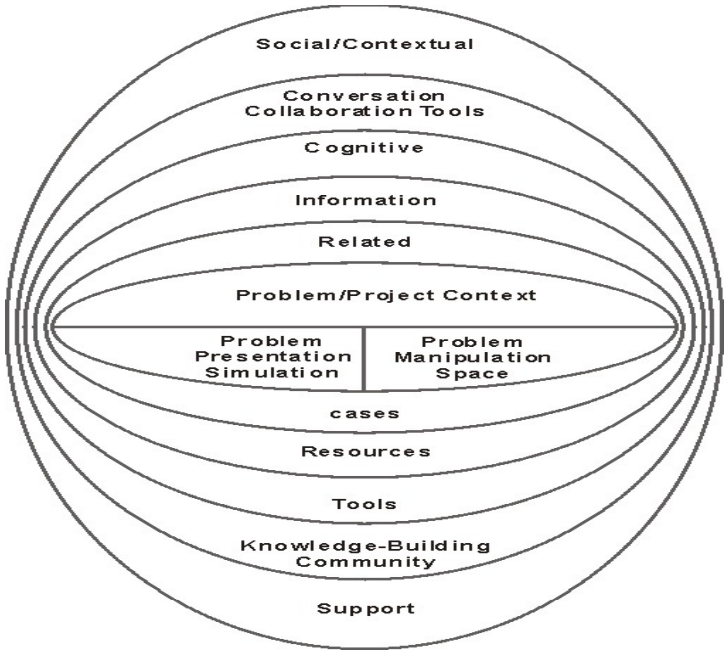

Figure 2. Constructivist Learning Model (Jonassen et al., 1999, p. 195)

Wrapping the core of Jonassen's model are various layers that build a framework for the learner that encourages active exploration, collaboration, experimentation, conversation, and contextualization. First, the learner is supported by related information in the form of cases that provide a real-life context and can be used from a comparison perspective to help understand the problem. Supporting the students' need for information, the next layer represents the variety of resources provided to the learner to support problem research activity. Building on the previous layer, the next layer acknowledges the contribution of cognitive tools that assist the learner in thinking through the problem while incorporating the information. Recognizing the collaborative nature of constructivist learning, the next layer girds this activity by providing the means by which students can converse and work together. Lastly, the final layer legitimizes the purpose of helping the student understand how the problem fits within a social or cultural context that is transferrable to real situations.

The usage of technology for providing constructivist learning activities is increasing. This is important from a design consideration because the usage of a technology does not always lead to learning innovation. Gros (2002) posits, "It is necessary to let technology show us what can be produced and for the educators to then determine what should be used, when it should be used and what is the most beneficial way it should be used for personal development and learning" (p. 324). From a constructivist perspective, learning environments that rely on technology can be characterized by the use of student-centered technology, by tasks that are realistic as possible, and subject to social change and evolution (Gros, 2002, p. 333). Consistent with this perspective, multi-media integration and the Internet are now being used extensively to facilitate constructivist strategies and student-centered activities. Future design efforts need to anticipate increasing integration with technology.

Based on the work of Andrie Meyer (1998), Table 2 provides an interesting comparison of how constructivism and computers support one another. Though not a design strategy, Meyer views computers and constructivism as complementary extensions of educational outreach, one that links users to learning through a physical mechanism while the other links students to learning through a knowledge creation strategy. Together, they form a partnership where one facilitates the strategies engendered by the other. Though constructivism appeared on the educational landscape long before computers, the outgrowth of the technology has extended the reach of constructivist learning strategies beyond the traditional classroom.

Key to Meyer's perspective regarding the computer's contribution to constructivism is the ability of the technology to play a surrogate role in enabling learning. Extending the

reach of the educator, the computer can be used to engage learners, support experiential education, create knowledge in virtual situations, provide collaborative opportunities, and evaluate learners. Also important, the computer supports individualized learning programs and feedback mechanisms, and provides the learner the opportunity to use discovery and imagination as part of the learning process. Computers extend constructivist strategies across virtual domains of learning.

Complementing the capabilities provided by computers, Meyer views constructivism as a strategy that mediates how the technology is used. Like the previous constructivist discussion, Meyer paints constructivist-technology influences as being student-centered, facilitative, self-paced, cooperative, and capable of motivating by achievement. Also relevant, Meyer acknowledges how the strategy supports independent evaluation, assessment, and exploration through discovery. Constructivism extends the usage of technology through a knowledge creation context and an interactive digital interface and brings a new "language" into knowledge construction.

Table 2

Constructivism and Computer Technology Comparison (Meyer, 1998)

What computers bring to Constructivism	**What Constructivism brings to computers**
Computers & educators Ability as a virtual working environment and cognitive tool, containing the curriculum based programs, instructional design programs in relation to live issues, and outcome based objectives. Computer as surrogate teacher for setting tasks; and gender free classroom.	**Educators & computers** Development of cognitive strategies; prompting ideas; presenting the setting which is conducive to learning in a virtual environment.
Computers and learners Engage and hold learners' attention; unique access to learning experiences; central aim of most instructional software is cognitive development; *externalize*	**Learners and computers** *Cognitive* behavior: knowing and thinking about virtual learning environment; learner-computer interaction: formation and use

learners' thinking; *presenting problems* for individual development of cognitive skills; opportunities to investigate and *discover* through simultaneous use of verbal medium, sound, text and images (graphics) in interactive multimedia. Modeling software for cognitive learning.	of concepts; organization of knowledge; *problem solving* experiences. Locus of control centered on learner. Individual learning styles are present. Learners maintain high level of control over learning experience.
Intervention Provide use of *cognitive models of instruction* built into multimedia software, related to experiential and activity based education; use of mnemonics.	**Facilitation** of *cognitive and skills development* activities with the aid of multimedia; including management of situated learning opportunities and facilities; use of questions or discovering answers.
Individualized learning programs Getting each student involved with learning plans designed to meet *individual* needs, interests and abilities; individualized/natural learning environments.	**Working as individuals** Selection and modulation of *own internal processes of thinking*; selection and absorption of information and decisions/ choices at own pace. Cognitive focus: memory, application of knowledge to find new solutions.
Software and cognition Metacognition and mental models: problem solving in collaborative setting; scaffolding with support materials and support processes; transfer: restructuring and application of knowledge in new virtual situations. Application of modeling software and databases.	**Working in groups** Cooperative and individual group learning; *group interaction*: communication between group members, including *cooperative problem solving exercises* with the aid of multimedia software. Scaffolding by peers.
Evaluation Responsibility of learner success rests with instruction: time available for all students to achieve same level of learning.	**Evaluation** Mastery learning: learners work independently and are evaluated on their own achievements.
Feedback ability Programmed feedback modi in software.	**Feedback** Selecting and reacting to feedback data: assessment, corrections, advance to next level or experiential learning situation.
Motivation Virtual presentation of practical results.	**Motivation** Intrinsic award: experience of achievements/ solutions to problems.
Playing Learning medium with opportunities for discovery and imaginative thinking, such as adventure games, problem solving and incidental learning. Accommodate integrated learning.	**Discovery** Exploration of images, sounds, text, stories and ideas, facts, figures and consequences. Exploration to develop physical and social skills and general cognitive possesses.

As a final example of how computing technology can support constructivist learning, Oliver and Hannifin (2000) presented a taxonomy (see Table 3) listing constructivist tasks with associated web-based resources that support the goal of the task. As the previous discussion confirmed, this design strategy also recognizes the benefits provided by linking constructivist activities with technology.

Table 3

Taxonomy of Constructivist Tasks (Gros, 2002, p. 338)

Constructivist Tasks	**Tools to support Active Student Processing of Web-based Resources**
Plan appropriate tactics, establish personal and group goals	Action of goal manager; web-based project planning
Discuss or debate internal conceptions and receive feedback	E-mail, listservs, bulletin boards, videoconferencing
Seek and collect external information	Bookmarking, digital drop boxes, Globe Web and so forth
Organize external information into internally coherent framework	Software to construct tables, charts, diagrams, timelines, concept maps, and so forth
Generate new information	HTML text editors, web page generators, collaborative web editing, word processors, and so forth
Manipulate external information and variables to test and revise internal hypothesis of models	Simulations, microworlds, etc.

Through constructivist design strategies, educators and technologists have joined together to develop new learning resources in the online environment. This section has presented several examples of research that either define constructivism or explain how technology can be used to support constructivist learning strategies. This material provides the basis for the following discussion on how these design strategies can be incorporated into a course website evaluation model.

Constructivist Taxonomy for Course Website Implementation

Jonassen (1991) details several course design principles that support constructivist concepts involving cooperative learning, knowledge sharing, reciprocal learning, interactivity, and problem-based learning, among others. Suggested guidelines include

- Create real world environments that employ the context in which learning is relevant.
- Focus on realistic approaches to solving real-world problems.
- The instructor is a coach and analyzer of the strategies used to solve these problems.
- Stress conceptual interrelatedness, providing multiple representations or perspectives on the content.
- Instructional goals and objectives should be negotiated and not imposed.
- Evaluation should serve as a self-analysis tool.
- Provide tools and environments that help learners interpret the multiple perspectives of the world.
- Learning should be internally controlled and mediated by the learner (pp. 11-12).

Though developed for the traditional classroom, many of Jonassen's (1991) guidelines translate well to online implementation. Linking learning to real world context and supporting conceptual interrelatedness is easily supported by hypertextual links to Internet enabled content (Comunale, Sexton, & Pedagano-Voss, 2001; Hazzan, 2001). Similar functionality also supports learner understanding and interpretation of multiple perspectives, with additional benefit provided by immersive technology such as hypermedia (Ballard, Stapleton, & Carroll, 2004). Acting as the site designer and developer, the

instructor is substantially involved in strategy analysis and coaching students via explicit instructions or navigational interfaces (Jensen-Lee & Falahey, 2002). Integrated communication functionality supports objective negotiation, and automated evaluation tools support self-analysis (Bonds-Raacke, 2006; Murphy, 2002). Finally, available anywhere/anytime interface, properly designed and implemented, provides the necessary flexibility for user control and mediation of learning experiences (Ballard, Stapleton, & Carroll, 2004).

Cain (2005) discusses web-based technologies and how they can be used for knowledge discovery and learner collaboration, both key principles of constructivism. The pervasive and expansive nature of the Internet supports learner access to resources that assist with solving problems and constructing knowledge. Faculty developed course sites that integrate and support internal and external information access via hyperlinks and hypermedia employ constructivist strategies. Alonso, Lopez, Manrique, and Viñes (2005) view hypertext and hypermedia as one of the most beneficial tools for the constructivist designer because it supports branched design rather than a linear format of instruction. The result is learner controlled and learner mediated, where a faculty enabled interface becomes a link to web-based constructivist learning. Along similar lines, the collaborative aspects of constructivism are supported by web-enabled conferencing tools providing "a path for learners to communicate in nontraditional manners to share and explore knowledge from one another" (Cain, 2005).

Course websites, designed to address the guiding objectives proposed by Dolittle and Camp (1999), the design principles proposed by Jonassen (1991; 1995; 1999), and incorporating computer interactions as envisioned by Meyer and others, have the potential to

enhance constructivist strategies, engage students, and support learning. A visual framework linking theoretical constructivst influences as categorized by Dolittle and Camp's constructivist guiding objectives to the technological functionality features of faculty-developed course websites is depicted in Figure 3.

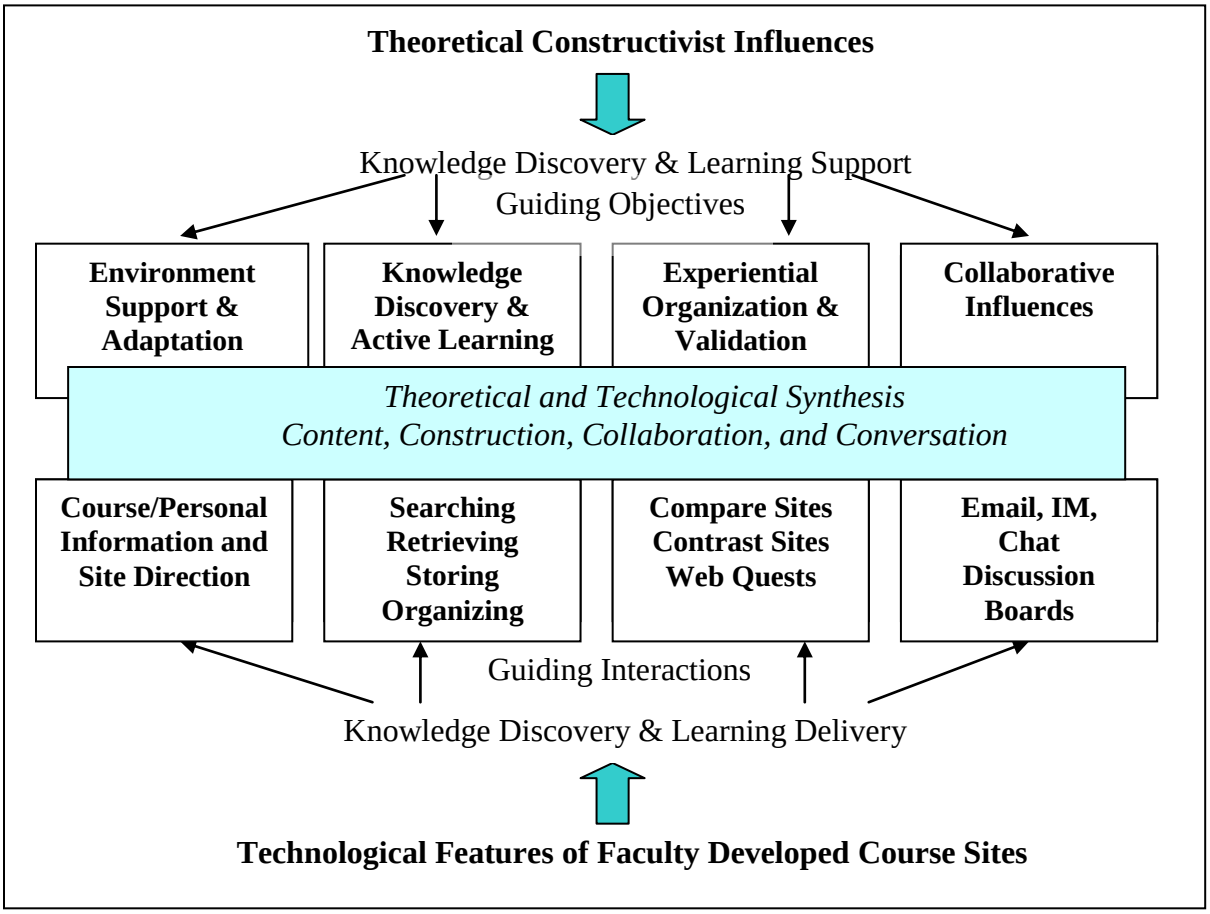

Figure 3. The Intersection of Theory and Course Website Technology.

In this design, the guiding interactions enabled by instructors in faculty-developed course sites, complement the guiding objectives central to constructivism as proposed by Doolittle and Camp (1999). The design principle specific to active learning is addressed by the active involvement of students, using web-enabled course sites to search, retrieve, store and organize information. The design principle specific to environment support and

adaptation is addressed by instructors providing course information, site directions and utilizing networked resources and hypermedia to support web-quests. The design principle specific to experiential organization and validation is addressed by using networked resources and hyperlinks to reinforce knowledge via multiple sources that compare and contrast information via external links or webquests. Last, the design principle specific to collaborative influences is supported by the use of communication and feedback technologies. Taken together, the model suggests a reality where theory and context meet, enabling a synthesis of theoretical and technological constructs that support constructivist activities and effectively engage learners.

Doolittle and Camp's (1999) distilled objectives create a focus of opportunity for faculty developing web-based course content. To support knowledge construction via active learning, course sites could include Internet activities involving initiating searches, retrieving results, storing data, and organizing information. To help learners symbolically construct knowledge and adapt to their environments, course sites could include web-based activities with directed site identification and other activities that lead the learner to information of interest. To assist learners with theoretical understandings of knowledge, sites could be designed that take advantage of multiple levels and perspectives of content information available on the Internet. Finally, to validate learners' knowledge that is socially constructed, site design could include computer mediated communications tools such as email, instant messaging, chat, and discussion boards. This theoretical framework is used in the subsequent case study analysis and results chapters to structure the discussion on the perceived value of faculty-developed course websites.

Chapter 3: Methods

Overview

This study is a case-study examination of faculty-developed course websites and their usage within a single midwestern community college environment. Its purpose is to develop an understanding of the perceived value of selected course websites from both student and faculty perspectives based on website design and use. Hammersly and Atkinson (1995) viewed concrete descriptions as representations of the phenomena they explain, providing a rounded picture that contributes to theoretical understandings (p. 208). Within this context, this study describes many of the phenomena experienced by specific community college students and faculty when interacting with course websites. Although this case study is descriptive in nature, it also draws on specific educational and technology theories from the literature review to inform research question development, case selection, and data analysis and interpretation.

Before explaining the methods used to conduct the study, it is important that I explain my role regarding the research site. As a faculty member at the study institution, I am familiar with the student body, other faculty members, and the administration. My role as researcher is further influenced by my own activities while developing course websites for use within my classes. To address any potential conflicts and avoid any confusion about my role involving this research, I excluded my own course website and my own students from the study. In addition, case units examined within this study were drawn from departments other than my own and are composed of faculty members and students that I would normally have little or no interaction with. In this chapter, the study design and specific procedures involved with developing instruments, interviewing participants, making observations, and

coding data are explained. The goal of this methods chapter is to provide sufficient methodology documentation to help the reader to understand how the study was executed.

Research Design

The study utilizes data provided by focus groups, individual interviews, and some direct observation for analysis within a qualitative case study format. Stake (2000), when discussing what can be learned from a case, points to case study as a strategy of inquiry that focuses the researcher's attention on specific questions (p. 435). Using a case study approach, the researcher views the important aspects of the individual, group, or community, supporting the development of rich descriptions of complex interactions (Berg, 1998; Stake, 1997).

The case study approach is ideally suited for this study because, as defined by Merriam and Simpson (2000, p. 109), a case study is "an intensive study of a particular social unit." For this research, this social unit is composed of a course website, a specific instructor who developed the site, and the students who utilize the site. Yin (1994, p. 9) states that if "a 'how' or 'why' question is being asked about a contemporary set of events, over which the investigator has little or no control," a case study should be used. In this study, the "how" relates to the enabling of course website functionality, which is specifically the role of the instructor, and the process used by students to access and utilize the content. The "why" relates to the design intentions of the instructor and the value students derive from site usage. Berg (1998) addresses this "how" and "why" within a case selection context, pointing to usage of specific cases as mirrors that may be able to reflect understandings of a larger set of cases (p. 217).

To understand the perceived value of course websites, the websites were researched as units of analysis composed of the website itself, the students who utilize the website, and the instructor who supports website development and ongoing maintenance. The cases are designed to address this unit structure and recognize that the three components create a complex interplay of technology coupled to an educational purpose. Figure 4 graphically depicts the three case units of analysis used in this study to capture both student and instructor (pseudonyms are used for members of both groups and for the URL addresses to preserve anonymity) experiences when utilizing course websites. Each case unit is composed of a course website, five students who utilize the website, and a single instructor who supports the website. Each of the participants experience course websites and view perceived value differently based on their role as website users or website facilitators. The case study design provides the opportunity to analyze course website usage from both participants' perspective and as a cohesive unit that is affected by the provided technology. Including multiple cases in the study allows broader analysis, supporting comparisons between the individual cases and the generation of conclusions that highlight macro issues of course website usage. The rationale for choosing three cases is explained in the participants' section of this chapter.

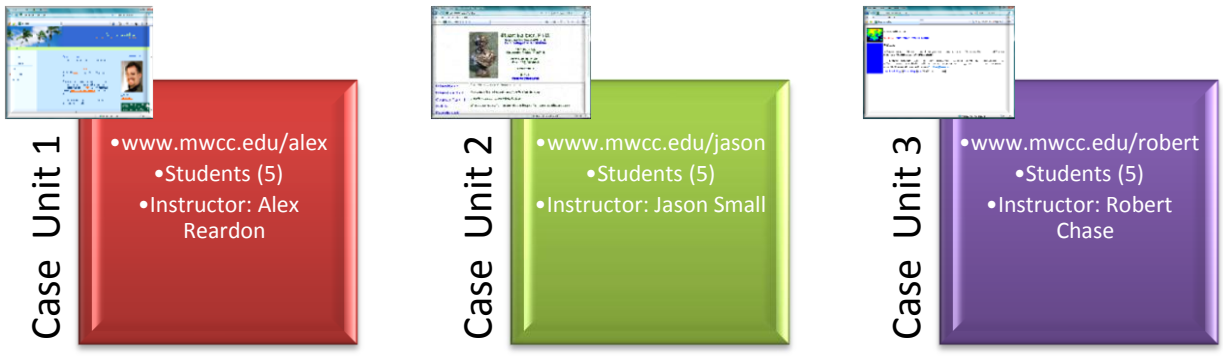

Figure 4. Selected Case Units of Analysis

Employing a qualitative case study approach, I gathered information using interviews, direct observations of course website usage, and my own research-inspired website exploration. Specifically, data collection involved 7 student interviews (most with multiple participants), 3 faculty interviews, and limited observation of site usage by students individually. The interviews provided in-depth descriptions and explanations of both students' and faculty's experiences with course websites. The interviews conducted with faculty creators of the course websites and with student users of them were augmented by direct observations of site utilization by the students and my own exploration of the websites. The study was conducted over the course of three consecutive semesters (fall, winter, and spring/summer of the 2007-2008 academic year) and involved the following phases and activities (discussed in detail later in this chapter):

- Pre-data collection activities (review of literature; theory-driven research question formulation, Human Subjects approval)
- Research site selection and approval
- Categorization and analysis of candidate faculty websites
- Case study site(s) selection
- Conduct student interviews within individual cases
- Conduct interviews with faculty of selected sites
- Transcribing of student and faculty interview recordings
- Detailed thematic analysis of focus group transcriptions
- Identification and labeling of course website phenomena

- Coding, categorization, and summarization of categories
- Final documentation of study results

To further illuminate the methodology employed for the study, this chapter is divided into 5 sections. Each section discusses a particular aspect of the study, which includes the study setting, participants, data sources and data collection procedures, data analysis and interpretation, and data validation.

Research Site

Physical and Population Characteristics

This study involved selected students and faculty at a Midwestern public community college (MWCC). The college main campus is located on a 640-acre campus complex that is characterized by its beautifully landscaped garden center, miles of running and fitness nature trails, sports facilities, and a covered bridge. The college has a local, state, and national reputation as a leader in education and training and is considered vitally important to the economic well-being of the region. Students and faculty alike enjoy the natural surroundings that positively enhance learning and teaching. The college also utilizes three satellite campuses, strategically located within the tri-county area bordering the main campus. All of the interviews and observations in this study occurred at the main campus facility.

The community college draws primarily local students from varied social and economic backgrounds. According to the college's website for the 2007 academic year, most students (83.9%) reside in the tri-county district, and more students are enrolled on a part-

time basis than full-time because most students are also working full or part-time. Faculty ranks are composed of full-time faculty (42%) and part-time adjuncts instructors (58%).

The college's 2007 demographic profile data (see Table 4) revealed that enrollment totaled 10,118 students, of which 43% were men and 53% were women. Student minority representation was approximately 15%, primarily consisting of 7% African American and 4% Hispanic students. Faculty in 2007 numbered 509, of which 213 were full-time faculty, either tenured, tenure-track, or one year appointments and 294 were adjunct instructors. Of the full-time faculty members, 44% were men and 56% were women, and as a group they averaged fourteen years of service or teaching and their mean age was 48.39 years. Minority representation in the faculty ranks was approximately 10%, with 5% African American representation, 2% Hispanic, and less than 1% Native American, Asian, and other.

Table 4

Summary of College Demographics

	Student Data 2007 (%)	**Faculty Data 2007 (%)**
Female	57	56
Male	43	44
White	83	90
African American	7	5
Native American	1	<1
Asian	1	1
Hispanic	4	2
Other	3	2
Total Minorities	15	10

Technological Infrastructure

The technological aspects of the research setting include the technology that supports the college's course website infrastructure, the computers used by students and instructors to access the course websites, and the software tools used to enable and utilize course website functionality.

The college actively supports a technical computing environment that is characterized by networked capabilities, remote access, and enabling technology. Students and faculty members can access course websites from a variety of locations without physical restrictions. Some of these points of access include on-campus locations such as offices, classrooms, computer labs, commons areas, and the library. Other off-campus access points include homes, businesses, coffee shops, or other places where Internet access is facilitated. In both on-campus and off-campus locations, wireless hotspots are also facilitating access to course websites for students and instructors.

The general model is client–server based, meaning that course websites are stored on a separate computer (the server), housed in a secure data facility, and accessed by instructors and students using personal computers with web browsers (the client). The college's internal information technology department maintains the servers that house the course websites.

Student and instructor access to the course websites is provided through a local area network, relying on wired or wireless connectivity, while on-campus, and through the Internet, utilizing the World Wide Web (WWW), when off-campus. Typically, students and instructors access the websites through a personal computer (PC), either a desktop or laptop, utilizing web-browser software such as Microsoft's Internet Explorer or Mozilla Firefox, among others. To access a specific course website, users enter the college domain name with

the instructor name (e.g. www.somecollege.edu/someinstructor) within the web-browsers uniform resource locator (URL) address line. Once the website loads in the web-browser, functionality is accessed by clicking on links or graphics, using menu systems, or other site options as enabled by the designers.

Course website development is enabled at the college by simple text editing using editors such as notepad or by full-featured development applications such as Adobe Dreamweaver, among others. For those instructors who understand hypertext markup language (HTML), simple editors provide quick and effective means for crafting course websites and making changes as required. The general process is very similar to programming and requires an understanding of HTML and must be accomplished within a text-oriented format. For those who prefer to work with full-featured site development tools and to see what they are developing as they develop it, the college provides Dreamweaver licenses. Dreamweaver is a WYSIWYG (e.g. "what you see is what you get") web-development application that has quite a steep learning curve for those who are not well-versed in computer technology and web development. The college provides informal training via professional development opportunities and formal classes specific to each type of development strategy. These professional development opportunities are offered each semester, cover website development using Dreamweaver, HTML, and other tools, and are available to adjuncts as well as full-time faculty.

Site Selection Rationale

MWCC was selected for this study because of convenience, a willing body of faculty and student participants, institutional access, and administrative interest in the study.

Technically, the current computing environment enables the type of online capabilities critical for this type of study. All faculty members are provided dedicated web-server space and access to professional development activities that encourage site development (e.g. web development training). All students have dedicated web space for their own use and password access to the networked environment. All users are supported technically for remote Internet access to college resources. Finally, administrative and peer interest in the study and willingness to participate provided further motivation for conducting the study at this particular college.

Sampling Procedures

The accessible populations for the study included students attending classes and faculty members teaching classes at the college during the 2007-08 academic year (e.g. Fall, Winter). The target study population was those faculty members who utilized course websites and their students. Of the current 213 full-time faculty, 88 of them had course websites (41.3%). To help manage this number of candidate sites, a systematic site analysis process was created to enable ranking of sites for classification and case identification.

Case Study Selection

The case units selection rationale was based on a maximum variation sampling strategy involving content and technical features. To support logical classification of the 88 candidate websites, an evaluation matrix was designed (see Appendix A) to provide a central focus for gathering information about each website. Recognizing the dual role of theoretical constructivist influences and technological considerations, the matrix employs a composite

weighting strategy that is designed to balance website development effort with educational and technology theory. As the websites were scored according to the matrix, the scores served to segment and classify the websites based on provided information and observed functionality. The intent was to plot the scores of the websites along a continuum that supports broad classifications and to provide categorization required for case study selection. The faculty website analysis matrix is divided into an information section and four sections that draw upon the four constructivist themes elaborated by Doolittle and Camp (1999) and the technology features highlighted by Oliver and Hannifin (2000), Lightfoot (2005), and Meyer (1998), among others.

The first section serves to gather demographic information specific to each faculty member. Information captured in this section includes the analysis date, contact information, and the website address or URL (uniform resource locator). Also important, the section captures a list of courses taught for the instructor and department information. Finally, this section also provides a convenient location for score tabulation and a space for recording any notes concerning special features or other observations.

As discussed in Chapter 2, knowledge discovery and learner collaboration involve four constructivist objectives that inform technological interactions reflected in the web-based environment. The website content sections of the analysis matrix serve to segment data collection based on these four guiding objectives by capturing website content based on environment support and adaptation features, knowledge discovery and active learning features, experiential organization and validation features, and collaborative features. The following discussion provides an overview of each section in context with theoretical and technological linkages that contribute to each section's composite weighted score.

The first category of the analysis matrix is designed to address the guiding objective of environmental adaptation. Operating under the assumption that a web interface is similar to a traditional classroom implies that faculty-developed websites would support familiarization that would serve to introduce a student or students to an instructor and course resources. This is accomplished by providing features such as personal and professional information specific to the instructor, information specific to the course, and information regarding site direction and navigation. It also includes awareness that providing web-enabled content involves the underlying technical linkages that support delivery of this information. The analysis matrix is designed to capture these features and effectively score their contribution to environment support and adaptation.

Category 2 of the analysis matrix is designed to address the guiding objective involving knowledge discovery and active learning. Fundamental to the active learning process emphasized within constructivist theory is the importance of interactivity (Brooks & Brooks, 1999; Fosnot, 1996). Characterized by technically enabled searching, retrieving, organizing, and storing of online information, the analysis matrix supports data capture of active learning features from a course-specific perspective and from a content-specific perspective. The course-specific perspective is utilized to identify the interactive activities involving assignments, projects, worksheets, tutorials, and other related activities, while the content-specific perspective is used to assess subject delivery features including course datafiles, presentation materials, lecture notes, and other related content.

Category 3 of the analysis matrix is designed to address the guiding objective involving experiential organization and validation. Faculty websites utilizing Internet resources can be used to provide resources and learning experiences to the students.

Characterized by technical utilization of Internet resources to provide information, the analysis matrix supports data capture of experiential organization and validation features also from a course specific and content specific perspective. The course specific perspective is utilized to capture the linkages to external sources that provide related or course specific information. The content-specific perspective is used to capture experiential organization and validation activities such as web-quests that take the learner on virtual journeys to comparison sites where other related subject information is found. The analysis matrix is designed to capture experiential organization and validation features and score them accordingly.

The final section of the analysis matrix, Category 4, is designed to address the guiding objective involving collaborative features. Unlike the traditional classroom where students can easily interact with their instructors and other classmates, the course website environment has to support this interactive via technical means. Characterized by technical enabling of communication, the analysis matrix supports data capture of collaborative features based on whether this occurs via static interfaces or via dynamic interfaces. Static interfaces typically involve asynchronous user interactions including email, blogging, discussion forums, recorded audio or video clips, or collaborative editing activities. Dynamic interfaces typically involve synchronous user interactions such as chat room discussions, live voice interactions, live video feeds, and instant messaging. The analysis matrix is designed to capture and score features that contribute to online collaboration.

The weighting strategy employed within the site analysis matrix is designed to validate the contribution of both theoretical constructivist influences and technological features. Each section of the analysis matrix includes columns to capture a constructivist

score, labeled “C.Sc,” and a technological score, labeled “T.Sc.” These scores are determined by the weight specified for each item and entered based on the presence of a specific feature in a candidate site. Accordingly, items within the matrix that have direct linkage to constructivist influences that involve knowledge discovery, active learning, and collaborative learning are weighted higher than those items that simply provide information. Similarly, items within the matrix that simply provide static information and require limited technical skill to implement are weighted lower than those items that involve dynamic content or require advanced technical understanding for implementation. Taken together, the weighting system is designed to generate a composite score that effectively delineates the candidate sites for case study selection.

As each course website was analyzed, the researcher scored its features according to the website evaluation matrix and then tallied the score for each section. The section scores were then added to create an overall site score, and the resulting overall score was logged in a summary matrix. The summary matrix (see Appendix B) was designed to support filtering based on category scores, the total scores, the instructor’s department, or some combination of two or more columns.

After analyzing all candidate websites, logical categories emerged that supported case extraction from a maximum variation perspective based on website features alone. Table 5 provides a general description of the categories with the number and percentage of candidate sites that fall within each category. Course websites were assigned to the categories based on their evaluation score as recorded in the summary matrix. As Table 5 indicates, more than half the course websites examined had minimal or no content. Those that remained were distributed across the other categories disproportionately based on provided features. Course

websites that provided enhanced functionality scored higher than those that provided minimal content, placing them in a higher category.

Table 5

Faculty Website Analysis Categories

Category	Description	Number	Percent
Category 1 (C1)	Website characterized by minimal personal information, no class information, no course content, or may be under development.	47	53.41%
Category 2 (C2)	Website characterized by personal detail and some organizational class information, little course content if any and little or no constructivist learning objects. May exhibit some attention to site aesthetics	26	29.55%
Category 3 (C3)	Website characterized by personal detail, organizational class information, some course content, some constructivist learning objects. Multi-page site with links to external resources and some attention to site aesthetics.	9	10.23%
Category 4 (C4)	Website characterized by personal detail, organizational class information, course content delineated by classes including assignments, notes, presentations, learning objects, external links, collaborative features. Features constructivist learning objects and has extensive resource links. Multi-page site with attention to site aesthetics.	6	6.82%

The categories provide the basis for a functional continuum that supports the maximum variation selection strategy. After examining the sites within the context of the categorization, it became obvious that there was little value in pursuing a case involving the first category. There was simply not enough meaningful content contained within the category 1 websites that would provide sufficient basis for case study analysis. Unlike category 1, the remaining categories have increasing amounts of content and provide increasing interest from both technical and constructivist perspectives supporting individual

case discussions and multiple case comparisons. These categories framed the case study pools from which specific websites were selected for inclusion in the study.

Participant Selection

Participant selection was conducted for two distinct groups: faculty members who developed course websites and students of the chosen faculty members. After classifying the course websites into groups based on functionality and content, each group consisted of a pool of possible candidates who could participate in the study. The pools varied in size from 26 candidates in category 2 to 6 candidates in category 4 (see Appendix B). Since the highest level category contained six candidates, it was logical to place the categories on equal footing and restrict the pools to the top six candidates in each category leaving 18 possible course websites.

Case study selection began with soliciting faculty volunteers from categories 2, 3, and 4. The top six candidates for each category were identified based on their website evaluation score and numbered from 1 to 6. A die was tossed and the resulting number was used to select a specific candidate. Though the candidate pool was more demographically diverse, random selection procedures (the toss of the die) resulted in the selection of three white male faculty members that fit the criteria. Although the selection process did not support demographic diversity, the selection process did support discipline/departmental diversity through the choosing of faculty from psychology, English, and mathematics. Acknowledging this limitation, had the toss of the die allowed a more diverse demographic sample, study results might have differed.

Moving forward, an email (see Appendix C) invitation was sent to the selected candidate from each category. After answering a few questions about timing and involvement, all of the instructors initially contacted agreed to participate in the study. I then talked to each of the instructors individually about the specifics of the study and their preferences for soliciting student volunteers.

Soliciting the student volunteers involved two approaches. One of the instructors wanted me to come to his classes and solicit the volunteers for the study, while the others chose to handle the presentation themselves. For the former, I visited each of his classes and spoke about the study and answered questions for about 10 minutes. At the end, I circulated a sign-up sheet to solicit students' names and contact information. The other instructors talked to each of their classes about the study and interested students added their names and contact information to the sheet I sent via email. Each of the case study groups had a potential pool of 12-15 student volunteers from which 5 were chosen. Students were chosen for case study interviews based on a purposive strategy that ensured representation from multiple classes and, to a lesser extent, scheduling availability.

Data Sources and Data Collection Procedures

Specific data sources for the study include transcripts from interviews and observation notes. This section describes the process by which the data were generated by interview and observation, collected within audio recordings and journal entries, and processed using qualitative research methods and technology. Data collection procedures specific to the data type are discussed from procedural and descriptive perspectives. The timeline in Appendix D provides the specific dates when these activities occurred.

Ethical Considerations

At all times during the study, proper ethical procedures were followed. Ethical considerations involve three primary issues: "the protection of the participants from harm, the ensuring of confidentiality of research data, and the question of deception of subjects." (Fraenkel & Wallen, 2003, p. 57) To ensure that these and other ethical issues were properly addressed, human subjects approval was obtained from the appropriate institutional review boards (IRBs) at Eastern Michigan University and at the study college. All the participants in the study, students and instructors alike, were required to sign full disclosure consent forms (see Appendix E) detailing their specific rights regarding participation, their ability to quit the study, how study data were to be used, and information regarding the study itself. Participant anonymity was preserved and the instructors were never informed about which of their students were contacted for the study.

Data security was protected by ensuring that no one other than the researcher and the transcriptionist had access to the data collected. Informal debriefing occurred at the end of each interview when participants were invited to provide feedback to the researcher regarding their perceptions of the interview process. Finally, to secure and preserve the privacy of the participants, pseudonyms are used when reporting the results in the study narrative.

Interviews

The purpose of the interviews was to gather feedback from the students and faculty regarding the characteristics of course websites that provide rich contextual information that

illuminates and inform study findings. As the primary source of study data, the interviews were designed to encourage participation and assist the participants with framing their discussion. There were 18 interview participants composed of 15 students and 3 faculty members. To encourage an open exchange of ideas, I conducted interviews with student and faculty participants separately.

Student Interviews

The student interviews occurred at the end of the fall, 2007 semester. This timing was intentional, so I could gather data from students who had utilized a specific instructor's course website for an entire semester. It was expected that having a full semester of involvement would support detailed discussion of course website experiences based on fifteen weeks of usage and ample opportunity to become familiar with site nuances. Also important, interviews were conducted prior to the student beginning another semester and their previous course website experiences becoming stale. Seven interviews were held as focus groups, with 2-4 students in each interview. Students were interviewed only within the context of their specific course website case unit; groups were not mixed across units.

Interview scheduling was handled via phone contact based on purposive selection involving class distribution and availability. Students were sent electronic mail messages to confirm participation, meeting times, and location. Prior to beginning the interviews, students were instructed to read and sign the informed consent agreements and provide demographic information about their age, major, and educational backgrounds that was recorded in my field notes. Based on Hamersley and Atkinson's (1995) suggestion to allow the interviewees a little time to discuss what's happening in their life, students were

encouraged to share a little about themselves (p. 226). This initial conversation prior to starting the formal interview provided the opportunity for casual rapport building and served to relax the participants and aided interview participation.

The student interview questions (see Appendix F) were designed to elicit information related to students' technological background, the setting and course website experience, the course website content, the student/instructor interaction regarding the site, and usage of course management systems. First, the background questions dealt with the students experiences using computers, the Internet, and prior usage of course websites, either in high school or college. After the background questions, questions were asked about the setting to extract information regarding the physical interaction with the site, providing details on particulars such as site access and site navigation. Next, questions explored specific course content provided within the site, how it was used in the course, and the perceived value of the content. Also important, the next set of questions involved interaction between the students and instructor regarding the website, extracting information about student involvement in course website design. Finally, the last set of questions probed for student experiences with other Internet delivery course content provided specifically within course management systems. Each of these areas of inquiry provided student responses that in many ways support the constructivist categories and site taxonomy discussed in the literature review chapter and used for initial course website evaluation and thematic coding. Specifics are discussed within the analysis chapters.

Interviews progressed in a question-by-question manner, with opportunities for respondents to add information they felt was important. As the interviews progressed, students were encouraged to elaborate on interesting points, and if the conversation went too

far astray, the discussion was pulled back to the interview questions. The students seem to enjoy the interview experience and talking about the course websites. They were paid $20 each for their participation.

Faculty Interviews

The interviews of the three faculty members occurred at the beginning of the Winter 2008 semester. Timing of the faculty interviews was less important than the timing of the student interviews since faculty interact with course websites prior to beginning a semester and often as the semester progresses. However, to create cohesiveness between the students' experiences and the instructors' intentions regarding the information provided with the course website, I felt it was important that the faculty interviews occurred while the student responses were still fresh in my mind. Another consideration was to ensure that faculty participants were interviewed before they made major changes to the course websites used by the previous semester's students. Three individual interviews were held, with each lasting approximately one hour.

Once again, interview scheduling was handled via phone contact and electronic mail confirmation. Prior to beginning the interviews, faculty members were instructed to read and sign the informed consent agreements. The faculty interview questions (see Appendix D) were similar to the student questions -- also designed to extract information including the faculty member's technological background, the course website setting, the course website content, interaction opportunities, and usage of course management systems. First, faculty participants answered background questions regarding their teaching experiences, technology usage, and prior experiences with course websites. This preliminary questioning also

included questions that exposed website training and the types and sources of professional development opportunities attended by the participants. After the background questions, questions were asked about design strategy and how they enable the physical interaction with the site, providing details on particulars of why they designed the site the way they did. The next set of questions explored the course content they provide, how it is expected to be used in the course, and their expectations regarding perceived value. Also essential, questions were asked that delved into student and instructor interactions as they relate to course website design. Last, the interview ended with questions regarding the usage of course management systems and how they affect them personally and faculty-developed course websites as an educational artifact. Once again, each of these areas of inquiry provides discussion opportunities to be explored in the context with the constructivist categories and site taxonomy discussed previously. Specifics are addressed on a case-by-case basis within the analysis chapters.

Similar to the student interviews, the discussion progressed in a question-by-question manner, often diverging into related areas of educational interest. As with the students, I encouraged elaboration on topics of interest. Faculty members seemed to enjoy being interviewed; and they all expressed an interest in reading the study findings. Faculty members were not compensated for their participation.

Interview Processing

All of the interviews were recorded using a digital recorder. To facilitate the analysis process, a professional was hired to transcribe the recordings and create interview transcripts using Microsoft Word. Prior to beginning data analysis, I listened to each of the recordings

while reading the transcripts to ensure that the data had been transcribed accurately. The interview transcripts, along with my observation field-notes file, composed the input used during the analysis part of the project.

Observations

The purpose of the observations was to provide information about the specific functionality of the course website environment and to see how students and faculty interacted with the course website technology. To support this activity, interviews were scheduled in locations where the students would have easy access to a computer. After the student interviews were completed, I asked for two volunteers from each case study unit to demonstrate how they utilize their respective course website. Six students volunteered for the observations providing equal representation for the three case study course websites. The intent was to gain familiarity with the user's typical experience and link "hands-on" demonstrations with participants recorded responses to interview questions. The activity also gave me the opportunity to see how the user handled technical aspects (such as site navigation or searching) of course website usage and how they accessed course specific information provided within the site. These observations provide an additional level of data that add value to the descriptive aspects of the study. As the demonstrations occurred, I recorded observations of interest in an online journal of field notes using Microsoft Word.

Data Analysis and Interpretation

Qualitative research is characterized by common practices involving observations (usually ethnographic records), interviews (open-ended or semi-structured), and thematic

coding and analysis that is grounded in the qualitative data. The previous section detailed the procedures involved with data collection. Subsequent chapters will deal with reporting the study results. This section describes the analysis process.

Data analysis is about making sense of the data. Initial assumptions form the basis of some understanding of the studied phenomena and the roles played by the participants that is later confirmed, denied, or changed in some way. For me, informal data analysis commenced at the beginning of this study. In examining each case unit structure (composed of student, instructor, and course website), I could see that an interactive educational relationship existed between the two groups of participants that was being moderated by the course website technology. The formal data analysis processes allowed me examine this relationship and provide required evidence to replace initial assumptions with substantiated understandings.

The observations and interview transcripts captured during the data collection phase of the project provide the input for data analysis. The strategy involved in-depth analysis of the transcribed data, capturing conceptual information as it emerges, collating that information with like information, and adding/augmenting that information as new categories emerge. As Hammersly and Atkinson (1995) indicated, the goal is to generate a stable set of categories and do so via a systematic coding of the data within the context of the categories. Therefore, interpretation and analysis procedures involved organizing the data based on the categorical groupings that emerged and identifying the underlying properties. Final analysis and summarization involved dissection of these categories and properties on a case-by-case basis and in context with broader themes. The findings are discussed in the following chapters.

Coding Procedure

Data analysis of the observations and interview transcripts relied on both open and axial coding strategies, employed in an organized manner that would aid in the retrieval and interpretation of data. According to Strauss & Corbin (1998), open coding involves the "breaking down, examining, comparing, conceptualizing, and categorizing data" (p. 62). Axial coding involves taking the codes derived from the open coding process and making connections between a category and its sub-categories (Strauss & Corbin, 1998). The ultimate goal being the development of categories and sub-categories that leads to "the construction of systematic, hierarchical relationships among categories" (Coffey & Atkinson, 1996, p. 142).

The open coding process was handled by working through the observation notes and interview transcripts in a line-by-line, systematic manner. Though tedious, this strategy supported the extraction of thematic elements within the context of their usage in a more thorough manner than a selective sampling strategy would. Rather than employ a preconceived set of codes, I utilized open coding to allow the data to speak for itself. As lines were read, themes emerged that were highlighted, captured, and recorded in the study database. As new codes emerged, I annotated their entries with memos designed to capture my initial interpretation and other thoughts regarding relationships to previous codes. The initial iteration of data processing produced an extensive list of preliminary codes that were used for subsequent data analysis.

Open coding continued in a recursive manner, repeating the process of examining the notes and transcripts line-by-line until no more new thematic codes emerged. Utilizing this repetitive, systematic approach to data analysis allowed me to consider the students' and

instructors' responses in context with each other and to view these responses as different perspectives that, in some cases, inform the same code. As the analysis proceeded, codes were grouped into categories and sub-categories that served to organize the code list into a coherent code map. The complete list of thematic codes (see Appendix H) with the categories and sub-categories became the input for the axial coding process.

Axial coding involved the examination of the code lists, categories, and sub-categories for purpose of exposing relationships within the data. Strauss and Corbin (1998) define axial coding as "the process of relating categories to their subcategories, termed 'axial' because coding occurs around the axis of a category, linking categories at the level of properties and dimensions" (p. 123). Axial coding of the observation notes and interview transcripts involved seeking data that helped support or falsify suggested relationships involving perceived value and theoretical linkage to the constructivist taxonomy within a category and its sub-categories.

To facilitate the coding process, the researcher purchased a license for the MaxQDA software. This application is specifically designed to assist a researcher with developing coding strategies that assist with analyzing qualitative research data. The application supports input of files using the rich-text format, open and axial coding of transcripts, generation of descriptive graphics that help with data analysis, and simple or complex queries to extract information, among others. After reviewing several competing applications, I determined that this software provided superior functionality for the best cost. Figure 5 is a screenshot of the application.

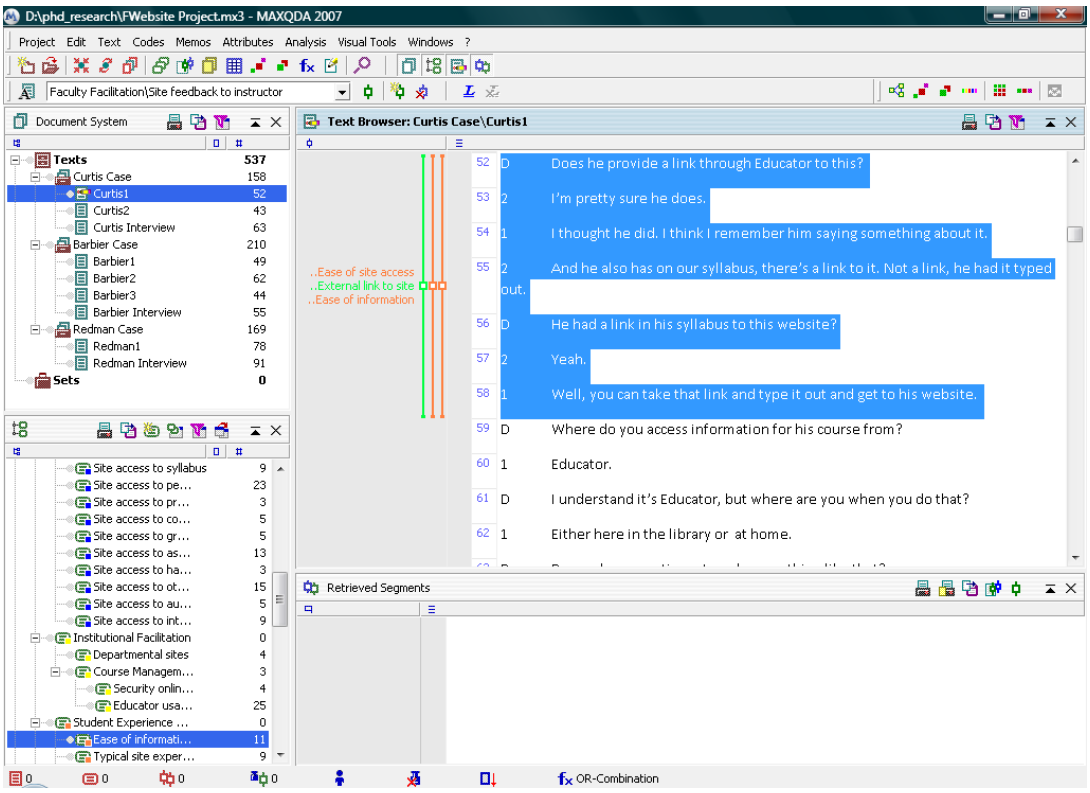

Figure 5. MaxQDA Application Screenshot.

The MaxQDA application greatly reduced the processing time normally associated with hand-coding observation notes and interview transcripts. Though the application does not do the analysis for you, it definitely helps to organize your data files and code lists. The process began with loading the digital files associated with observations and interview transcripts. Utilizing the text browser window, I parsed the text files line-by-line, highlighting any entries that contained thematic elements. I then used the code menus to create a new thematic code (if warranted) or applied an existing code to the entry. I often used the memo option to provide analysis annotations to the code entries. Multi-level code trees were developed, which allowed me to visualize the categories and sub-categories that

are used to organize the codes. Additional analysis processes were supported by the graphics capabilities, easy code retrievals and collation, and report generation.

As coding proceeded, the code structures and their associated transcript entries were captured in the MaxQDA project database. After the coding process was completed, this database became the focal point for data analysis related to the case units and how they inform the theoretical linkage with constructivist learning. Using the retrieval functions of the application, queries were run against the database to extract descriptive or inferential information relevant to particular themes. The query results were often used to provide "local color" and concrete-and-verbatim support for arguments presented in the results chapters. An example of a typical retrieval is provided in Appendix I.

Validity

To support and legitimize the validity of the data, the study design involved the use of a variety of reinforcement mechanisms. The researcher utilized the same semi-structured interview questions and protocol for each interview and constantly monitored the process to keep things on track. Students and faculty alike were given the same general questions specific to their roles in utilizing the course websites. However, participants were encouraged to discuss other aspects of course websites that arose as a result of a particular interview question. Briggs (1986) discusses standardized interviews within the context of using a common set of questions for all participants, allowing some flexibility to encourage discussion based on how the interview progresses (p. 20). In the case of this research, the semi-structured interview questions provided a focus and an interview structure that moved the discussion from one topic involving course websites to another, without being procedural

in nature. This strategy supported a more conversational dialogue while encouraging the participants to address other related topics of interest.

Also important for research validity, the study employed multiple data sources including literature resources, interviews with students and faculty, and observations. When discussing triangulation, Glesne (2006) views the use of multiple data-collection methods, multiple data-collection sources, multiple investigators, and multiple theoretical perspectives as a way to augment trustworthiness and research validity (p. 36). The use of triangulation in this research is reflected in the multiple data sources (e.g. observations, students and faculty input) and multiple methods of research (e.g. literature review, interviews, and observations). The study is designed to utilize triangulation and incorporate multiple perspectives into substantiated arguments that support defendable conclusions regarding the study websites.

Also recognizing the potential issues with performing research at my own institution, I was very careful to preserve my role as researcher and not taint the study by involving any of my students or any of the other faculty members within my department. Glesne (2006) discusses several concerns with "backyard" research involving research design, bias, and ending the study (p. 31-33). This study was designed with an awareness of these issues and a plan to avoid any possible conflicts.

Reflexivity

Being a computer science teacher and a user of a course website provides a unique perspective from which to view this study. My understanding of the technical requirements for course website construction and of the potential educational value of informational and

functional websites contributed to my understanding and interpretation of the data I collected.

In consideration of my relevant personal experiences and beliefs, my interest stems from a background involving computer technology and how it can be used effectively to support educational objectives. In developing my own course website and web-enabling learning activities, I could see the potential for using this technology to reach out to students who have grown up with computers and Internet connectivity. As the study proceeded, I was happy to see that others were using the technology to meet similar objectives. However, I did not allow this optimism to affect my ability to be objective while collecting, analyzing, and reporting the study results.

Being a faculty member at the study institution also provided certain benefits and apprehensions regarding how the study was conducted and what to do with the results. Having handy access to a willing faculty and student body within my own "backyard" is both convenient and causes concerns. Not having to travel to another institution or multiple institutions proved beneficial from a time and resource perspective. However, by interviewing students and faculty within my own institution, I didn't have the opportunity to remove myself from the research setting. Though the participants were drawn from other departments within the college, there may come a time when I will have to interact with these individuals again. Recognizing this possibility allowed me to plan appropriately for dealing with such a scenario and ensure that ethical processes involving participant anonymity and confidentiality were observed. Also important, I have concerns that in the course of communicating study findings within the institution, the potential exists that some aspect of the findings may be misunderstood or contribute to a negative view of the study. To guard

against any potential issues along these lines, I've worked hard to ensure that my perspectives were corroborated by the data and not biased toward a particular finding. Self-monitoring of interview and analysis processes helped me to be cognizant of my own participation in the study and served to keep me focused on an objective pursuit of understandings that was grounded in the data.

Interacting with the study participants and examining other course websites has provided me additional frames of reference that will affect my own course website design strategies in beneficial ways.

Chapter 4: Findings

Overview

This study sought to address the fundamental question; how do instructors and students perceive the value provided by faculty-developed course websites? To explore this question, three multi-faceted cases were examined, utilizing interviews and observations to develop three unique impressions of instructor and student course website interactions. This chapter provides an individual view of the findings for each case, supporting the conclusions discussed in Chapter 5. To support a cohesive narrative, the cases are discussed individually based on a similar outline that addresses the individual participants, specifics of the website setting, thematic analysis, and how the course website reflects the constructivist model. The findings and results are presented as an interleaved dialogue involving both students and instructor sprinkled with thematic elements and discussion, where appropriate, regarding the guiding research questions.

To understand the perceived value of course websites, this study focuses on a case study unit (see Figure 6) composed of the website itself, the students who utilize the website, and the instructor that supports website development and ongoing maintenance. Including multiple cases in the study allowed for broader analysis, supporting comparisons between the individual cases and the generation of conclusions that highlight macro issues of course website usage. Collectively, the three cases span a continuum of functionality and were chosen based on a maximum variation strategy that best represented the typical course websites within the target institution. Recognizing that the three course websites that compose this study are a very small subset of a much larger pool, random selection strategies

resulted in an academically diverse but not demographically diverse set of faculty participants.

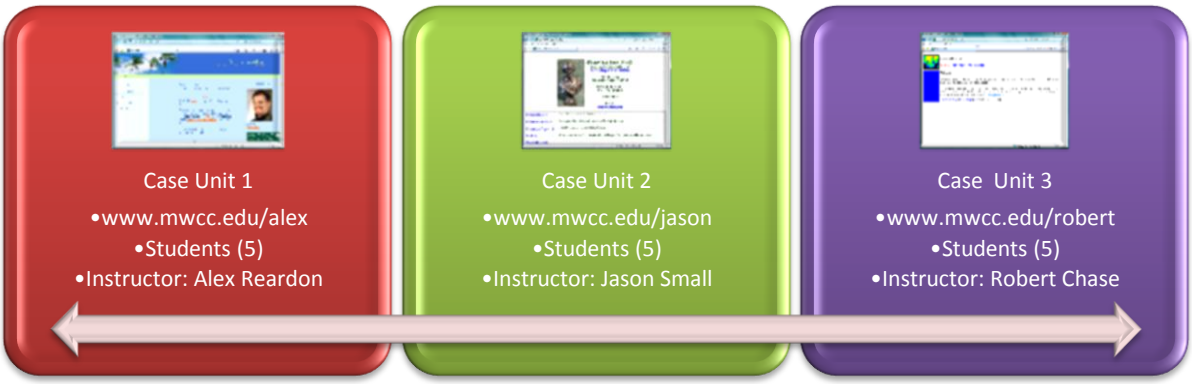

Figure 6. Multiple Embedded Case Study Units

This chapter is organized around individual examinations of the three case study units. First, the constituent members of the individual case units are discussed within the context of their specific role. Next, the course website associated with the specific case unit is analyzed based on researcher observations and the participants' responses. Each case is then discussed based on its emergent thematic elements captured during the coding process to support rich in-depth discussion of course website impressions. Last, the course websites are discussed in the context of the constructivist model detailed in literature review chapter. The case discussions are ordered based on provided functionality and the classification levels determined during the initial evaluation process.

Case Study Unit 1

The first case study unit involves a course website that is representative of the Category 2 classification (see Table 5) identified during the preliminary course website

evaluation phase. Category 2 course websites were characterized by attention to personal detail with some organizational class information, little course content if any, little or no constructivist learning objects, and may exhibit some attention to site aesthetics. Twenty-six of the candidate course websites scored within this classification, which represented 29.55% of the websites evaluated for the study. While acknowledging the limited content provided by Category 2 websites, the percentage of websites that fall within this category is sufficient to justify further analysis. The website was chosen for case study inclusion based on the website features present at the time of the preliminary examination and the selection strategy explained in the previous Methods chapter.

Participants

Case Study Unit 1 participants included five students and their instructor, Alex Reardon. Alex is a full-time, tenured faculty member at MWCC, teaching in the psychology department. He has been teaching at the institution for eleven years with fifteen years of teaching experience including prior part-time teaching. He is also extensively involved in the shared governance activities at the institution and supporting faculty development via the college's Center for Organizational Success (COS). This is evidenced by his active involvement in the Faculty Executive Committee (FEC) and teaching responsibilities specifically directed at other faculty members.

The student participants (see Table 6) for this case study were solicited for study inclusion as specified in the Methods chapter. Prior to the formal interview, each of the students was asked for some personal demographic and academic information, which was recorded on the back of each participant's Research Project Consent Form. Student

participants for this case study included three female students and two males. All of the students were relatively close in age, with the youngest being 19 and the oldest being 23. Academic majors represented included psychology (2 students), nursing (2 students), and business (1 student).

Table 6

Case Study Unit 1 Student Participants

Name	Initials	Age	Gender	Ethnicity	College Level	Major
Krista Johnson	KJ	19	Female	White	Finishing first semester	Psychology
Jennifer Teal	JT	22	Female	White	Sophomore – 2nd year	Nursing
Brandon Carter	BC	20	Male	Black	Freshman	Business
Steve Bower	SB	23	Male	White	Second Year Clinicals	Nursing
Amy Larue	AL	21	Female	White	Last semester - Transferring	Psychology

Both the students and the instructor were asked preliminary questions designed to gauge their familiarity with computers and utilization of Internet provided resources. The following narrative provides a little background that serves to frame the participant's technical expertise in regards to computer usage.

Alex indicated that he had been using computers since 1981 (27 years), which places him at the beginning of the personal computer generation that began with the original Apple computers, IBM PCs, and other early technology. When looking back at himself prior to college he said, "I was a little geeky. I almost went to Michigan Tech for computers." From an Internet perspective, Alex indicated that he has been "online" since about 1992 or 1993,

stating, “I was an old Protégé Computer user, I think that was my first network dialup.” Once again, Alex was early adopter, becoming an Internet user just about the time the technology started to poke its virtual nose into many people’s lives. He is representative of a subset of faculty who has grown up with the computer and is comfortable employing the technology for personal and professional purposes. He characterizes himself as “one of the earlier digitally native faculty.”

When discussing how he made the leap from personal computer use to employing computers from an educational perspective, Alex describes a progression that started as what he called “sheer technology playing.” This was particularly true of his initial forays of using Internet resources to support his classroom activities. Outside of the usual use of email to communicate with students, Alex uses the Internet to augment traditional teaching practices by incorporating streaming video in his classes. He viewed this as a personal challenge:

> One semester I made myself a bet that I could go the entire semester without ever bringing in a VHS or a DVD. And for my AV stuff and I met that. I’ve since gone back because DVD quality is so much better, but students to have access at home so lots of times if a student misses and they say and I say we saw a video in class, they have the ability to actually still see the video if they want to. I use it as one of my first, I’m probably almost over relying on it. One of my first research areas, I’ll Google it or something similar. Go to a scientific journal online even though I get a lot of journals.

When looking at the Internet adoption rate that occurred in the late 90s, Alex realized that as more students came online, the Internet could be used to augment information-sharing. He points to a particular defining moment in the following exchange:

> A: Initially, it was just sheer technology playing. I was interested with it, wanted to see if I could do it. And then once I got it up there, I started realizing it was a great way to, as more students got Internet at home, it was a good way for sharing information with students.
> D: I can see how that could ramp up. Initially a lot of the students didn’t have Internet access at home.

> A: Yes, but in the late 90s once that really took off, that's when I kind of really took off. My epiphany moment was one day when there was a snow day and it happened to be the day that there was a test as well that there was that snow day, I posted online "Test will be next class session." And started realizing that I could share just a whole lot more than just that.

Alex clearly understood the potential of the medium and was intellectually interested in exploiting its capabilities.

Alex's "epiphany moment" resulted in technical growth that supported an additional educational outreach that he could utilize to augment his teaching. Viewing his computer usage from a teaching perspective, Alex talked about computers within an organizational context, highlighting the critical role the technology currently plays in helping him administer his courses and organize his notes.

> I use it for almost every area of my teaching. I prepare my notes online. I use Power Point. I teach online so for some of my courses, almost, except for face to face meetings and phone calls, almost every component of my class I do through my computer. I use mostly Educator for that. I use to use Instant Messaging, I've dropped away from that because I found that students didn't take advantage of it as much as I'd hoped and it was easier to do it by phone or face to face visits. All my record keeping is online. Frequently I will either take my computer to any sort of meetings and record on that or if I don't, I scan my notes in as a pdf file and keep it for my computer. You mentioned my office is clean; that's because everything's going on to my computer.

Similarly, when asked about Internet access and what would be result if it went away, he responded, "I would be very much at a loss…if I were to lose my Internet access or my computer, my teaching would be substantially impacted." Clearly, from Alex's perspective, computing technology and Internet access provide essential support for delivering educational content and help keep the academic minutiae under control.

Most of the students interviewed for this case study unit indicated that they were first introduced to computers in grade school. Given their ages at the time of the interviews, this

places their first exposure to computing technology during the mid-nineties. A couple of the students pointed to limited use of computers and computing devices at home. Brandon, a business major, stated, "My grandma gave us one of those little computers that you carry around and it's got little programs on it," and Amy, a psychology major, talked about having access to an old "green screen" model with "tear away white printer paper." They all agreed that computer usage increased as they progressed through junior high and high school, with classes specific to computer learning providing most of the opportunities for computer interaction. Jennifer, a nursing student, stated, "In middle school that was when they started teaching you how to type and actually get on the Internet and start using Microsoft Word and little programs first started coming out."

From an Internet perspective, all of the students indicated that they have had access for some time now. One of the students mentioned 1996, another 7th grade, another 8th grade, and Krista, a psychology major, added, "Since I was little." When asked how they used the technology, their responses vary; however, there was one overriding commonality. Consider the following exchange:

> D: You guys are pretty much the Internet generation. You've had it most of your lives that you can remember. What do you do on the Internet?
> KM : Well, if I have homework that is my number one priority. I haven't had to do a lot of research this semester, though last semester I had a lot of research. Other than on schoolwork, I am on Face Book, Myspace, e-mailing, general, you know.
> AL: Pretty much the same thing. I do research. Shopping, sometimes I just browse through websites shopping and stuff looking for the newest things that are coming out. Myspace, Face Book, communication. I do a lot of e-mailing. Anything I need I pretty much use the Internet for. I even use it for phone numbers, like yellow pages and stuff like that. Dictionary a lot, especially when I'm in school. Any information, I really don't open many books, like telephone directories and stuff like that anymore.

All of the students described various levels of involvement with digital communities (e.g. Facebook, MySpace, etc.) and common communication functions such as email and instant messaging. All of the students exhibit a level of technical sophistication that was unknown to previous generations and is a natural extension of their apparent need to be continually connected to each other. This is evidenced by the generation's dependence on cellular technology, text messages, instant messaging, and other Internet enabled interactions.

These students represent a technically savvy, digitally connected generation. Alex is representative of a technically proficient faculty who relies heavily on computing and Internet delivery of course information. Together, they meet at the course website, the focus of the next part of this narrative.

Website Setting

Reflecting back on where it all started, Alex viewed website development as a "kind of techy, geeky, [on the] bleeding edge type of thing" that got him excited about using the Internet and motivated him to develop his first course website in 1997. Beginning with HTML (Hyper-Textual Markup Language), then using HTML editors, and finally migrating to website development applications like Microsoft Frontpage and Dreamweaver, Alex developed and maintained his course websites. When asked what influenced his site design, he responded:

> Originally and for probably the first two years that I was using it for my classes, how I developed it was by looking at what was considered current at the time; I've since lost that cutting edge, I don't try to keep on the bleeding edge of design any more, but what I was looking at was sites like CNN or PBS website and seeing what worked there and make it easy, at that time, to share information. And so I would essentially emulate that for sharing.

Later in the interview when asked whether he looked at other faculty members' websites, Alex said:

> I stole their ideas whenever possible. I looked at who was doing something better. …Back in the days of web counters, there used to be a little web counter about who had the most hits at the college. Back when it was kind of easy to keep track of who had web pages.

If imitation is truly the ultimate form of flattery, Alex paid CNN, PBS, and his colleagues a compliment by emulating the strategies they employed for information-sharing.

Launching or loading Alex's course website involves using a website browser such as Internet Explorer or Mozilla Firefox, among others. The college facilitates faculty-developed course websites by providing storage space on one of the college's web servers. Once instructors have uploaded their web pages, browser access is provided by typing the college's URL (Uniform Resource Locator) address and then the instructor's college ID on the browsers address line. When asked to demonstrate how they accessed the instructor's course website, students involved in the observations took two different paths to arrive at the same information. Krista launched Internet Explorer and went to the site directly by typing in the instructor's URL address. Steve took more of a convoluted approach as evidenced by my observation notes:

> Student launched Internet Explorer, typed in college URL, used search function to locate faculty member and then clicked on his name. Bio page for instructor launched. Student clicked link on bio page to get to course website. (wonder why student did not type url for site and go there directly)

Of the three course websites evaluated for this study, Alex's website is probably the most aesthetically pleasing. Designed to invoke thoughts of tropical breezes and incorporating a pleasing pastel color scheme, students are presented a very professional-looking course website homepage. The website is laid out in a frames-type format with a

themed banner across the top, a navigation menu on the left side of the page, and a content frame that displays information relevant to the page displayed. As the user clicks on the various links in the pages, the content frames change to reflect the user's choice. According to Alex, the site was constructed using a Dreamweaver template and the Dreamweaver application. Its present form is the result of an evolutionary process that began with his first course website and his initial coding with HTML.

One of the first things you notice when you launch the website is a picture of Alex. When asked what the student first sees when accessing the website, Alex responded, "It's a welcome page, a picture of me to see what I look like, especially for my online students, I actually think that's kind of important that they see your face with the name." Some of his students agree with this perspective while others are ambivalent. While Brandon views this as a positive, stating "he's not scared to show who he is…he's comfortable with himself," Amy questioned the value of the picture by responding:

> I guess it really doesn't matter. I guess if people are looking at them to find out if they know nothing about them and they're deciding whether they want to take their course or not, their picture is not going to make a difference. You still don't know anything about them, you just know what they look like.

Clearly, these students differ on the perceived value of an instructor's image.

Users rely on a clearly presented navigation menu to move around within Alex's website. Links provided from the main page include course links, office hours, an "about" page, "what's new," and a contact page. Additional links in the content section allow the users to connect with the psychology department and the college's main website along with the college's course management system. At the bottom of the page, Alex provides a disclaimer concerning the ownership of his views, copyright information, the last

modification date, and an email link to support soliciting comments about his website. Jennifer had this to say about the welcome page:

> He made it simple. If you look to the left you know which button goes to what and to know when you click on course links it's going to take you to his course links. And office hours is just going to tell you office hours. Some websites you click on something and it brings up a whole bunch of extra stuff to where you get confused. You don't even know where to go when you first get on somebody's web page. There are a lot that are like that. This is pretty straightforward, buttons are right there.

Clicking on the "course links" menu item launches Alex's current course listings. Maintaining the same website structure, the content pane changes to display current courses with a graphic of the course textbook, a link to the publisher's textbook website, and a link to the college's course management system (CMS) where other course information is found. Alex differs from the other faculty in the study because he provides very little course content on his personal website, instead relying on the college's CMS to deliver that type of information for his students. Because of this strategy to rely on the CMS, students had little use for this page with the exception of clicking through to the publisher's website to interact with textbook related content there. Some of the students relied on the link to access the publisher's website while others simply studied the text on their own.

The next link on the welcome page allows the user to access the instructor's office hours. The page displays a matrix in rows that span 8am through 5pm and columns that span Monday through Friday. The instructor blocks out office hours and reserved times for classes and other responsibilities on a semester basis. Other information provided on the page includes the instructor's course schedule, office hours and location, meetings, and his phone number. Once again an email link is provided to simplify the contact and feedback process. As a group, the students found this useful and also confirmed that similar

information was available in the CMS and on the instructor's syllabus. When responding to a question regarding the office hour webpage, Steve responded:

> Yes, but I had it on Educator and on the syllabus too. He said it on the syllabus office hours so I already knew, but it is very important to know that. Because if you need one time an extra question that you can't get done in class because the other students, you don't want to take up there time, you need to know when you can go speak with your professor.

The next link on the main menu allows the user to access the "about" page. When the page loads, the user is presented quite a comprehensive list of links that provide additional detail about the instructor's education background, professional background, and current college committees and activities. From an educational perspective the instructor provides links to his Bachelors and Masters programs both at the college and departmental levels, with special links to major and minor fields of study. The professional background provides the student with an overview of his career path from the time he was a graduate research assistant up through his current position of Associate Professor at MWCC. The last block of information details some of the instructor's administrative responsibilities, listing his current committee obligations and activities performed on behalf of the college.

The students and the instructor provided conflicting views on the perceived value of this type of information. When asked about the least important information on his course website, Alex responded, "I suppose the background information about me." He did qualify its inclusion by adding, "It would be nice for the students to know that I am marginally well qualified to teach." On the student side of the discussion, they found this page quite useful from two perspectives, professional and educational. From a professional perspective, some students want to know their teachers' qualifications. Krista responded:

> I think that all the teachers should have their websites up before you take their classes. If you want to know, I would like to know more about my teachers, their educational background, make sure they did have a good educational background, because if you have two teachers together and one has less, then you probably want to take the one that has more of an educational background. And then the professionalness that is a real good thing to have. You want to know all their professional background. And then the activities just let you know what kind of person they are. Like it says on there that he is involved with committees, which would kind of show you that he is more of a relaxed teacher.

Other students used this type of information to gain some insight into what the teacher was going to focus their attention on when teaching a course. When asked whether this type of information was important, a couple of the students replied:

> SB: Yeah, if they want to know who they're being taught by if they know anything or just there. Obviously, every professor knows a little about what they are doing. I think his detail what he learned, what he specified, what he specialized in like neuroscience, so we know that he's going to talk a lot about that.
> D: How about the professional background, do you find that of value at all?
> AL: Yeah. It shows that he was a research assistant so obviously he did some research in the study of psychology. So it shows that he does have knowledge of new material that could possibly be coming out.

The next link on the main menu allows the students to access the "what's new" webpage. When the page loads, the user is presented a page that currently details an update regarding the instructor's new office hours. The instructor indicated that this content changes and that he uses this page to make announcements to the class and as an alternative communications page that would be used if the CMS were unavailable. Students confirmed that announcements were occasionally posted here.

The final link on the main navigation menu allows the students access to the instructor's contact information. The webpage provides the instructor's contact information, beginning with his office location, a link to a campus map, his postal address, his email address (clickable), and his on-campus phone listings. From the instructor's perspective, this

page is the most important page in his website. When asked what he considered the most important content, Alex responded, "How to get in touch with me." Students found this page important and useful, as well, indicating that similar information was also available in the CMS and on the course syllabus. When asked whether the contact page was important, Jennifer replied:

> Because if you can't fit in for office hours, you need to contact him to see if you can schedule for different hours for something that he can make and you can make. Or even via e-mail a good way to communicate. Like when I had car trouble and didn't make it to class one day, I could e-mail him and let him know that I would get my paper to him on time or vice versa. You get all that information.

Alex's course website, though simple in form and light in content, provides limited information that his students find useful since he utilizes the college's CMS for course content delivery. From a navigational perspective, the website is very simple, easy to understand, and utilize. At the personal level, Alex does a good job introducing himself and his background via his photo and many personal links.

This part of the narrative was designed to provide an overview of the website in the context of a site walkthrough, while supporting an interleaved discussion where the instructor's and students' perspectives add color to the website descriptions. The next part of the narrative is designed to explore the website thematically based on the coding of the interview transcripts.

Thematic Analysis

The next part of the narrative discusses some of major themes that emerged from the data analysis process. As described in the Methods chapter, this process involved in-depth, line-by-line analysis of the interviews transcripts and observation notes, capturing conceptual

information specific to course website design, features, and functionality. Analysis involved several passes through the data until a final list of codes was generated, resulting in 158 code occurrences spread over 50 unique codes and eight sub-domains. The codemap provided in Appendix J highlights the unique codes related to their sub-domains. Icons included on the code map are sized based on the number of a particular code's occurrence (e.g. larger icon, more occurrences of that particular code).

First Impressions. An appropriate place to start the discussion is with emerging themes relating to the students' experiences with the course website. Based on the findings for this case, first impressions of a course website are important. For this course website, those first impressions include a portrait of the instructor and preliminary site instructions, all packaged professionally in a visually pleasing website. With the exception of Amy, most of the students generally viewed this personal display positively, using words and phrases such as "confident," "good teacher," and "good background." The presentation served to make the students feel "comfortable" with the website and supported ease of access to information. The instructor provided a clearly delineated course website that supported his students' efforts to access information on the site. As a contributor to perceived value, first impressions help to develop a student's interest in a site, while ease of information access creates an efficient information flow between the instructor and the students.

Meaningful Content. Also important, course websites need meaningful content. Due to Alex's usage of the college's course management system, there is limited content available on Alex's course website. Students reacted to this limited availability of course content by expressing a "limited interest in the content" available on the site. As a student who had Alex for other classes, Krista commented that she rarely uses the course website. Other

students who were new to Alex's classes said they quickly lost interest in the website content once they realize that all of the meaningful course information is provided in Educator (CMS). Steve even went to bat for all the parents who want to stay connected to their sons' or daughters' learning by stating:

> Maybe a parent or someone wants to know what their kid's doing nowadays. So maybe they don't want to access Educator so they're like "what is my kid studying in psychology." Maybe they want some information.

The findings suggest that content is a critical component if an instructor wants to keep his/her students interested in the course website. For Alex's students, the course website offered limited information from a course perspective with more information of a personal and professional nature. The majority of the students' comments centered on the personal nature of the supplied information. Other themes that occurred in moderation related to using a course website to provide access to course information, contact information, assignments, interactive content, and other resources. Though limited in what they can experience with Alex's course website, students generally agreed that the course website can be used effectively to provide these types of content and resources. Some of the students wondered why Alex's website content was so limited. Speculating on the lack of course assignments, Jennifer said, "Maybe he doesn't have them on there because he doesn't want people to know what the assignments are to try and do them early and get them done." Regardless of the reason, the lack of meaningful course content limits the utility of Alex's course website.

Site Focus. Instructors facilitate course website interaction for varying reasons. In some cases they are providing substantial learning resources, while others use the websites to accomplish other goals. Understanding the focus of the site is an important step for

developing an effective course website strategy. In Alex's case, he views his course websites as a "prospecting tool" that is really not designed for his current students. He had this to say about his strategy:

> Why did I set up my site this way? Mostly because as a prospective student I want them to be able to find out what to expect of the course, if they're thinking about taking my course what's going to be required for the course, and most importantly how to get in touch with me to ask if it would be appropriate for them to take or not.

By focusing his course website on his future students, Alex might be missing an opportunity to develop more substantial connections with his current students. When discussing the value provided by course websites, several of the students viewed the instructor's role of facilitating course websites as enabling technology that would help students and faculty connect. This view is also shared by the instructor. When asked whether his course websites help students feel more connected to his class Alex stated, "I suppose indirectly, yes just because I hope they have the wherewithal with that to get in touch with me if they were ever to need to get in touch with me, but beyond that they are not really connecting with psychology much through that." Alex acknowledges the usefulness of his "contact" page while recognizing the lack of subject specific content.

Site Design. Both students and instructors recognize the importance of website design and development. A critical part of this process involves designing websites based on the audience that is going to be utilizing the site. Alex had this to say regarding site development:

> So from just the very mundane to a lot of the pedagogical issues of what is a) effective to use and b) appropriate to use. I still kind of go back and forth between how much I want to require from my students and I've erred more towards going simple, simply because I like the "keep it simple, stupid" adage. It makes it easier for students to pick up and frankly makes it easier for me to maintain it as well.

Alex's adherence to simplicity highlights two clear benefits: the site is easier to use and easier to maintain. From a student perspective, keeping it simple is appreciated. Consider the following exchange:

> SB: Some websites have too much going on. That one is very professional-looking.
> BC: He made it simple. If you look to the left you know which button goes to what and to know when you click on course links it's going to take you to his course links. And office hours are just going to tell you office hours. Some websites you click on something and it brings up a whole bunch of extra stuff to where you get confused. You don't even know where to go when you first get on somebody's web page. There are a lot that are like that. This is pretty straightforward, buttons are right there.

Effective course website design involves intuitive navigation and page presentation that is not confusing. Alex has delivered on this requirement by providing a simple and intuitive course website for his students.

Also important from a website design perspective is an instructor's access to professional development opportunities that support course website development. Being computer savvy helped Alex overcome initial development hurdles involving coding with HTML and using web development applications. He also recognizes the value in maintaining currency to support continued development of his course website. When asked how he kept up, he talked about skill development from two perspectives: conference attendance and conducting workshops:

> About half the conferences that I attend are technology related conferences, and the other half are professional development for psychology. I am going to teach Ed 392 in the fall and, as you know, when you teach it, it forces you to bone up on it whether you want to or not. And then just doing some of the workshops, even though I am ostensibly the leader for a lot of these workshops. [At] almost every workshop I've ever taught, somebody's taught me something at the same time.

Fortunately, Alex works for an institution that actively supports professional development for the instructors and provides numerous opportunities for participation as learners or workshop

facilitators. Institutional support of technical training for course website development is critical considering the rate of change in technology and continued emphasis on digital integration.

Contribution to Learning. Another important consideration that affects perceived value relates to a course website's educational contribution. In this regard, Alex's site intentionally falls short. Because he has delegated the delivery role of course content to the college's course management system, Alex's course website provides few learning resources. When asked whether the course website contained anything that helped them "learn," students mentioned the textbook links as the only resource that provided any "learning" opportunities.

Blended Strategies. Blending course website and course management system usage can provide additional functionality for students and instructors. Commenting on features that the CMS provides, Krista had this to say:

> There's more information on Educator than there is on this site. I don't see an option for a discussion board on there [his course website]. And I don't see an option to take the exam on there. Or information like if you look on Educator like we are studying memory and you can click on that and there is some stuff you can print off. Some extra stuff like the slide show stuff.

The student points to features not provided on the instructor's course website that are typically supported by course management systems. To enable similar functionality (e.g. discussion boards, secure assessments, etc.) would require a technical skill level that is probably outside the reach of most faculty members. The availability and ease of use of more advanced features make the course management systems an attractive alternative to building your own course website.

Blending course website and course management systems usage can potentially create confusion for some students. Though most of the students didn't have a problem using both the instructor's course website and the college's course management systems, Steve voiced the following frustration:

> … it could maybe be better if he had more of what's going on in his classes instead of just on Educator [CMS]. Instead of just having it split between two websites. I think that it would be better if he just did it in one. I think that it would be a lot easier. So then it wouldn't be like I need to go here to get to know all this stuff, but I have to go to Educator to get my grades, when I should really be able to go to one site. I think when I go to his website it should have what he requires and everything should automatically be on his website. So if you are a part of my class, this is the stuff that you will be doing. And all that stuff should be on his website.

The student has a valid point; why post information in two different locations? Instructors need to be careful about using multiple resources and clearly communicating their strategy for doing so to their students.

The primary themes for this case study unit involve the students' experiences with the course website, the content provided on the site, faculty facilitation, website design, educational contribution, and course management system overlap. Viewing perceived value as a dimensional construct recognizes the contribution that each of these thematic elements provides to the overall course website experience.

The next part of the narrative focuses on the theoretical linkage to the constructivist model described in Chapter 2.

Constructivist Assessment

When asked whether he provided constructivist learning content on his course website, Alex responded, "That's not really the goal of that site." This perspective is

consistent with the findings from examining the website. Of the course websites included in the study, Alex's website is the most aesthetically pleasing, providing a very professional looking web interface. Though conveying a well-developed design, peeling back the layers reveals a limited set of internal pages that provide minimal course information and content. From a constructivist perspective, the amount and types of technological features and relevant information that intersect with the constructivist model are also limited. Table 7 provides a high-level overview of the specific course website features paired with the theoretical constructivist influences presented in the assessment model.

Table 7

Constructivist Assessment Matrix – Alex Reardon

Constructivist Influences (Guiding Objectives)	**Course Website Content and/or Technical Features (Guiding Interactions)**

Environment Support & Adaptation	• Welcome page with preliminary instructions.
	• Personal information provided.
	  ○ Contact information
	  ○ Educational history
	  ○ Professional affiliations
	  ○ College responsibilities
	• Textbook information provided.
	• Site design supports easy navigation and usage.

Knowledge Discovery & Active Learning	• No active learning activities on course website. • Linkage provided to textbook resources that lead to publisher provided active learning activities. • Instructor provided active learning functionality supported on college CMS.
Experiential Organization & Validation	• Links provided for other college resources. • Links provided for textbook resources.
Collaborative Influences	• Email link provided for student/instructor communication. • Messaging and Discussion Board functionality supported on college CMS.

Addressing environment support and adaptation, Alex's course website does provide the user with informational resources designed to point the user toward key information. The instructor provides a welcome page with preliminary instructions, significant personal information, textbook information, and an easy-to-navigate website. One of the challenges of helping students construct knowledge involves making the students comfortable with the instructor and the media used to deliver course information and content. Alex's website meets this challenge primarily by introducing the instructor well, while providing little course level information. The welcome screen begins an introduction that flows across multiple web pages and includes the instructor's photo, contact specifics, his educational history, his professional affiliations, and college administrative assignments. Though not intended to help his students construct knowledge specifically, the information does serve to introduce the instructor and allows the student to develop a base level familiarity with the instructor's educational credentials, professional associations, and level of involvement in college activities.

Alex's website does not contain any specific content designed to aid the student with knowledge discovery through active learning. However, Alex does provide linkage to the publisher textbook website, which contains significant active learning opportunities. Some of the supported activities on this auxiliary website include interactive quizzes, flashcards, research exercises, and hypermedia links to other web content. When asked how they used this website, Amy found value in the linked content, commenting:

> I use it to study for tests. You pick a chapter and there [are] matching games or crossword puzzles and stuff like that.

Though unintentional, by linking to the publisher's textbook resources Alex is providing constructivist oriented, web-enabled content that supports his psychology students' efforts toward knowledge discovery and learning.

The textbook website also provides limited support for the guiding objective involving experiential organization and validation. The students are able to reinforce the learning begun in the classroom by utilizing the external links, research exercises, and web-quest activities provided on the site. Though none of the students specifically mentioned taking advantage of these resources, nonetheless the instructor's course website is providing access to this type of content.

The last guiding objective involving collaborative influences is supported to a limited perspective by the instructor-provided email link on the course website. The email link supports student-instructor interaction from a limited perspective; however student-student or group interaction is not supported on the instructor's course website. Further collaborative functionality involving interactive chat sessions and discussion boards is supported on the course management system (CMS).

Alex's course website provides a limited subset of constructivist content that supports the categories defined in the assessment model. Despite these limitations, the website meets the instructor's objectives for providing basic introductory information and linkage to other content and the college's CMS. Though deficient in providing constructivist learning experiences for his students on his course website, the instructor does provide two pass-through links that lead to substantial knowledge discovery resources; the first is the publisher's textbook website and the second is the class shell in the college's CMS.

Case Summary

Alex Reardon's course website provides a limited subset of content and functionality to a technically-savvy group of students. By slowly abdicating content and information delivery to the college's course management system, Alex has changed the focus of his course website from course support to logistical support, providing personal, professional, and organizational information. Students' comments were consistent in regards to perceived value, with little or no variation based on gender or race.

Emerging themes highlighted the utilitarian role of the website while recognizing the lack of content functionality. Students valued the information provided; however, most had little use for the website once they had gained familiarity with the current content. Nonetheless, the existing course website was preferable to having no website.

From a constructivist perspective, the course website offered limited content and resources that map to the constructivist model. Most significant was the textbook linkage and access to the interactive and knowledge discovery opportunities presented on the publisher's website. Also important, interview comments suggest that the instructor did a good job introducing himself and facilitating course website usage via the website design.

Case Study Unit 2

The second case study unit involves a course website that is representative of the Category 3 classification (see Table 5) identified during the preliminary course website evaluation phase. Category 3 course websites were characterized by attention to personal detail, organizational class information, some course content, some constructivist learning

objects. These were typically multi-page websites that had links to external resources and paid some attention to site aesthetics. Nine of the candidate course websites scored within this classification, which represented 10.23% of the websites evaluated for the study. As before, the website was chosen for case study inclusion based on the selection strategy explained in the previous Methods chapter.

Participants

Case Study Unit 2 participants also included five students and their instructor, Jason Small. Jason is a full-time, tenured faculty member at MWCC teaching in the English department. He has been teaching at the institution for nine and a half years with five years experience prior to coming to MWCC. Currently, he is teaching freshman composition first and second semester, spelling, and a literature course.

As before, the student participants (see Table 8) for this case study were solicited for study inclusion as described in the Methods chapter. Student participants for this case study included four female students and one male. The age difference for this case was slightly more pronounced than the prior case, with the youngest being 18 and the oldest being 29. Four different academic majors were represented, including teaching, nursing, chemistry, and computer science. Terry indicated that she was undecided regarding her major field of study at the time of the interview.

Table 8

Case Study Unit 2 Student Participants

Name	Initials	Age	Gender	Ethnicity	College Level	Major
Barb Richards	BR	26	Female	White	2nd Year	Teaching
Terry O'Neal	TO	18	Female	White	Freshman	undecided
Hosefa Garcia	HG	22	Female	Hispanic	Sophomore	Nursing
Ali Murphy	AM	29	Female	White	Bachelors	Chemistry
Cary Dodak	CD	21	Male	White	Freshman	Computers

Similar to the first case, the students and the instructor were asked preliminary questions designed to gauge their familiarity with computers and utilization of Internet provided resources. The following narrative provides a little background that serves to frame the participants' technical expertise in regards to computer usage.

Jason indicated that he had been using computers since about 1979 (28 years) when he was fourteen years old. He stated:

> A long time. I first had exposure to computers, [when] I was about fourteen at a Michigan Tech Summer Youth Program to do Fortran programming with the little cards. We give it to the people and the next day you pick up the print out to find you had a typo.

Later in high school, Jason was provided his first programming experience when working for Dow Chemical as a co-op. This interest in technology continued into college, where Jason eventually minored in Computer Science. When asked what type of activities he used the computer for, Jason listed several, including word processing, research, and spreadsheets. He indicated that most of his activities are related to his teaching and he spends little time playing computer games.

When asked about his Internet experience, Jason responded that he has had Internet access through graduate school employment since 1994 and access at home for the last four years. He typically uses the Internet for research purposes and occasionally indulges his shopping urges when he "finds things that he wants to buy." Jason enjoys working with computer technology, and though he has no wish to teach entirely online, he utilizes the technology for all of his face-to-face classes. When talking about his online components, he uses the analogy of an "online filing cabinet" to describe how the technology supports his course activities.

Early professional development opportunities provided the inspiration for Jason's course website. A couple years after he started working for MWCC, Jason participated in a "Teaching Online" course directed by one of his colleagues. An outgrowth of this course was the creation of a website that evolved into his current course website. When asked how he developed his website, Jason responded:

> Well, I took the office assistant's department site, asked her if I could borrow it and then put in my own stuff. So instead of English Department, I put in Jason Small's home page, added my own picture, pretty much used her link structure, and then developed smaller pages from there.

Like Alex, Jason mimicked a website that permitted him to climb the learning curve without having to reinvent the website from scratch. Jason estimated that he spent more than a hundred hours developing his website.

Similar to the first case unit, most of the students interviewed for this case indicated that they were first introduced to computers at an early age. All of the students were consistent in having at least ten years of computing experience with some pointing to first encounters occurring in school while others were introduced to computing at home. When

reminiscing about her early experiences with computers, Terry, an eighteen-year-old nursing student, commented, "My dad was one of the first people in Saginaw to get a computer…he was Inspector Gadget."

Also consistent with the students from Case Study Unit 1, all of the students have been online and using Internet resources for quite some time. For most of the students, Internet usage was an important part of their first computer experiences. It also provided a transitional experience where the student gained a new online identity. Hosefa, a twenty-two year old nursing student, expressed her excitement of having her own Internet login:

> HG: Let's see. The first time we got Internet I was probably about nine or ten. That's when we got AOL. Got my first screen name.
> D: That was a big deal, wasn't it? Did you have an ID? Did your parents give you an ID?
> HG: Yeah. It was the kids' one. I could only do like little things, but it was kind of exciting having my first screen name. People would e-mail me, so that was cool.

Becoming an online user was "exciting" and became the precursor to continued exploration and utilization of Internet resources.

When asked how they used computing technology and the Internet, most of the students echoed each other and the prior case study with consistent use of Myspace, Facebook, AIM (AOL Instant Messenger), and email communication. Other usages included banking, "surfing the net for fun," and downloading "music so I can put it on my MP3 player." The one exception was when Ali, a chemistry major and the oldest student participant. When asked about digital communities, she commented:

> I don't look at any of that stuff, but I use it [Internet] for looking at different stuff online. Like stores if I want to order anything.

Some of the students also recognize the value and convenience provided by Internet resources for supporting their educational efforts. Consider the following exchange:

HG: I do a lot of research on the Internet for classes and stuff that I want to learn about.
D: Do you, the same thing?
BR: Well, I usually go on the Internet for one main reason, two main reasons. That's to connect with friends and also to broaden my horizons on child obesity and exercise. That's what I'm going into. So I try to find any new research out there they found.

Students use the Internet as an information resource to support course selection and as a knowledge repository for specific research needs. Also, since the Internet is dynamically accumulating information, new research is made available for student use sooner.

All of the students agreed that life without computers and the Internet would be difficult. Comments ranged from "I need the Internet," to "I couldn't live without it," to "It's like my cell phone." Just as with the first case study, these students are comfortable and capable users of computing technology, representing a wired-in generation that is fully capable of exploiting electronic resources in their personal and professional (student) lives. Fortunately for them, they have instructors such as Jason who utilize web-based technology in their teaching.

Website Setting

When asked about design inspiration and whether he researched design specifics, Jason had an interesting response that chained the words "clown pants" to "digital rhetoric." Consider the following exchange:

J: In my graduate education we talked about readability issues, interest issues. I recall a professor saying one critic called a lot of sites like "clown pants." And it was very bizarre just how one would set up a…
D: Clown pants?
J: Trousers for a clown.
D: Ok.

J: Which I am not quite sure I understand fully. But that was very boring site setup. Templates, digital rhetoric is a fairly new field in my area.
D: Digital rhetoric?
J: Yes, that is what they call that. And I didn't really study a lot in digital rhetoric. But there is quite a lot of decision making that goes beyond just the coding.

According to WebDesignHelper (n.d), "Clown pants" from a website design perspective is typically viewed as "patchy, confusing jumble, without any apparent visual hierarchy of importance." Though Jason claimed that he was "not quite sure" he understood the term fully, he was obviously aware of what was "boring" from a design perspective. Likewise, though he claimed that he "didn't really study a lot in digital rhetoric," he understands the significance of expressing yourself well from a digital perspective and that decisions involving content influence the overall website design.

Jason's course website provides a simple, organized interface that supports student navigation and provides access to the websites many resources. In its initial inception, the website was created by modifying a copy of the English Department's general information website. The resulting design reflects a minimalist perspective that includes only essential information while avoiding a cluttered, haphazard welcome screen characterized by the "clown pants" analogy. Structurally, the welcome page contains a header section containing the instructor's contact information, a table with links to other web pages within the site, a condensed set of navigation links, and website-specific text that provides some basic administrative information. From a technical perspective, the site lacks the execution sophistication employed in the previous case. Rather than supporting a content view that maintains the sites structure, clicking on the links within the menu launches separate web pages. Aesthetically, the minimalist approach also falls short of the professional appearance inherent to the previous case study website, reflecting the website's reliance on a simpler

departmental website rather than being crafted using more sophisticated templates. In spite of these perceived design deficiencies, the website provides substantial information and resources to assist learners taking Jason's classes.

Rather than present a picture of himself on his welcome page, the main focus on Jason's welcome page is a statue image of a famous author. When asked why he decided to include this on his home page, he responded that the author is "related to English…major English writer…" Students utilizing Jason's site recalled the statue; however, they had a difficult time remembering who it was, with a couple of students agreeing that the instructor resembled the statue.

D: What is the first thing you see or experience when you go to his site?
HG: It's the picture of…
BR: Is it Walt Whitman? No.
HG: Edgar Allen Poe. I know it's a statue of somebody.
BR: Because he showed it to us before, but I can't remember who it is.
HG: A favorite writer. Robert Browning. No, William Shakespeare!
BR: I knew it was somebody, because he showed it to us like four or five times.
HG: And if you kind of look at Jason and William Shakespeare, they resemble each other.
D: Does it say anything to you about Jason's personality?
HG & BR: Yeah.
HG: They are like two peas in a pod.

When asked whether the statue is preferable to a picture of the instructor, Cary, a twenty-one year old computer science major, preferred the statue, explaining "It's not just bland, it gives you something to look at." Unlike Alex who wanted his picture on his homepage, Jason cited privacy reasons when asked why he didn't post a picture of himself, stating, "I don't want my own picture on there…they know what I look like because we have face-to-face classes."

Similar to the previous case study, Jason's welcome page provides navigation links that allow the students to traverse the website and access content. The main links include Office Hours, Office Location, Courses Taught, Syllabi, and "Favorite and Helpful Links." Additional links in the page allow the users to connect with the English department and the college's main website. When talking about the navigation scheme, Jason's comments confirm an understanding of common web development terminology:

> I would say that it is fairly linear. You could say hierarchical. There is the main page and it has links to subpages. It is recursive. Each subpage links back to the main page without even using "back."

Unlike the previous case, Jason does not provide a link to the college's course management system though he also uses it to provide course content. The page ends with some standard boilerplate communicating the last revision date, the base URL, copyright information copyright information, and where to direct questions or comments about the website.

Starting with the "Office Hours" link on the welcome page, the instructor has provided the means by which students can easily determine office availability to answer questions or offer course assistance. The office hour webpage provides a common look and feel, relying on the same template structure used for the welcome page. Office hour blocks are represented in table format with a textual disclaimer inviting the students to suggest other times if necessary. A link back to the welcome page is provided along with a sub menu that allows students to access other content areas in the website. Similar to Alex's website, Jason also provides a link from the welcome page to a campus map to help students find his office. Students typically viewed this logistical information favorably, with several students reporting that they used the office-hour page when needed. Cary stated, "When I got on it

[Jason's website] you know, I checked out his office hours, and where it was. I liked knowing when he was available."

Clicking on the "Courses Taught" link takes the student to a webpage that lists the courses Jason teaches for MWCC. Clicking on the individual course links launches a separate webpage specific to the course that provides detailed information about the course and other offerings within the English department. The students' opinions varied regarding the value of this page, with most considering this marginally important content. However, Ali found this particularly valuable:

> It shows what courses he teaches in the future. Because he was a good teacher, I would be interested in taking him again. So it was kind of nice to see what classes he offered other than English.

Because this page is more informational and not specific to his current course load, its role is more aligned with providing students with information about English courses taught by the instructor and serves as a recruitment tool to help students make future course decisions.

The next navigation link on the welcome page connects students to the various course syllabi. Jason aptly refers to this as "What you can expect from me and what I will expect from you in a particular course." Clicking on the "Syllabi" link launches a webpage with a listing of Jason's classes. Students can view the syllabus for a specific class by clicking a course link. Once they have done so, the syllabus displays in its own webpage. According to Jason:

> I think every instructor should have a thorough syllabus, which includes some idea of a schedule if not so detailed, the student's need changes from semester to semester. But at least a generalized idea of what the students can expect, and when assignments are due I think is crucial. In my syllabus, there is significant linkage to every possible thing I could think of.

Jason provides a dynamic syllabus for each of his classes, which are filled with links to associated course information and content. Besides aiding the students in understanding course responsibilities, Jason's syllabi also provides links to writing resources and reference tools. When discussing the significance of the online syllabus, Hosefa summed it up best:

> The syllabus was very specific. This gives us online resources for writing our papers, and reference tools and grammar and style. Because it was an A class we spent a lot more time focusing on those things.

When asked what the most important content was provided in the course website, the students and the instructor all agreed that the syllabus was the most important resource provided because it details "what is expected of you" and "when things are due."

From a course content perspective, Jason uses the syllabus to provide a hypertextual skeleton that supports branching (linking) to related course information in a logical way. By taking advantage of web delivery, as opposed to a static document handed out in class, the instructor encourages exploration of course information without overwhelming the students with all of the information at once. Course information provided within the syllabus includes contact information, office hours, CMS usage, course overview, required text and materials, course outcomes and objectives, course learning activities, course assignments, course policies, resources for writers, and a comprehensive schedule of sessions. Each of the individual components has links to related information or other resources designed to answer questions or meet individual learning needs. By using hyperlinks and a webpage format, the instructor can easily add or remove content, enable or disable links, and incorporate new information as needs dictate.

The last link provided by the instructor leads to the "Favorites and Helpful Links" webpage. This page provides an extensive set of resource links that are designed to assist

Jason's students and help them improve their writing and research skills. The provided links extend the instructor's reach to external content delivery that include writing labs, online libraries, online universities, research and reference tools, guides to grammar and style, citation guides, and other miscellaneous links. Several of the students mentioned using the citation services often when learning about MLA and APA formats and how they differ. Others remembered using the Online Writing Lab OWL at Purdue and some of the dictionary links provided on the page. Generally, they viewed the resources as important and helpful. Terry, though confused on the correct terminology, found one of the research resources helpful. She said, "There's also, what's it called, not a transfer, let's call it a link it goes right to an amazing research paper builder type thing where it helps you get all your research." However, Barb, a twenty-six year old teaching major, marginalized the value of the resources page. When asked what's least important on the website, she replied, "I mean the resources for writers, I mean a lot of them is kind of common sense, but it's still nice that he put that up there for us."

Unlike the first case study, the instructor did not have an "About Me" link or significant personal information on his course website. The one personal touch the instructor included was a link to a webpage with several photos of a garden he tended for five years. The photos are beautiful and Jason is obviously a skilled gardener. Jason talked about that specific page lightly, choosing it as the "least important" content provided on his course website. Academically, I am inclined to agree with his perspective; however, I think it brings a personal touch to a website that feels somewhat sterile and bland. Though Jason views the garden page as unnecessary, Ali remembered the webpage. When asked whether Jason provided any personal information on the site, she responded, "He has a garden page…you

can tell he was really into it, it's really nice." The same student thought Jason should include a photo of himself.

Jason's course website provides some meaningful content and significant resources that his students find useful. Regarding navigation, the website is very simple, easy to understand, and utilize. Concerning content delivery, Jason utilizes his course website and the college's course management system. On the personal side, Jason's students catch a glimmer of his interests in the garden page, but little else.

Like the previous case, this part of the narrative was designed to provide a tour of the website in the context of a site walkthrough. The next part of the narrative provides a thematic analysis of this case study in the context of the constructivist assessment model.

Of Thematic Interest

The next part of the narrative discusses some of the major themes that resulted from the analysis processes. As discussed previously, this process involved in-depth, line-by-line analysis of the interviews transcripts and observation notes, resulting in the extraction of a coherent list of codes that highlight thematic information about the case study. This process involved several iterations until a final list of codes was generated, resulting in 210 code occurrences spread over 57 unique codes and eight sub-domains. The codemap provided in Appendix K highlights the unique codes related to their sub-domains. Icons included on the code map are sized based on the number of a particular codes occurrence (e.g. larger icon, more occurrences of that particular code).

First Impressions. Similar to the previous case, the students' experience utilizing the course website provides the central focus and frames the thematic discussion. For Jason's

students, “first impressions” are important, providing essential clues that the student can use to visualize the course website and build familiarity with its content. Most of the students remembered the statue that occupies Jason’s homepage; however, their guesses of “Walt Whitman,” “Edgar Allen Poe,” and “Robert Browning” are basically “Much Ado About Nothing.” Though forgetting the name of the great bard, Hosefa associated Shakespeare with their teacher, claiming Jason and William are like “two peas in a pod.” All of Jason’s students talked about that statue when asked what they noticed first when they accessed the course website. Jason was bit more pragmatic; his response was a replay of the navigation scheme:

> My Main page, the Index page, the Home page, which has my name, title, and contact information on it. And then the links to things like office hours, syllabi, courses taught.

Though they view the homepage through different eyes, “first impressions” play a part in how students remember course websites.

Access Facilitation. Access, to the site and information, is also important to the student course website experience. Students expect course websites to be broadly available and accessible without jumping through technical hoops. Once they have accessed the website, the provided information should also support easy access and not require special technical skills. In support of this need, Jason provides a well-structured course website that utilizes a simple interface. Students are shown on the first day of class how to access the course website and how to navigate the site. Jason relayed the following:

> On the first day of class I take them to the MWCC Page and have them type my User ID at the end of the MWCC address. This brings them to my website. I show them what I have on my website, the different resources for them. Then we focus on the syllabus. The second day of the course we get into Educator [CMS]. Syllabi don’t print well from Educator for some reason. So that’s why I just always go into

my site first. So after that first day, I take students back to my website, my home page, if they are asking questions about something I covered on the site.

Talking about ease of use, Cary described Jason's website as "not full of mumbo-jumbo," and Terry called it "very blunt and bold." Judging from the students comments, Jason's presentation strategy and access facilitation are a success.

Blended Strategies. Similar to the previous case, Jason also utilizes the college's course management system to provide some course related information. Some of the students were confused by this strategy and wondered why Jason relied on two web interfaces. Consider the following exchange:

TO: It's hard because it's confusing like his website and Educator. Because they both have the same exact information. It shows you the entire campus too.
D: Do you find that confusing, that he has two different places for this information?
CD: It's kind of confusing. I don't understand why he uses one more than the other.

Students need to clearly understand where they must go to locate specific information on a course website. Instructors utilizing multiple web interfaces (e.g. course websites and CMS) can potentially create confusion for their students. The discussion continues:

D: So he's using the faculty website to provide some information and Educator to provide you guys with other learning content. Exercises involved with your class.
CD: Yeah.
D: How does this differ? Do you guys use them both? Go back and forth one to the other?
TO: I mainly use Educator.
CD: That's mainly what I use is Educator.
D: Because that's where your course assignments…
TO: That's where all the information stuff is. The assignments. The syllabus and the important stuff is on his website. But the stuff to make us better is on Educator.
CD: Educator.

Could this be any more confusing? One student claims that all the important "stuff" is on his website while another claim the "stuff to make us better" is in the CMS. No wonder they're confused.

So, how does Jason justify a blended approach of using both a course website and a course management system to provide course information? When asked about his usage of the CMS as compared to his course website, we had the following exchange:

> D: How does the content you put on Educator differ from the information you've provided on your faculty website?
> J: It's much more specific. It's all the assignments, all the course work we'll do in class. I've gotten to the point where all my handouts, with very few exceptions, are in Educator. And I no longer go through printing services for those, which helps the English budget significantly.
> D: What is the overlap? What is the same? What information is conveyed on the faculty website as well as on Educator?
> J: Syllabus, and contact information. Some links, although my links in Educator tend to be different than the ones on my main site. I don't just repeat those. I have assignment specific links if there are any.
> D: Ok. Do you have a preference for information delivered? One or the other. Which one?
> J: Educator, for secure. Website, for general.
> D: No? Are there any security concerns? Do you put any information out there on the site that a student might be concerned about?
> J: I do not. I do not and that is why I like a site like Educator. My actual course content is protected through Educator. I figure my syllabus is public domain, doesn't matter. But if I had a special lesson plan or approach, I wouldn't put it on my website for security issues. And I really don't want to password protect my website.

In explaining his rationale, Jason highlights a security issue that is probably a concern for many other instructors, as well. At times, Jason relies on copyrighted course content provided by the textbook publishers. He uses the CMS to place this content behind a secure firewall that prevents those without login access from copying the content. If he tried to enable similar functionality on his course website, he would have to engineer passwords and IDs for all of his students and endure the subsequent maintenance headache required to keep

things current. So, at the risk of creating a little confusion for his students, he is protecting course content that he doesn't want copied. Is the trade-off worth it?

Meaningful Content. Of the content provided on the course website, students viewed the office hours, contact information, the syllabus, and homework assignments as the most important. Unlike Alex, Jason provides very little personal information on his course website, instead focusing on content that relates to logistical needs and supports course activities. This strategy is supported by his students who seem apathetic about the need for personal information, though one student thought the site would be more interesting if the instructor included a picture of himself. What students do appreciate are instructors who provide meaningful information on their course website. Jason's students appreciated the level of detail provided by the online content, with several claiming that they were motivated by the availability of information on the course website. When asked whether the course website motivated them regarding the class, students shared the following comments:

> TO: Yes. It was nice. It was just something different instead of doing the Educator. You have more of a personal website. And me, I always forget things so for me it was nice to get on there and find the class information. It had everything that was due. I also liked that it shows what courses he teaches in the future. Because he was a good teacher so I would be interested in taking him again. So it was kind of nice to see what other classes he offered other than English.
> CD: I guess it motivates you because you know he has a website and is trying to help you and giving you the motivation and saying here is everything. He says, I'm laying everything out for you. This will help make you organized.

Convenience. Jason's students welcome the organizational assistance provided by the website content and the convenience of being able to access the information online especially if they lose something. Ali commented:

> You can see everything …and a couple of times I'd print them out and then lose them, but you can print it out. It made it better because it was online and not on a

> piece of paper where I could easily lose it. It's nice seeing a website up and not having a mound full of papers.

Convenient access to handouts, notes, and other course information is an important service provided by course websites.

Visual Communication. Course websites communicate to students visually. The site design and how the information is presented provide the students with visual cues that communicate information about the instructor's personality, educational goals, and interest in teaching. When I asked Jason what his course website says about him, he replied:

> Maybe, obsessive compulsive? I am not sure. I like things in their proper order and computers are very much about having things in their proper order. I think I am really good with computers, at least used to be in terms of programming because I am really good with English. Hopefully, the site says "I'm approachable." Their [students] success is my number one goal.

When I asked his students what the course website said about the instructor, students replied with "He went the extra mile" and "You can tell, he loves what he does and takes pride in it." Barb thought the site reflected a lot of hard work and effort, commenting:

> The site shows what he is about, and just know how hard he works with all the other classes he's teaching, and then you kind of have the sense that hey maybe you don't want to waste his time, so maybe you want to get this done before. I don't need him to worry about anything else. He's obviously a very busy person.

By recognizing Jason's efforts on her behalf, the student felt more motivated to keep up with course work and not waste the instructor's time.

Site Design. Audience consideration is of primary importance in course website design. College students expect to be treated like adults and be provided with content appropriate for their age level. Several students relayed prior experiences with course websites that failed to meet their learning expectations. Consider the following dialogue:

TO: I consider my high school one bad. Our teacher was cheating us, we were seniors in high school. We've done and gone through so many things in our lives, do not treat us like children. And that is exactly what the whole website was referring to, us being children. Wasn't anything hard it was just…
D: How did it refer to you being a child?
TO: Cause it was like dolphins jumping on a floating piece of ice, and if you'd get it wrong a whale comes up and eats you. I mean just childish games. And it made me feel like I was getting dumber by the minute.

The student felt cheated and was expected to utilize a website that relied on childish games. Designing a course website at an inappropriate level for the target audience is a recipe for poor site utilization and ineffective information delivery.

Poor website design also rears its head in other ways. Another student relayed an experience with a course website utilized for a band class that made a lasting impression on her.

HG: I would have to say the band website was kind of the worst because it wasn't exactly what I would have made it if it were my website. Like for band, the teacher is very disorganized and you could tell by the way her website was done that it was disorganized and things weren't posted where you would think they would be when you were looking for something.
D: So it was laid out illogically.
HG: Yes. It was laid out illogically and so it was frustrating every time I went on the website, I couldn't find what I wanted to find and have to spend a half an hour just looking for one thing. So that is very frustrating when I have to do that.

In the words of these students, a disorganized teacher created a disorganized, illogical course website that was frustrating to the students and provided little benefit.

Though not specific to the case website, these experiences with poorly designed websites provided the students a frame of reference through which they could view Jason's course website. A few of the students thought Jason could spice things up a little by adding "a color theme," "some excitement," "maybe some music," or "some better pictures."

However, most of the students were happy with the site in its current state. A couple students shared the following:

> BR: I honestly think it's great the way it is. If I were him I would probably do the same. Because I think he really went to a lot of depth, it's laid out well and covers a lot of information. When he showed us the site there were very little questions afterwards.
> HG: Yeah, I agree. I would have to agree with what she said about Jason's. His is my favorite site.

Students have definite needs regarding content delivery, the types of materials presented, and how it is to be accessed. Being the children of the Internet, they understand and know the difference between good web practices resulting in quality web experiences and poor web design practices that result in disappointing web experiences. The findings for this case show that perceived value of course websites is affected by first impressions, access facilitation, meaningful content, convenience, blended usage with course management systems, visual communication, and coherent design.

The next part of the narrative focuses on the theoretical linkage to the constructivist model described in the Literature Review chapter.

Constructivist Assessment

Though relying on a simpler web presence, Jason's course website provides significant course information and a moderate amount of course content. From a constructivist perspective, Jason's attention to providing substantial course information is also reflected in more technological features and relevant information that intersect with the constructivism model. Table 9 provides a high level overview of the specific course website features paired with the theoretical constructivist influences presented in the model.

Table 9

Constructivist Assessment Matrix – Jason Small

Constructivist Influences (Guiding Objectives)	Course Website Content and/or Technical Features (Guiding Interactions)

Environment Support & Adaptation	• Welcome page with preliminary instructions.
	• Personal information provided.
	  ○ Contact information
	  ○ Garden Page (Hobby)
	• Course descriptions and textbook information provided.
	• Course assignments and projects provided.
	• Dynamic course syllabus provided. (links to various resources and course information)
	• Course schedule provided.
	• Site design supports easy navigation and usage.

Knowledge Discovery & Active Learning	• Interactive resource linkage
	  ○ Citation builder
	  ○ Online writing labs
	  ○ Research and reference tools
	• Activities on both course website and college CMS

Experiential Organization & Validation	• Links provided for other college resources. • Links provided for writing resources. (significant)
Collaborative Influences	• Email link provided for student/instructor communication. • Messaging and Discussion Board functionality supported on college CMS.

Similar to Alex, Jason's course website supported the students logistically by providing informational resources designed to address environment support and help users adapt to accessing course information online. The instructor provided a welcome page with preliminary instructions, course descriptions, course schedules, textbook information, and syllabi, all accessible via an easy-to-navigate website. Unlike the previous case, Jason does not provide any personal or professional information that serves to introduce him to the class, preferring to present this information while talking with his classes directly. Though lacking

in the personal information department, Jason's website did a thorough job introducing course information that allows his students to develop a base level familiarity with course objectives, requirements, and other logistical minutiae.

Jason's course website provided several active learning resources designed to help the students with knowledge discovery and support their writing activities. When Jason was asked whether he had any constructivist learning content on his course website, he responded with the following:

> Sure. A lot of the resources are designed for that. For example, Modern Language Association Citation Convention, they can link to a site that explains those in depth, and they can, therefore, learn how to do it themselves. We do, of course, go over that in class until we're both sick of it. But it is a hard concept for students to grasp. The website links help them with this.

Student comments supported the value provided by these writing resources, with several students mentioning the citation services and the interactive writing labs as resources that were used in course of completing assignments. By providing access to interactive writing resources, Jason is utilizing course website technology to support his English students from a constructivist perspective.

To support experiential organization and validation, Jason's reinforces lessons learned in the classroom by providing several links to external resources. Included among these external resources are online writing labs, research and reference tools, style guides for grammar and word usage, citation support, and other writing links. Students can utilize these resources to augment and extend the lessons taught in the classroom and the information provided in the course text. Once again, students viewed these links from a positive perspective, acknowledging their usage in the course of completing various writing assignments.

Similar to the previous case, the course website provides limited opportunities for technology supported collaboration. Once again, the sole feature is an instructor-provided email link on the course website that supports student-instructor interaction from a limited perspective. Activities requiring student-student or group interaction are supported by use of the college's CMS on a limited basis. Though the capability is supported by available technology, the instructor was not a big fan of group discussions, describing the experience with the word "chaos." He cited the following example:

> I used to do midterm assessments on line. I had students in writing [class] answer three specific questions. I would summarize those questions and upload them to BlackBoard [CMS system] and then have them chat their reactions. And it would invariably degrade into some nasty comments. Not about the course, but students would start picking on each other. A few, not many.

Jason's course website provides some features and content that support the categories defined in the constructivist model. Basic information is provided to facilitate student usage of the course website and access to course resources. Knowledge discovery and active learning are supported by several interactive writing resources. The students learning experience is augmented by links to external resources that complement lecture and text activities. Last, collaboration is supported by email links and features available within the course management system.

Case Summary

Jason Small's course website provides a moderate amount of content and functionality to a technologically literate group of students. Jason also relies on the college's course management system to provide some of the same content and other copyrighted

content as well. By using a blended strategy that addresses security concerns from a copyright perspective, Jason has created some confusion for his students. Typically, the students view Jason's course website positively and appreciate the time and effort expended by the instructor on their behalf. As with the previous case unit, there were no noticeable gender-specific or racial differences between students regarding their views of perceived value supplied by the course website.

Emerging themes contributed to an understanding of some of the dimensional aspects of perceived value that enhance the users' experience with course websites. Highlighted themes included first impressions, access facilitation, course management system usage, meaningful content, communication, and coherent design. Jason's attention to site design strategies that support these themes provide the basis for positive course website experiences for his students.

From a constructivist perspective, the course website offered a moderate amount of content and resources that map to the constructivist model. Most significant were the resource links that supported interactivity and knowledge discovery while helping students become better writers. Also critical, the instructor's dynamic syllabus provides an organizational framework that the students rely on for accomplishing course objectives.

Case Study Unit 3

The third and final case study involves a course website that is representative of the Category 4 classification (see Table 5) identified during the preliminary course website evaluation phase. Category 4 course websites are characterized by personal detail, organizational class information, and course content delineated by classes including

assignments, notes, presentations, constructivist learning objects, external resource links, collaborative features, and others. These websites utilize a multi-page format requiring extensive navigation linkages and involve some attention to website aesthetics. Six of the candidate course websites scored within this classification, which represented 6.82% of the websites evaluated for the study. As before, the website was chosen for case study inclusion based on the selection strategy explained in the previous Methods chapter.

Participants

As with the other cases, Case Study Unit 3 participants included five students and their instructor, Robert Chase. Robert is a full-time, tenured faculty member at MWCC teaching in the Mathematics department. He has been teaching at the institution for fourteen years and also taught part-time as a graduate assistant when working on his Master's degree. Like Alex, he is also extensively involved in the shared governance activities at the institution, serving as the chair of the Instructional Technology Advisory Committee (ITAC) and as a participant in many other college activities.

The student participants (see Table 10) for this case study were solicited for study inclusion as specified in the Methods chapter. Student participants for this case study included two female students and three males. All of the students were relatively close in age, with the youngest being 18 and the oldest being 23. Academic majors represented included Business (2 students), Law Enforcement (1 student), English (1 student), with one undecided.

Table 10

Case Study Unit 3 Student Participants

Name	Initials	Age	Gender	Ethnicity	College Level	Major
Sarah Keller	SK	20	Female	White	Sophomore	Business
Thomas Nugent	TJ	23	Male	White	Returning to school	Law Enforcement
Tracy Erskine	TE	18	Female	White	Freshman	English
Don Bradley	DB	20	Male	Black	Sophomore	Undecided
William Owen	WO	22	Male	White	Some college – 2nd year?	Business

Following the interview structure, the students and the instructor were asked preliminary questions designed to gauge their familiarity with computers and utilization of Internet provided resources. The following narrative provides a little background that serves to frame the instructor's technical expertise in regards to computer usage.

Robert indicated that he had been using computers since about 1980 (27 years) when he was sixteen years old.

> I've used computers literally since high school. That was, say, age 16, so that would be 27 years ago. And typical high school program Basic to make it add numbers or something or play Ping Pong or play Tic Tac Toe. And then college, I got into college and I didn't have a serious interest in computers, but in there I did use computers and they were all like here is the main frame, here is your terminal, this is what you can do. I didn't really get into that, so I go into math and then I left with my undergraduate degree, and then say went to the University of Minnesota. There I got a minor in theoretical computer science. Because there is a lot of math connected to computers and then I said, the central question that I do when I look at things, what can a computer do. My gosh, I realized that it could do a lot of things as long as I should know what I should ask it to do. Now I got my Master's degree in `88 in theoretical computer science, but [what] I learned in 1988 any computer student would learn sophomore or junior year now.

Robert's initial ambivalence to an archaic interface was transformed into fascination as computing technology improved. Realizing that the mathematics that fueled his Bachelor's degree was an important part of computer science, he straddled both interests academically and earned a Master's in Theoretical Computer Science. Continuing along those lines, Robert described his use of computing technology to solve math equations, "to talk to people, to gather information and disseminate it."

Similar to the other instructors in the study, Robert has been using the Internet and the World Wide Web since its early inception. Citing an early adventure using online technology, Robert recalled the following:

> I do remember having to deal with ARP and that, and that was what it was called. I remember going to a lecture one day and saying we're going to take you to the Louvre in France. We're going to show you the Mona Lisa and they loaded the page with mosaic, I think it was called, and dot, dot, dot, the pixels came. So they said ok, the good news is we got the Mona Lisa, the bad news is its going to take six more hours. And there is 30 people there and the graduate professor and we just laughed at them. You're insane. But we know where it ended. So, then I was captivated.

He typically uses the Internet for communication purposes and to support his classes via his course website. Being an educated, "captivated" user, Robert considers himself computer savvy and feels he "could use any computer to do anything he wanted to do." He is especially conversant in Apple technology, and when asked where he ranked himself technically, he confidently stated, "A nine. I would say that because I do specialize in this brand of Apple computer's operating system; I am not an expert in Windows."

Teaching responsibilities provided the motivation for the creation of Robert's first course website. His first course website was created using the hypertext markup language (HTML) and developed as a model to demonstrate website functionality to an introductory Internet class in the early nineties. Later iterations resulted from online teaching

responsibilities and were subsequently incorporated into use in his face-to-face classes, as well. When commenting on the time required for the development process, Robert described the process as "evolving." Consider the following exchange:

> R: You couldn't put it into days or something because that website has got code in it that's ten years old because it's evolving, growing, so over the years I've got to that point. But I never start from scratch. Every few years you start from scratch, but I haven't started from scratch for a long time.
> D: So you had that look and feel…
> R: That look and feel is exactly and currently about two years old, if you went back five years it would look pretty much like that and if you went back eight years it would not look like that.

Robert's website is a continually evolving creation that changes based on course requirements and technological enhancements to support faculty/student interactions, providing a convenient information flow.

Consistent with students' experiences in prior units, Robert's students indicated that their first experiences with computers occurred at an early age while in elementary school. When asked how they employ the technology in their daily lives, the students' answers ranged from doing homework and writing reports to recreational activities like playing games. Thomas, a twenty-three-year-old law enforcement major, was quite comfortable with personal computer technology, commenting, "The most I've ever done with a computer is actually build one out of spare parts and such." All of the students have significant experience using personal computers and related technology.

The students' answers varied when asked about Internet access. Tracy, an eighteen-year-old English major, remembered first accessing the Internet in 5th grade; Sarah, a twenty-year-old business major, recalls logging on when she was 10; and Don, a twenty-year-old undecided sophomore, said, "I've had access as long as I can remember." Like the other

students involved in the study, this group relies on the Internet and the WWW for conducting research (Wikipedia and Google), social networking (Myspace and Facebook), and keeping connected with each other through email. The students agreed that Internet usage is considered an everyday thing, and a couple even tried their hand at creating their own web pages. William, a twenty-two-year-old business major, commented, "I use to have a Home page. I went through one of those My Free Home page.com type of things, but that was years ago." Along those same lines, a Thomas said, "I had a homepage at one point, but now I don't even know if it's still there." When asked what happened to their interest in homepages, Thomas blamed their demise on the usage of digital communities like Myspace and Facebook, stating "The whole social networking thing kind of collapsed it." As Tracy aptly phrased it, Internet utilization is "just changing the way everybody does the student thing."

As in the other two case study units, the students in this case represent a digitally-connected, technologically-savvy generation that is well-equipped for course website usage. Relying on his educational background and technology experience, Robert provides his students with a content-rich course website that is designed to enhance their educational experience.

Website Setting

When asked whether he did any research on website design specifics prior to building his course website, Robert talked about several key concepts that significantly influenced his design philosophy. One of these concepts acknowledged the role of communications in course website design:

> And I do remember a really good book, and this woman was [an author] in the O'Reilly series and she was a designer and she had to have co-authors to explain the HTML to her. But she said, "The purpose is to communicate, and the purpose is to design." She was doing it right. She didn't know any of the HTML to do, but she said who cares what you write if you don't get it to the students. If *they* don't get it. So communicate was the word.

Robert pointed to a design strategy where what is communicated takes precedence over the technology that supports the communication. Also relevant, Robert learned that providing a consistent user interface that contained current content was an important design consideration:

> When I started, there was nobody saying this is the rules for making a website or this is even the rules for talking to your students. Now after a while you get in your mind thing like "Oh, but it ought to look the same on every page so you don't confuse people." You got to be consistent. You got to be current. If you're not current, they'll learn quickly not to come back. So consistency, currency, and then while you're looking and reading books, the books say you should be consistent and you say well everybody else figured that out too.

Collectively, the three design influences (communication, consistency, and currency) were reflected in Robert's course.

Deceptively simple in appearance, Robert Chase's course website provides an efficient user interface that disguises an extensive internal navigation scheme. The website was built entirely by Robert using HTML coding and does not rely on any standardized design templates. Reflecting his personality and mathematics interest, the page is anchored to a fractal graphic in the upper left-hand corner. The main menu is presented in a horizontal format and contains links to a personal page, a contact page, a courses page, and a fractals page. Below the main menu is a text greeting that introduces the instructor, provides some preliminary directions to a user, and explains the purpose of the site. Concerning this purpose, Robert establishes a rationale for the considerable effort spent making this course

website available to his students and colleagues. He writes, "I am trying to show my students and colleagues how valuable the web can be for distributing information and informing visitors." The page concludes with a sub-menu at the bottom that provides an email link, a link to the Mathematics department website, a link to the college's website, and copyright boilerplate.

The students navigated to Robert's course website using a variety of methods. When asked to demonstrate their preferred method of website access, William typed the entire website address on the URL line in their browser window. Also demonstrating access, Sarah used the faculty link provided from the Mathematics Division website to launch the welcome page. When asked how he accessed the website, Don said he searched the college's website for the instructor's name and clicked on that link. Thomas said he relies on an Internet search application, external to the college, to find the instructor's website. When asked how he accessed Robert's website, he answered:

> Google. I always typed in Robert's Web Corner, even if I didn't put in the apostrophe or the capitals or whatever, it was the first site right there.

Like multiple paths that lead to the same destination, the students utilize different and sometimes, unique ways to access the instructor's website. Once they access the site, the welcome screen displays, titled "Robert's Web Corner," which Thomas described as "very inviting."

Departing from the navigation scheme utilized by the previous cases, Robert's first link is to his personal information. Once the initial page loads, the user is presented a personal welcome page that has sub-menu links to other personal pages specific to education, reading, and favorites. Clicking on the "education" link launches a page that details the

instructor's educational path through the various universities he attended, providing links to the schools. William said, "I like how he had his credentials in there…he talked about what classes he had taken and where he studied…I liked that." Clicking on the "reading" link launches what the instructor describes as "the last ten books I have read." Revealing a little of the personal side, Robert provides a limited book review page that shows where some of his interests lie. Clicking on the final personal link, "favorites," launches a webpage with multiple links to other websites related to mathematics (e.g. recreations, resources, and organizations) and personal interests websites (e.g. computers/calculators, mandolin, and chess). These are wonderful links that represent significant time invested in trolling the Internet for resources. Tracy found Robert's hobbies interesting, commenting, "I found out he played the mandolin." Recognizing that this personal information had little to do with his mathematics courses, Robert viewed these pages as the "least important" information on his course website. Don agreed and said, "I think his personal information is probably the least necessary of all the other information." However, Sarah liked the personal touch and thought the personal information made the instructor more social and approachable:

> He has his profile and personal information letting us know a little bit about himself, which made him more social and kind of more approachable in a way instead of being kind of stiff about the whole thing. Like I'm your instructor and that's it kind of thing.

The next navigation link on the welcome page provides access to the instructor's contact information. The webpage provides the instructor's contact information beginning with his office location, a listing of office hours, his email address (clickable), his on-campus phone listings, and his address. Students found this page important and useful, indicating that similar information was also available on the course syllabus. When asked whether the

contact page was important, William replied, “Instructors should always have that information posted in case we lose the syllabus.”

Moving across the main menu, the next navigation link connects the students with the courses taught by the instructor. The course page contains a semester-specific matrix with the instructor’s current course listings, the times the course meets, and the instructor’s office schedule. Students access specific course web pages by clicking on the matrix links or using the sub-menu at the top of the page. Once they click on a specific course, the course syllabus displays in the browser. Like Jason, Robert provides his students a dynamic, web-enabled syllabus that contains basic course and grading information, a clickable course schedule, exam information, and course policies.

Embedded within the syllabus are various navigation links that direct the student to course content and other resources. Students wanting to find out what is going to be covered on a particular date simply click on the date in the course schedule. The resulting webpage contains a complete lesson overview with homework assignments, quiz links, handouts, resource links, and even links to printable graph paper. This is the “meat and potatoes” of Robert’s course website. Robert had this to say about his strategy for web-enabling course content:

> Every single thing that is used in the course is online. My syllabus is online. It’s not on paper. There’s nothing I can give my students that’s not online, because that is literally where I keep it instead of a file cabinet. I literally keep it. When the semester ends, I take it down, burn it to a CD so I can say, “In Winter 2005 this is what it looked like.” Or what did I assign. But there is nothing about a course that shouldn’t be online.

Robert uses his course website as a filing cabinet and, by doing so, provides his students digital access to everything they need to be successful in his courses.

The final navigation link on the main welcome page connects the student with Robert's fascination with fractals. Clicking on the "fractal" link launches a webpage containing the history of fractals and a sub-menu with links to several interactive and informational fractal pages. This part of Robert's course website is a collaborative effort where much of the content is being provided by students working in association with the instructor. Robert writes about the purpose, "Our goal is to inform, entertain and help you experience some of the wonder of mathematics! Join us as we explore the shocking implications of infinity!" Visitors to this part of the website can "play" with fractal exploration by changing the values used to draw the Mandlebrot or Julia fractals. Don had this to say about the fractal webpage:

> You can change the values for some of the fractals and affect how they display. Also, he has a very detailed fractal lab sequence that is very interactive. At least if you do the work and try the exercises. I really learned a lot by working through some of these.

Robert's course website, though simple in design from a presentation perspective, provides significant course content and considerable resources that his students find indispensable. From a navigational perspective, the website provides an easy-to-utilize interface. From a content perspective, Robert, with the exception of grade information provided on the CMS, relies entirely on his course website for content delivery. From a personal perspective, the website provides Robert the opportunity to share a little of himself and his interests with his students.

Of Thematic Interest

The next part of the narrative discusses the results of analyzing the data collected for the Robert Chase case from a thematic perspective. Following the analysis processes described for the previous cases, a final list of codes was generated, resulting in 169 code occurrences spread over 55 unique codes and eight sub domains. The codemap provided in Appendix L highlights the unique codes related to their sub domains. Icons included on the code map are sized based on the number of a particular codes occurrence (e.g. larger icon, more occurrences of that particular code).

First Impressions. Like the previous cases, this thematic discussion begins with the student's impression when first viewing the website. Unlike the previous cases, Robert's students had little to say about first impressions, which are probably a reflection of the dated website design. Where Alex's website was designed with a visually-appealing page layout, Robert's website was functional, current, consistent, and focused on content. By his own admission, Robert revealed that the website has changed little from the design scheme he put in place five years ago. However, the content changes often, and new technology is being incorporated as needs develop within his classes. Though Robert's website is simple in design, student comments supported its effectiveness at providing course content and information.

Organizational Assistance. Robert's students view organizational assistance and convenient access as important features that contribute to perceived value. From an instructor's perspective, providing course website functionality is all about making information available to students conveniently without excessive maintenance overhead.

Students want to be able to access course information at their convenience and via convenient technology without having to overcome technical hurdles. Robert recognizes this need and addresses it by providing complete course information and by facilitating delivery of content by employing strategies such as podcasting to augment normal website functionality. When discussing the usefulness of Robert's course website, Thomas had this to say:

> It keeps me on track. I don't know if I can put it into one word. Maybe…hmmm..provides direction. Direction's a good word for it. It keeps me on track like this is what I need to do, this is what I have to do. It's an organizational tool in that sense, but it motivates me because I have everything laid out instead of me just forgetting something or having to remember how to look it up. Kind of like a sticky note.

The student used the course website as a digital "sticky note" that provided organizational assistance and direction to help him stay on task.

Robert's teaching philosophy supports a strategy based on organization that is reflected in his course website. He commented:

> The number one thing that I have to teach them is to be organized, and when they see that outline and they say this is today and this is tomorrow; this is part on of today, this is part two of today. Even though outlines, some people swear by we need the mind math, I am very linear. And I tell them, I can teach you how to do anything you want if I teach you how to organize it correctly.

Course websites can be used to provide organizational assistance for students by providing assignment schedules with embedded links to support materials, and they can also be used as examples of organization that can serve to help organize a student.

Convenience. Another typical use of course websites is to provide convenient access to information outside normal class times. Unlike online programs that promote student convenience, students missing lecture-based classes are typically relegated to getting notes

from other students or chasing down the instructors to find out what they missed in class. At other times, students working late at night remember the instructor said something, yet they can't quite recall the entire thought. Wouldn't it be helpful if students could replay lectures or view the instructor's blackboard work at their convenience? Some instructors support these types of activities through their course websites. Robert makes extensive use of technology, providing his students access to lecture and problem solving content through the video lectures and smart board captures that he posts to his course website to help them learn about mathematics. Robert relayed the following:

> I record all my lectures in selected classes, not every lecture every class, but I record lectures and then I post them online so they can look at them. Or they can listen to a lecture if they miss, or listen to a part that they have trouble with. I make short videos, how to do this math problem, or what's this technique, and I post those online too. So they see me use videos. I use it kind of like a library for my class material, here are all my handouts. They're online.

Robert invests a lot of time creating, posting, and maintaining video resources. Why?

> It encourages them to work outside class. It gives them something else that the other calculus class doesn't have. Although people are starting to do everything, but it gives them another way to do the material. Another way to interact. Oh there's video, oh there's a recording of this. And when I took calculus there was no video. The professors didn't give out answers after they did it. Now students just take it for granted. They look for the video. They say, where are the answers?

By supporting convenient access to recorded content that can be accessed whenever it is needed, Robert is indirectly encouraging his students to be more proactive about their coursework.

Contribution to Learning. Robert's course website supports student learning in a variety of ways including access to lecture notes, problem solutions, and tutorial resources, among others. Students appreciate the availability of these resources and how they support

their studies. When asked how the course website supported their learning, students responded with the following:

> TE: I like Mr. Chase's site. Math is a hard subject for me and his site has examples that I can use to study. For me, I have to see how things are put together and he has step by step explanations of problems and how to get to the answer. I wish my other teachers had stuff like that.
> DB: It had everything on there that you went through. It had the study guides, it had the calculator worksheets, and he had your homework problems, when they were due. Everything was there. Like if you weren't in class you could take the information and go to the Learning Center or try to teach yourself the material. It was really easy for that.

The important consideration here is that students were able to address specific learning needs by utilizing content provided on the course website. Rather than support his students only through traditional means (e.g. office hours, in-class assistance, etc.), the instructor uses his course website as a digital teaching assistant that provides assistance outside of class. The instructor had this to say when asked whether the course website motivates his students:

> Oh, definitely. Because they learn things there that they didn't learn in class. They feel they are getting tips. Hand-outs [that assist problem solving] with answers is "Oh, we're getting a tip" or "Robert's giving us a break." Or there's like a special movie he posted. Did you see that movie, it was funny.

Enabling course content that supports student learning is appreciated by the students. As an example, several of the students commented on the video and smart board technology and Robert's efforts to support their particular learning needs. The smart board technology is a definite plus for mathematics classes. It allows the instructor to use a whiteboard-like device that is tied to a computer system. Anything written (e.g. calculus problems) on the board can be captured and recorded for digital distribution. Sarah found this content very helpful and relayed the following:

> Definitely, the Smart Board stuff was cool, because every once in a while I'd go on there and it would be pretty helpful. It would be a little clearer. It was just a different

> perspective than the book. And, the fact that he integrated the video in his website made it accessible anywhere. It let me take responsibility for trying the problems and working them through. I knew that I could watch his example if I screwed it up. I also think it contacts your photo memory. You know if you see something, it clicks and you kind of remember where you were at in the class and you say Oh, I remember that.

Technological learning aids such as video and smart-board captures support visual learners and connect the student to the lecture by reinforcing their memory of the lesson. The offsite availability of digitally recorded media on course websites also supports convenient access and indirectly encourages the student to take responsibility for learning new material.

In further support of his students' learning efforts, Robert used his course website to support individual learning needs. A couple of his students talked about how digital recording technology was used to help them work through specific problems:

> SK: I don't know if this falls within the realm of the website, but also if you had a question he'd use that technology and even send you a video or a clip or a voice recording via Internet or whatever to answer that question. Sometimes this stuff ended up on his website too.
>
> TN: Yeah, he showed us in the class problems like if there was something you had to draw, he'd draw it out and he actually has like a doc camera where he would actually record it. So again if you had a question all you had to do was ask and if you asked for it in video format he would take the time and make that up for you. Some of these ended up on his website.

The student comments highlight a key point about the dynamic nature of course websites. In this case, individual requests for help resulted in content additions to the website. Robert encouraged student involvement by recognizing the value of these individual lessons and adding them to the website.

Roberts's efforts to provide meaningful content on his course website had a long term effect on one of his students. When asked whether her learning experience was enhanced by the course website, Sarah responded with the following:

> I wouldn't want to take his class without it now that I know what can be provided. I think it adds another dimension to our learning. We're not only getting the normal classroom experience, we're also getting technical support that we can use outside the classroom.

William claimed that the course website "allowed me to experience math from a different perspective..I liked it." Providing learning assistance via course websites "adds another dimension" to learning strategies employed in traditional settings. Digital reinforcement of classroom lessons allows students to interact with traditional subjects in non-traditional ways.

Community. An unexpected outcome of course website usage was its contribution to creating a sense of community within Robert's classes. Considered within this context, students pointed to common usage of the course website resource as a uniting influence on their overall course experience. Students responded with the following:

> D: Would you say you feel more connected to the class by having a course website?
> WO: Yes. It gave you a way of being in the class without actually being there.
> SK: Yeah. It was nice to have a place to go for the assignments. I knew everyone else had to use it too that way I could ask others what I missed and then check the site.
> TN: I mean even describing what he played or what he did, even that gives a background that creates a better work atmosphere for him and a better atmosphere for the class. You feel in a sense more at home. And that can actually statistically improve your grade.

In this case, the course website provides the students a central focus that not only supplies everything they need to accomplish course objectives, it also gives them some background information on the instructor that made them feel "more at home."

Responding to the idea of community building and how the course website contributes to that, Robert had this to say:

> It certainly helps to build a sense of community when the students make the transition, when they're totally committed to the class. Then you see the group form into a study group and "Oh I got the notes he just posted or I got the solutions he just

> posted." Then it's community. When they make the commitment that they are going to do the class. Others are just trying to figure out how can I just be in this class and get the passing grade, and not work more than I have to, then they don't join any group.

There is a lot going on here. Robert talks about students committing to the class, forming groups, and then interacting based on content that was put up the course website. He also acknowledges students who don't make this "transition" and choose to go it alone. Either way, the course website provides a common point of interaction that joins these students together through regular usage of posted content.

Through his course website, Robert has provided an excellent resource for his math students. By web-enabling the majority of his course content, he provides his students organizational assistance, convenient access to information, content that supports their learning, and a resource that helps build a sense of community. Robert's initial interests in computers have translated across technical boundaries and enabled new educational interactions for his students.

The next part of the narrative focuses on the theoretical linkage to the constructivist model described in the Literature Review chapter.

Constructivist Assessment

Of the course websites included in the study, Robert's website provides the most course-related content. Based on the instructor's HTML coding abilities, the deceptively simple main page provides access to a set of internal pages with significant course information and content. From a constructivist perspective, the amount and types of technological features and relevant information that intersect with the model are also

considerable. Table 11 provides a high level overview of the specific course website technical features related to theoretical constructivist influences.

Table 11

Constructivist Assessment Matrix – Robert Chase

Constructivist Influences (Guiding Objectives)	Course Website Content and/or Technical Features (Guiding Interactions)

Environment Support & Adaptation	• Welcome page with preliminary instructions.
	• Personal information provided.
	  ○ Contact information
	  ○ Educational information
	  ○ Personal interests information
	  ○ Reading Lists
	• Course descriptions and textbook information provided.
	• Course assignments and projects provided.
	• Dynamic course syllabus provided. (links to course related content)
	• Dynamic course schedule provided (links to lesson content)
	• Site design supports easy navigation and usage.

Knowledge Discovery & Active Learning	• Interactive resource linkage
	  ○ Fractal generation
	  ○ Research and reference tools
	  ○ Mathematical recreations
	• Video Links and Podcasting (audio/video) of lectures
	• Smart Board content

Experiential Organization & Validation	• Links provided for other college resources. • Links provided for mathematics resources. (significant)
Collaborative Influences	• Email link provided for student/instructor communication. • Student/faculty collaboration on fractals pages. • Messaging/discussion boards not supported.

Similar to both of the previous cases, Robert's course website supported the students logistically by providing informational resources designed to address environment support and help users adapt to accessing course information online. The instructor provided a

welcome page with preliminary instructions, personal and professional information, extensive course information, a dynamic course schedule, course assignments and notes, textbook information, syllabi, all accessible via a logical navigation scheme. Similar to Alex, Robert did provide personal information designed to acquaint the student with his educational background and some personal interests. In addition to the personal information, Robert utilized his course website as an "electronic filing cabinet" for all course related information that his mathematics students need to successfully navigate his classes. He did a thorough job of presenting course information that supported his students' ability to interact with the course website to access mathematics content and resources specific to their classes.

Robert's course website provided several active learning resources designed to help the student with knowledge discovery and support their mathematical problem-solving abilities. When Robert was asked about constructivist learning content on his course website, he responded with the following:

> First thing I would say specific to mathematics is solutions to problems. Because people have to see, it's not enough to hand back a paper and say 8 out of 10. They got to know why, they got to know what went wrong, and then the downside is they got to make the effort to go find out why. I can hand back the paper and say 8 out 10 and some say I'm satisfied. And they never come to my site. But the ones who want to know will go find out and come to the site to view the videos or look at answers.

One of the primary ways that Robert supported his students was by providing tutorial videos recorded from smart boards and online notes that walked the student through mathematical problem-solving. Students could use these resources to develop understandings of specific mathematical concepts and to improve their problem-solving ability. Thomas viewed this resource usage from a convenience perspective, commenting "A lot of time, I don't even have to look things up in the text because he has examples and explanations on his website."

Tracy talked about the learning process from a personal perspective, stating "For me, I have to see how things are put together and he has step by step explanations of problems and how to get to the answer." Last, Sarah had this to say about the smart board technology:

> Definitely, the Smart Board stuff was cool, because every once in a while I'd go on there and it would be pretty helpful. It would be a little more clear. It was just a different perspective than the book. And, the fact that he integrated the video in his website made it accessible anywhere. It let me take responsibility for trying the problems and working them through. I knew that I could watch his example if I screwed it up.

By providing access to tutorial resources, Robert was aiding his students with knowledge discovery and supporting active learning.

Other active learning resources on Robert's course website include the fractal pages and the mathematical recreation links on the "Favorite Links" page. Both of these resources provide the student access to interactive applications that allow them to "play" with math by supporting visualization of mathematical equations and formulas. The fractals provide an opportunity for Robert to get the students to think about math differently. Robert had this to say about this particular strategy:

> D: What's with the fractals? Do your students understand that?
> R: Some of them. For example, last semester in calculus class a student wanted to do it on his own. What do you want to do? Well, how do you do these pictures? So we spent the semester showing him how to do it. And then there are courses that I teach, which take the students to the place where they could understand. And I say you see that picture. That is that equation. Then we talk about it. So I tell students that math is not about numbers, math is about shapes and relationships. And the very simplest way to code the relationship is complicated with maybe color and shape. So color and shape communicate a lot. The interactive content I provide on my website helps them to see this.

By allowing the student to "see" the results of changing input values to equations that generate graphics, Robert was using web technology to help students understand difficult concepts and provide constructivist learning opportunities.

To support experiential organization and validation, Robert augmented lessons learned in the classroom by providing links to external resources. Included among these external resources are mathematical recreations, mathematical sources, and mathematical organizations. Students could utilize those resources to augment and extend the lessons taught in the classroom and the information provided in the course text.

Similar to the previous cases, the course website supports email functionality between the student and instructor. Unlike the previous cases, Robert's website does provide collaborative content in the form of the fractal portion of the site. Jointly collaborating on the fractal pages content, Robert and some of his students developed an interactive lab sequence that involves constructivist strategies to teach the basics of fractal mathematics. William had this to say about the content:

> You can change the values for some of the fractals and affect how they display. Also, he has a very detailed fractal lab sequence that is very interactive. At least if you do the work and try the exercises. I really learned a lot by working through some of these.

Robert did not use other forms of collaborative support technology as provided by the college's CMS or on his course website.

Robert's course website contained features and content that mapped to the categories defined in the constructivist learning model. Basic information was provided to facilitate student usage of the course website and access to course resources. Knowledge discovery and active learning were supported by several interactive mathematics resources. The students' learning experience was augmented by links to external resources that complemented lecture and text activities. Last, collaboration was supported by email links and contribution to website content based on learning needs.

Case Summary

Robert Chase's course website provided a large amount of content and functionality to a technologically literate group of students. Unlike the previous cases, Robert chose to rely solely on his own course website, with no course management system linkage, to provide course related information to his students. Be enabling a single point of web contact for his students, Robert avoids any confusion created by blending course content delivery. Students utilizing his course website appreciated the level of detail and efforts the instructor makes on their behalf. Though the participants were predominantly male and white students, there were no noticeable differences between student perspectives regarding the perceived value provided by Robert's course website.

Emerging themes contributed to an understanding of some of the dimensional aspects of perceived value that enhance the user's experience with Robert's course website. Highlighted themes included first impressions, organizational assistance, convenience, contribution to learning, technological innovation, and contribution to community. Robert's attention to site design strategies that support these themes provide the basis for positive course website experiences for his students.

From a constructivist perspective, the course website offered a considerable amount of content and resources that map to the constructivist model. Most significant is the use of video lectures and smart-board technology facilitated by web delivery or podcasting to handheld devices. Also important was the resource links and fractal lessons that supported interactivity and knowledge discovery. The instructor's dynamic syllabus provided an organizational framework that students relied upon for accomplishing course objectives.

Chapter 5: Discussion, Conclusions, and Future Directions

Overview

This study was designed to explore the perceived value of a select group of faculty-developed course websites from instructors' and students' perspectives. A review of relevant research involving education and technology interactions offered direction for the study from two perspectives: a theoretical influence driven by constructivist learning strategies and a technological influence involving the design and technical features of the web pages. A case study design provided the structure by which three individual course websites were analyzed from multiple perspectives that included participants, website settings, thematic areas of interest, and linkage to a constructivist model that recognized both the theoretical and technological influences.

Multi-dimensional qualitative data collection processes contributed to a broader understanding of the relevance of the study and the specifics for the particular cases. Data collection methods involved interviews of study participants, observations of course website usage by participants, and extensive examination of course website content by the researcher. Transcriptions of interviews and observations were analyzed to identify areas of interest and to validate connections with the constructivist model. Further information was provided by a comprehensive literature review of research specific to faculty-developed course websites and educational strategies that affect their usage. Collectively, the data sources and background knowledge were refined into the study findings.

The research had a number of objectives. One of the objectives involved the identification of aspects of faculty-developed course websites that influence perceptions of perceived value for students and instructors. By identifying features that provide the most

value, either educationally or logistically, development efforts can be aligned with beneficial delivery of information. Also important, by identifying features that provide the most value, course website features that provide marginal value would be identified, as well. Once again, this information can be used to guide development efforts away from areas that provide little benefit. The study was designed to extract this type of information.

As has been discussed, constructivist design strategies are being extended by the use of computing technology, the Internet, and web-based resources. Another of the study's objectives involved the examination of selected course websites in context with the constructivist model detailed in the literature review chapter. This research was designed to identify specific technological features of course websites that support constructivist strategies and validate whether these features provide value to students by supporting their learning efforts.

A third objective of the study was to report out significant findings and phenomenon that arise as a by-product of the analysis processes. Course websites occupy a technical and educational niche that is still being understood as the underlying technology and educational landscape changes. This study represents a snapshot-in-time of three specific course websites and the people who interact with them. Together, they form a collage of educational intent and functional effectiveness that is mediated by design effort, content, and usage repercussions. The outgrowth of studying this interplay of technology, educational support, and personality is the identification of influences that affect course website effectiveness and design.

This final chapter is designed to complete the circle and link the findings of the study with the objectives detailed above. The subsequent discussion is divided into three main

areas to address the three defined objectives: perceived value, course website linkage with the constructivist model, and influences on course website design and usage. Following the discussion are the conclusions, implications for practice, and some ideas for future research.

Discussion of Results

Perceived Value

According to study findings, positive perceptions regarding perceived value of faculty-developed course websites vary across the cases and across participants. What is generally considered a value-adding feature is subject to its usefulness in accomplishing some course objective, skill attainment, or providing information. Consistent with Murphy's (2002) finding, participants' ideas of perceived value also vary based on their specific role as either student or instructor. Perceptions of value are strongly influenced by relevant content that supports course activities and other content/features that support logistical and organizational information such as course schedules, office hours, and contact information. This is consistent with results found in previous research studies (Ballard, Stapleton, & Carroll, 2004; Sanders & Morrison-Shetlar, 2001; Leung & Ivy, 2003; Bonds-Raake, 2006). Study findings also highlighted other features that contribute to perceived value, though to a lesser extent. Included among these course website features are assessment activities, group participation, and the instructor's personal information.

If you visit many college or university departmental websites, invariably you'll come across a link to "staff" or "faculty." Clicking on this link usually causes a listing to appear with links to the individual faculty member websites. If you are a student taking a class from one of these teachers or considering it, these links become important extensions of the course

or instructor and a communication channel that should be exploited. Confirming Ballard, Stapleton, and Carroll's (2004) assertion, study findings indicate that students appreciate faculty websites, the information they provide, and the effort expended to make them possible. In addition, students were almost unanimous in wishing that all of their teachers had course websites.

Students have definite needs regarding content delivery, the types of materials presented, and how it is to be accessed. Being children of the Internet, they understand and know the difference between good web practices that result in quality web experiences and poor web practices that result in disappointing web experiences. Study findings indicate that students are relying more and more on Internet-delivered course materials and have expectations regarding the features of course websites (Debevec, Shih, & Kashyap, 2006; Robin & McNeil, 1997). Being students of the information age, they expect easily accessible, Internet-enabled interfaces supporting course content dissemination.

In this study, students rate perceived value of a given faculty member's course website by the amount of information and convenience provided. Looking back at the student replies to the interview questions, we see certain words emerge that directly relate to adding value to the course website design process. According to the students, perceived value is enhanced by the way a course website provides "convenience," "clear communication," "clear direction," "answers," "access," "mobility," and "information." In short, students want an easy access, web-enabled portal to general course information, class notes, due dates, and anything else that needs to be communicated. Based on the study results, course websites providing more relevant information will rate higher from a perceived value perspective than those that do not. This is evidenced specifically by the

Chase case unit and the students' absolute reliance on this website for successful completion of course activities, as compared to the other two case units in the study.

Other perceived value considerations emerging from the study concerned intrinsic aspects that became evident through common usage. Several of the students felt that having access to the information on the course website motivated them regarding their coursework. They highlighted the organizational influence exerted by the course websites as a big help in regards to staying on task and getting activities completed on time. Also important, for those websites that included resource links, several students pointed to beneficial interactions that contributed to their learning and success. Some of the students also indicated that the course website contributed to overall sense of community, connecting students together through common usage of technological media.

Looking at the other side of the coin, poorly designed websites or sites that lack important features contribute negatively to an overall impression of perceived value. According to the study, design aesthetics are less important than meaningful content. The findings clearly indicate that students see value in website content that is well structured, organized, and relevant to the course. Of equal importance is what they find distracting or confusing on the sites they've used and how that diminishes perceived value. Critical to usability is the enabling of valid links and ensuring that site information is current. Today's students were raised on the Internet and have little patience for sites that don't work correctly, are difficult to navigate, or reflect lack of effort. Students highlight the need for clear, concise navigation and easy access to information. In all of the cases included in this study, navigation schemes are clearly supported by the use of menu systems and embedded links within individual pages to help users traverse web pages.

Also contributing to a negative impression of perceived value is the lack of relevant course information or outdated information provided on a course website. As an example, several of the students viewed the available information on Alex's course website as irrelevant and lacking enough detail to make it useful for their classes. Because Alex was providing most of his course information on the college's course management system (CMS), his students viewed the provided content as mostly irrelevant, negatively impacting their impressions of perceived value. To a lesser extent, a similar attitude of irrelevance was reflected in students' comments regarding Jason's course website. Once again, because the same information was provided on the college's CMS, student impressions of perceived value were lessened.

Last, the student interviewees had some specific suggestions regarding the type of content they would like to see faculty provide via their web sites that relate directly to perceived value. Expanding on their comments, many students are not good note takers; they feel harried and rushed when trying to capture main points of an instructor's discussion. They would greatly value the availability of lecture notes provided via some online resource. On another front, sometimes students are looking for information that extends beyond what is covered in class or clarifies some background information that isn't covered in course material. All of these suggestions for additional content provide valid opportunities for instructors to specifically address student needs and enhance the perceived value of their course websites.

Instructors develop personal websites, course websites, or combined websites for different reasons. As varied as these reasons may be, they result in a digital montage reflecting the efforts, personality, historical era, and technical abilities of their designers. A

quick glance at faculty websites at any college or university reveals the diversity of design that is inherent to personal expression. Also apparent is the web development era that governs the site design. As web technology has evolved, so has the look and functionality provided by faculty web sites. Finally, with newer scripting languages and full function web browsers, the instructor's technical abilities can either support fantastic creations or stymie design. How this advancing technology is utilized to enable course website functionality can directly affect value assessments of users and designers.

From the faculty perspective, the idea of perceived value varies within the cases. In the first case, Alex recognized that his course website provided little value from an educational or content point of view; however, he pointed to its use as a prospecting tool as an value-driven design feature. Unfortunately, Alex hasn't communicated this strategy to his students who erroneously assume the site was designed for them. Consequently, their impressions of perceived value are quite low. In the second case unit, Jason views his course website as a logistical extension of his face-to-face classroom and points to the syllabus and resource links as the strongest features that contribute to perceived value. Though his students appreciate his course website, overall impressions of perceived value would be higher if not for information duplication on the college's CMS. For the last case, since Robert provides all of his course information and other innovations through his course website, he views the amount and types of content as the strongest contributors to perceived value. This perspective is confirmed by his students and their absolute dependence on the material provided via his course website.

Collectively, the three cases support differing perspectives of perceived value from both the students' and instructors' viewpoints. Confirming the findings of previous research

studies (Bonds-Raake, 2006; Communale, Sexton, & Voss, 2002; Ballard, Stapleton, & Carroll, 2004; Sanders & Morrison-Shetlar, 2001; Leung & Ivy, 2003), the study indicates that perceived value is strengthened by the amount and quality of course specific content, while lessened by irrelevant content and/or lack of useful content. Adding to previous research, study findings indicate that course websites can sometimes motivate students and contribute to a sense of community for classes utilizing the website. Knox (1997) points out that though a web site is relatively static, it is a contributor to creating and sustaining the community of a given class. Her perspective is that a web site does more than deliver content; it delivers content in a particular way, the subtext of which communicates powerfully with the student. The website is an expression and becomes an extension of the individual teacher, highlighting what is uniquely personal and irreproducible. Study findings from case unit 3 validate this perspective from both the students' and instructors' viewpoints.

Also important, impressions of perceived value can be enhanced by employing a strategy whereby course website usage is required and encouraged by uploading and linking all relevant course content (e.g. Robert). Conversely, instructors can negatively affect perceived value by providing little content (as is evidenced somewhat with case unit 1), outdated content, confusing students (in some cases by relying on multiple delivery sources for course content), or simply allowing their course websites to fall into disrepair.

Constructivist Linkage

Another objective of this study involved the examination of selected course websites from a constructivist perspective. To support this activity, a theoretical constructivist-technological model was developed based on the literature review. The model segments

theoretical constructivist learning objectives, pairing each of them with a subset of technological course website features that support the specific objective. This model was used to structure the initial course website evaluation process and guided part of the findings discussion for each of the study cases.

Comparing the study's course website with the constructivist model resulted in three different views of course website constructivist integration. For the first case, the course website offered limited content and resources that map to the constructivist model. Most significant was the textbook linkage and access to the interactive and knowledge discovery opportunities presented on the publishers website. For the second case, the course website offered a moderate amount of content and resources that map to the constructivist model. Most significant were the resource links that supported interactivity and knowledge discovery while helping students become better writers. Last, the course website examined for the third case provides a considerable number of features and content that map to the categories defined in the constructivist model. Of these, the most significant involved interactive mathematics resources that contributed to knowledge discovery and active learning and augmented the students' learning experiences.

The study findings confirm that course website technology can be used to effectively enable constructivist learning activities. This perspective is validated by students utilizing provided resource links to perform learning activities that aided the learner in constructing knowledge to augment and complete assigned coursework. In each case, knowledge discovery is facilitated by the inclusion of hypertextual links to digital content that is enabled by the instructor. The computer and Internet evolution that prodded advances in Web technology has made this type of constructivist interaction possible and changes the dynamic

that existed previously between teachers and students. By utilizing course website technology as demonstrated by this study, classroom boundaries are erased and are no longer enforced by architectural elements.

Key to effective constructivist implementation is the importance of "identifying learning domains and considering students' prior knowledge and experiences when designing web-based learning experiences" (Moallem, 2001). Course websites and digital technology usage adds another layer to a student's educational experience that, with proper planning and effort, can be used to support constructivist learning activities. Clark (2000), in writing about instructional architectures, presents a taxonomy that focuses on four architectures designed to address different types of learners. Specific to the course website constructivist linkages, Clark's situated guided discovery architecture and exploratory architecture support active learning and knowledge discovery. Situated guided discovery "emphasizes the building of unique knowledge bases versus consistent acquisition of predetermined knowledge" and is also associated with case base learning (Clark, 2000, p. 4). The students utilizing Robert's course website were exposed to this type of learning architecture when they interacted with the fractal activities. The exploratory architecture with its "high learner control" is particularly relevant from a course website and constructivist perspective. Students interacting with course websites are able to move around and examine topics at will by utilizing navigation menus and hyperlinks. Students utilizing the various resource links provided by Alex, Jason, and Robert were interacting with course website features that illustrated this exploratory strategy and supported constructivist learning.

The observed link between course website usage and constructivism supports Meyer's (1998) description that viewed computers and constructivism as complementary

extensions of educational outreach, one that links users to learning through a physical mechanism while the other links students to learning through a knowledge creation strategy. Going beyond Meyer's somewhat dated study, the results of this research point to a partnership where networked technology is used to support activities envisioned by constructivist strategies. Specifically, where Meyer focused on computers, this study focused on the web-enabling of course website features, demonstrating how networked computing technology extends the reach of an educator to engage learners, support experiential education, create knowledge in virtual situations, and provide collaborative opportunities. According to Moallem (2001), web-based constructivist learning activities can be used to facilitate individual learning needs. Study findings from Jason's and Robert's cases validated this perspective with both instructors and students providing examples of how course websites support individualized learning efforts and provide the learner with the opportunity to use discovery and imagination as part of the learning process. The study results suggest that course websites can extend constructivist strategies across virtual domains of learning.

Meyer (1998) paints constructivist-technology influences as being student-centered, facilitative, self-paced, cooperative, and capable of motivating by achievement. As applied to the study's course websites, these characteristics were supported to varying degrees depending on the specific cases. However, Robert's course website is the best example of one that meets the combined objective and goes beyond it. When thinking of specific site features that corroborate Meyer's constructivist-technology influences, Robert's usage of multimedia (e.g. sound and video) and alternative delivery of content (e.g. podcasting) provides a student-centered focus that is certainly facilitative, self-paced, and cooperative.

Other features that assisted student's efforts with solving math problems provided motivational support and helped the student through achievement. Though not specific to his course website, Robert's podcasting efforts further extend constructivist-technology influences to hand-held devices and even more convenient access to information. As evidenced by the study, Meyer's constructivist-technology influences are well-supported in course website environments and evolving as instructors facilitate new technology interactions.

Collectively, study results indicate that the three cases support constructivist strategies to varying degrees. Though these websites were developed without constructivist learning goals in mind, because constructivist strategies embody interactive learning styles, web-enabling interactive content on course websites creates constructivist learning opportunities. When you consider what Robert was able to achieve from a constructivist perspective accidentally, you have to wonder what could be accomplished with some prior planning. An appropriate area for future research would involve course websites intentionally designed to address constructivist learning strategies.

Influences on Design

The final objective of this study was to discuss course website design influences as indicated by the study findings. Just as a pebble dropped in a pond generates small ripples that radiate out from where it fell, aspects of course website design and usage have ripple effects that are felt by the students, the instructor, and the institutions that support course website functionality. Stephens, Lehr, Thorp, Ewing, and Hicks (2005) reminds us that "while some teachers may believe that certain websites or software applications simply add

bells and whistles to entertain without educating, the proper use of technology can significantly enhance teaching and learning; the key is identifying the ways that teachers can best teach and students can best learn."

Based on the study findings, there are multiple influences (see Figure 7) that affect course website design and usage. Critical among these are the contributions made by students, professional development, technical abilities, institutional support, and course management systems. Results of the study suggest that each of these areas deserve more attention in consideration of course websites design strategies and guiding administrative practices.

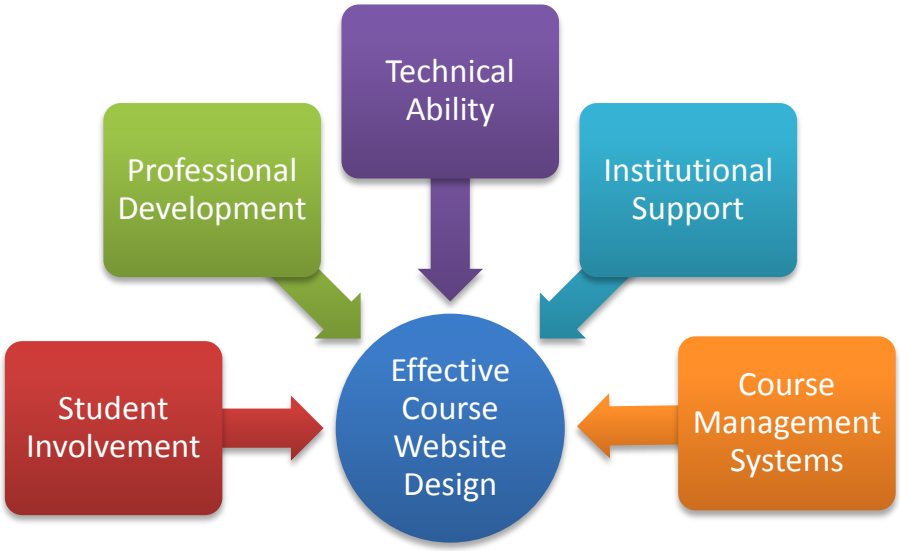

Figure 7. Course Website Design Influences

Student Involvement. Study findings indicate that a critical element is missing from the course website design process: the student. As I listened to the faculty members and students discuss their site experiences, it became obvious that much of the faculty's development efforts occur without the influence of the student. In some cases, the result is

ineffective course websites with visually-appealing home pages providing personal information and little of what the students really want. A logical and radical step to increasing course website effectiveness would involve incorporating the students' perspective in course website design strategies. According to March, Jacob, and Salvador (2005), "New and unexpected interactions with the immaterial have expanded the design territory to include people as designers." The authors discuss the web technology design process from a radical perspective of supporting community involvement in design decisions. Along related lines, technology study findings from manufacturing have relevance to the design of instructional technologies from a usability perspective (Norman, 1993; Haddad, 1996, 2002; Mayhew, 1999).

Student involvement can prove beneficial to course website design. Recent research details a strategy called We!Design that involves students in the design of software, Web-applications, and course websites. According to the study, the We!Design methodology "enables computer literate students and designers to cooperate in the design of applications that (1) enhance typical educational processes for which students have extensive experience in, such as note-taking or assessment, and (2) are well-suited to the technological, social and cultural particularities of each educational environment" (Triantafyllakos, Palaigeorgiou, & Tsoukalas, 2008). The students' contribution to the process is centered on the areas that affect them the most.

According to the research, students' attitudes and usage of Web-based learning resources are directly affected by providing useful information that contributes to course success (Heffner & Cohen, 2005; Sanders & Morrison-Shetlar, 2001). In consideration of this reality, it is reasonable to assume that students would want to be involved in the course

website's design process and make suggestions to improve site design. However, in this study, students were not provided with opportunities to make suggestions for site improvements. When asked whether their instructors invited feedback regarding the course website all of the students responded, "No." This failure to bring the students into the design process was consistent across the study cases. A couple of the instructors did comment that over the years a few students have volunteered suggestions for site improvement. However, this was not due to any instructor-initiated efforts. One of the instructors commented that occasionally a student will make a suggestion via the course evaluation process, though this is a rare occurrence. The inevitable reality is that something designed for the students does not always reflect their needs. Clearly, this research uncovers a missed opportunity to improve website design and functionality through user input in technology development.

Technical Ability. Another consideration that affects course website design is the technical abilities of the instructor. Heffner and Cohen (2005) point to lack of computer training as a reason some instructors avoid creating course websites. Study findings suggest that course website development is a natural outreach for those instructors who have prior computing experience. The instructors involved in this study were all proficient computer users with considerable programming and computer applications experience. When beginning work on their first course websites, these instructors already had above average familiarity and experience working with the technology required to enable course website functionality. Even with this experience, all of the instructors commented that site development involved considerable effort that is followed by never-ending course website maintenance responsibilities.

Newer technology does not necessarily translate to easier web development processes. Though advances in web development software have streamlined rudimentary aspects of web programming and assist with site layout, many of these tools require a large investment of training time to achieve a modicum of proficiency. Once the course websites are developed, they have to be uploaded, tested, and tweaked to correct errors or provide additional content. For some instructors, the technical reality is not a problem. For others, it is a daunting obstacle. In summary, instructors planning to provide course websites need to be technically literate or have access to training opportunities or support staff who can assist with site development, enabling, updating, and problem correction.

Professional Development and Institutional Support. As a technologist and a computer scientist, I find that much of my thinking flows along logical lines. Prior to performing this research, I had logically assumed that course websites were enabled as part of some type of formal design process. Study findings indicate otherwise. As I listened to the instructors talk about designing their course websites, it was noteworthy that all of them lacked formal web development training. Consistent with Heines' (2000) assertions regarding website development efforts, instructors confirmed that course websites require time for development, ongoing maintenance, and updates to reflect changing technology.

Though all three of the instructors acknowledged some participation in professional development opportunities, either available through the college or other resources, only one of the instructors equated participation with more effective course website design practices. Ironically, his course website provided the least content. For the most part, the instructors relied on considerable computing experience, self-taught web development skills (e.g. HTML coding, Frontpage, Dreamweaver), predefined templates, persistence, and mimicry to

enable course website functionality. The self-help strategy worked out of necessity to some extent; each of the instructors has been providing course websites to their students for several years now, yet site effectiveness varies. Thus, not taking advantage of professional development opportunities hinders the technology from being as effective a learning tool as it might otherwise be. As is established by the technology management literature cited in Chapter 2 and elsewhere, adequate training is essential to effective technology development and use (Haddad, 2002; Ricigliano & Bayer, 2008).

Study findings indicate that faculty create course websites for a variety of reasons; however well-intentioned, they rarely research "best practices" or seek out student input prior to developing course web sites. Wanting to "get something out there" or "play with the technology," some faculty members spend little time planning what they will provide and simply dive into working with some web development tool. As was evident in the first case, the resulting product may look professional but provide little value to the students utilizing the website. Cook and Owston (2001) view current website design processes as "impromptu" and encourage administrative and faculty participation in strategic planning processes and professional development opportunities that benefit future development of course websites. Instructors need to be aware of how they present themselves via their course websites and take advantage of professional development opportunities that support effective design.

Along these lines, the college does provide professional development opportunities focused on web development and training specific to the course management system. Recognizing the importance of providing organized professional development opportunities, the college supports faculty with a formal organization, called the Faculty Center for

Teaching Excellence, which coordinates training activities. Whether these efforts are adequate to address faculty needs in regards to course website development is unknown and would require further study.

Also noteworthy from a study perspective was the perceived lack of institutional involvement in the course website design process. Course websites reflect not only on the instructor, but also on the institution. Though admirable that MWCC supports professional development activities focused on web development, study findings indicate that little is done to manage and monitor the course websites being delivered by the institution's web servers. Once MWCC instructors build and upload web pages to the college's dedicated web space, the pages are available for display to anyone with Internet access. This raises some questions. What if an instructor posted inappropriate or copyrighted content? Who is liable for course website content delivered on college servers? What are legal implications for the instructor and the institution?

Study findings indicate that institutions are sometimes remiss about communicating their web development policies. When asked about institutional involvement in course website development, Jason vaguely alluded to the college having some "soft requirements" for course website design, though they didn't elaborate what these requirements entailed. Another of the instructors mentioned using the departmental template as a starting point for developing his course website; however, that was result of a friendly suggestion from the office staff and not a reflection of any departmental policy. All of the instructors confirmed that there were no specific departmental requirements that "they were aware of" that affected course website design. This is noteworthy considering that the college has a very detailed policy page, also delivered online, available to any staff member for review via the college

intranet. Though not intended to stifle creativity, faculty are "encouraged, though not required" to use the college's web page design elements to maintain a consistent look and feel for the students. The policy page also details certain required features and provides policy statements concerning copyrighted materials, use of college logos and seal, and accessibility requirements. While the instructors were seemingly unaware of this policy page, all of their course websites appeared to be compliant with policy directives.

Other institutional considerations that also have professional development implications, involve helping time-constrained faculty members with course website development assistance. To effectively support this process, institutional support may involve release time or extra compensation to motivate faculty considering course website development. At this time, the study college does not provide this level of support.

Course Management Systems. Faculty-developed course websites may be dying a slow death, and course management systems (CMS) may be holding the smoking gun. Of the course websites included in the study, two of them share information delivery responsibilities with the college's CMS. Over time, both of the instructors responsible for these sites are increasing their reliance on the CMS and decreasing the amount of content provided on their course websites.

Faculty-developed course websites provide a creative avenue for instructors who support unique expressions within an educational context. The college's course management system relies on a standardized set of templates that provide the same look and feel for all students and all classes at the institution. Study findings indicate that students like both. Just as the students responded positively to the personal nature of the instructor's course website, they also liked the consistency of navigation and "sameness" provided by the CMS.

However, those who had to utilize both types of websites were often confused about where to look for specific information. Instructors supporting both environments need to be unambiguous in their intent for each by clearly communicating each resources specific purpose.

Just as some people prefer to buy a house rather than build one, many instructors prefer the built-in features provided within course management systems rather than trying to develop similar features within their own course websites. Because of in-house support and a consistent interface, technical limitations are less of an issue for instructors interacting with the college's course management system. Also important, study findings indicate that instructors are concerned about security issues involving open access to course websites that are not a problem for password protected course management systems. The bottom line is that course management systems provide an easier alternative for instructors to provide secure, web-enabled content to students.

The highlighted influences on course website design identify opportunities for improvement in existing educational processes. Efforts need to be made to engage students in constructive feedback, encouraging their participation in the design process to ensure that their needs are addressed. Instructors need to take advantage of professional development opportunities to stay current with web development technology and learn new and creative ways to add value to their course websites. Institutions need to be actively involved in helping and supporting faculty development of course websites though professional development, compensation, and/or other human resource efforts.

Conclusions and Implications for Practice

This study began as an investigation of course websites and how they are valued by instructors and students. Ironically, a website provides the perfect metaphor for what this study is all about. When we surf the Web and find an interesting site, we spend a little time looking at the main-page, getting overall impressions of the site, and then looking for links that take us deeper into the site hierarchy and expose content of interest. This study was conceived along those lines. The main-page of the course website provides a technological portal linking the instructor and the students. This point of technological intersection provided the inspiration for the study and the initial website evaluation impressions. Digging deeper, the study utilized several data collection sources including the literature review, interviews, observations, and website examinations to probe the links that led to deeper understandings of content features that supported or detracted from value perspectives and/or supported constructivist learning. Finally, just as we click away from a website after getting our "fill" of what it has to offer, it is time to step back from the study to evaluate and discuss what has been learned.

How the students perceive value in a course website is not always clearly defined; it's subjective and based on "objective" content. Looking at a given course website, some students might say the site was quite valuable while others, for whatever reason, find little of value within the site. Who is wrong? Who is right? Neither? Both? The study findings suggest that students had strong value impressions if the course website met their individual organizational and informational needs. Once again, it is a subjective consideration. For the three cases in the study, the findings suggest that Robert's website provided the most value to his students and had the most complete content; however, the others were valued by the

students, as well. However, there is really no basis for comparing perceived value of one website with perceived value of another because the students can only relate to the course website that they interact with. On the other hand, if students utilizing the course website from the first case later used the course websites from the later cases, their impressions of perceived value specific to the first website would likely change. In any case, study results indicate that perceived value is mediated by content, presentation, accuracy, and perceived effort and is affected by usage reliance.

Instructors' ideas of perceived value are also subjective and tempered by the purpose of the website, whether it is used as an exclusive resource, and what types of content they provide in it. If an instructor is simply using the website as a prospecting tool with some organizational support, as was the case with Alex's website, their perceived value perspective is skewed by the limited purpose of the website. Likewise, instructors who provide learning resources and activities within their websites tend to view this content as contributing most to perceived value. In either case, where the students are actually pointing at specific features and saying, "That is the best thing on the site," the instructor makes an educated guess as to what produces the most value. Why? They guess because they don't ask the students. When the instructors were asked whether they ask for feedback on their course websites, the responses were: "Honestly speaking, the last three or four years probably not," "On the actual website – no," and "I have not." As discussed previously, this lack of student involvement could create a disconnection between what the instructor is trying to accomplish with the website and what the students receive, ultimately diminishing the perceived value of the website. Instructors utilizing course websites need to find ways to involve students in the design process.

Course website technology is being used to support constructivist learning objectives. Web-enabling features that facilitate information access, provide active learning opportunities, support experimentation, and encourage collaboration are appropriate and appreciated uses of course website technology. Students value the instructor's efforts at providing these features. Instructors value the students' learning by providing additional resources and interactive content that reinforces classroom lessons. The course website potentially acts as a conduit by which the student and instructor interact with technology and course content to meet constructivist objectives.

The preceding discussions have highlighted several areas that have implications for current practice. One of these implications involves the course website design process. Study findings indicate that instructors often develop course websites without a defined development process. None of the instructors involved in this study employed any formal development processes; they simply decided they wanted a website, and, using available resources, they created their web pages. This is a haphazard approach when compared to industry standard web-development processes that involve needs assessment, user input, documentation of design objectives, technical training (if required), website testing, and defined processes for ongoing maintenance and support (Zhao, 2003). Understanding that college instructors typically prefer their independence, one might still wonder whether the quality of course websites could be enhanced if the process were slightly more structured.

Whether a formal design strategy is employed, course website development should not occur without at least some type of needs assessment that involves the students. According to Dupin-Bryant and DuCharme-Hansen (2005), "Assessing student needs provides instructors with information necessary to select appropriate technology and

instructional strategies to develop an online learning environment that is appropriate, responsive, and beneficial for both the learners and the instructor." Those authors highlight five key areas whose proper exploration would support more effective implementations of course websites. The areas include computer skills, learning styles, available resources, the learner's desired outcome, and prior learning experiences. Instructors enabling course websites should consider how their website addresses these concerns.

A second implication of practice involves appropriate technology. As discussed in the literature review chapter, appropriate technology conveys the need to design technologies that are *appropriate* to end-users in complexity and scale (Hazeltine and Bull, 1999) and that serve human needs (Pacey, 1999). Generally associated with sustainable, culture-driven technologies, appropriate technology can also be associated with digital technology, software development, and Web usage.

According to Dupin-Bryant and DuCharme-Hansen (2005), students must have appropriate technology (e.g. hardware and software) and Internet access to take advantage of web-enabled class resources. Instructors designing course websites make many decisions as they work through the course website development and upgrading process. They need to be mindful of the technology, both hardware and software, that users employ to access the website and focus on information delivery without creating complications, technical and otherwise. Robert provided audio and video files of his lectures that were accessible via his course website and through podcasting. Downloading and playing these types of files can create issues for students if they are not using current technology or compatible media applications. To facilitate this type of content delivery, Robert provided links to media players and instructions for installation on his course website.

Also important from an *appropriate* perspective, instructors need to be careful about making assumptions of technological literacy in regards to computers and Web usage for their students. Though most of today's students have significant computing experience, personal experience has shown that many non-traditional students often come to class with no prior computing experience. Employing course websites that require more than basic computing skills (e.g. requiring the student to enable Javascript or installing Flash), could challenge some students and should be addressed by instructors with explicit instructions or, in some cases, technical assistance.

A final area of implication for practice involves security and privacy. Unless specifically enabled, course websites do not require password or user authentication to gain access to information. The course website pages are broadly served to any browser that connects via the uniform resource locator (URL). This open sharing of the course website across the Internet provides convenient access for students and is less of a burden for instructors from a maintenance perspective; however, there are other implications in regards to information security and privacy.

Instructors enabling course websites need to be mindful of the information they post on the website to ensure that the information does not infringe on copyrights. When discussing website content, Jason expressed specific concerns about posting assignments from the textbook on the website, citing the publisher's copyright as a concern though the textbook was used for the class. Any content, whether audio, video, text, or otherwise, has to be considered from a copyright perspective before it is posted to a course website. Burgunder (2004) discusses copyright in the context of distribution and creation and how the Internet is "radically changing the way that information is distributed to the public" (p. 407).

Instructors need to ensure that they get permission prior to posting copyrighted content and avoid legal issues caused by information provided on their websites. Institutions need to communicate copyright policies and would be well-served by a self-audit process that monitors course website content and assists faculty with avoiding problematic issues.

Other concerns involve privacy issues that affect both instructors and students. Well-intentioned faculty trying to provide grade information or assignment scores may inadvertently expose personal and private information about the student on the course website. Supporting access to this type of information requires the enabling of password mechanisms and secure authentication, which is more than likely outside the technical comfort level of most instructors. If the functionality is enabled, instructors are likely to have significant overhead maintaining the access list, servicing student requests for lost passwords, and ensuring that information remains secure. The end result is that providing private information on course websites is not easily supported, whereas most colleges' course management systems already enforce the required level of security.

Directions for Future Research

This study took a qualitative approach to examining three specific course websites at a single community college. As the study progressed, several areas of interest were identified that would support additional avenues for research. Also, the study design could be modified to support different perspectives and allow comparisons that were not possible in this study. Some specific suggestions follow.

Suggestion 1: Take a closer look at how course management systems (CMS) are affecting faculty-developed course websites. It appears that course management systems are

slowly absorbing faculty that previously provided course websites. Understanding the reasons why this shift is occurring could provide meaningful input to the course websites' design process.

Suggestion 2: Conduct an experimental or quasi-experimental study that measures student performance based on course website availability. Many instructors teach multiple sections of the same class. Collect data from those sections utilizing a course website interface and control sections that are not. Compare and contrast the study results.

Suggestion 3: Conduct an experiment where instructors and students jointly build the course website for a particular class. Utilize the website in subsequent semesters and evaluate perceived value based on a collaborative effort.

Suggestion 4: Conduct a long-term study, involving multiple institutions, that monitors rates of course websites usage (e.g. increasing, decreasing, etc.) and diffusion of technological features as technology advances become mainstream. Also, determine which of the factors identified in Figure 7 have the greatest impact on rates of course website development.

Summary

In this dissertation, I've examined course website usage within a Midwestern community college and addressed topics concerning perceived value, constructivist linkage, and themes of interest involving course website usage and design. The study incorporated both the instructor and student perspectives relating to a specific course website, allowing a cohesive narrative that describes both their interactions. The study speaks to perceived value impressions and the usefulness and utility of course websites while supporting the argument

of constructivist linkage. The study also illuminates several areas that influences course website design and highlights relevant implications of practice, including the coexistence of faculty-developed course websites with those provided within course management systems. Future studies are needed to continue course website exploration and develop further understandings of how course website technology will incorporate new technologies as they become part of the technological and educational landscape.

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APPENDICES

Appendix A: Website Evaluation Matrix

Faculty Website Evaluation Matrix			Date:	Site Score:	C.Sc	T.SC	Tpoints
Instructor Name:			Courses Taught	Category 1:	0	0	0
Dept:				Categroy 2:	0	0	0
Office Phone:				Category 3:	0	0	0
Site URL:				Category 4:	0	0	0
Notes:				Total Score:	0	0	0

Constructivist Category 1 - Environment Support & Adaptation Features:
Personal and Course Information, Site Directions, Site Design, Site Mechanics

Personal Information	☑	Wt.	C.Sc	T.Sc	Total	Notes:
Name						
Photo						
Office Listing						
Phone Listing						
Educational Information						
Experience/Background						
Professional Memberships						
Presentations						
Office Schedule						
Certifications						
Hobbies						
Interests						
Other:						

Course Information	☑	Wt.	C.Sc	T.Sc	Total	Notes:
Course Description		1.0				
Course Objectives		1.0				
Course Policies		1.0				
Course Syllabus		1.5				
Course Schedule		1.5				
Text Info (Description, etc)		1.0				
Exam Schedule/Specifics		1.0				
Grading Policy / Grading Links		1.0				
Other: Course Listing						

Site Direction	☑	Wt.	C.Sc	T.Sc	Total	Notes:
Site Introduction		1.0				
Site Navigation Map (Site Map)		1.0				
FAQ (Frequently Asked Questions)		1.0				
Search Functionality		1.0				
Other:						

Site Design	☑	Wt.	C.Sc	T.Sc	Total	Notes:
Single Page Website		1.0				
Multi-page Website		1.0				
Template/Theme Design		1.0				
Background Graphics		1.0				
Color Usage		1.0				
Aesthetic Design		1.0				
Consistent Look and Feel		1.0				
Menuing System		1.0				

Site Mechanics	☑	Wt.	C.Sc	T.Sc	Total	Notes:
Links Work		1.0				
Plugins Supported		1.0				
No Frames		1.0				

Section Score:			C.Sc	T.Sc	Total	
Personal Information			0	0	0	
Course Information			0	0	0	
Site Direction			0	0	0	
Site Design			0	0	0	
Site Mechanics			0	0	0	

Constructivist Category 2 - Knowledge Discovery and Active Learning Features:
Searching, Retrieving, Organizing, Storing

Course Specific	☑	Wt.	C.Sc	T.Sc	Total	Notes:
Assignments/Labs		1.5				
Worksheets		1.5				
Projects		1.5				
Practice Quizzes/Exams		1.5				
Tasksheets		1.5				
Interactive Tutorials		1.5				
Interactive Surveys		1.5				

Content Specific	☑	Wt.	C.Sc	T.Sc	Total	Notes:
Glossaries		1.5				
Course Datafiles		1.5				
PowerPoint Presentations/Shows		1.5				
Handouts		1.5				
Lecture Notes/Outlines		1.5				
Study Guides		1.5				

Section Score:			C.Sc	T.Sc	Total	
Course Specific			0	0	0	
Content Specific			0	0	0	

Constructivist Category 3 - Experiential Organization & Validation Features:
External Resources, Comparison Sources, Contrasting Sources, Web-Quests

Course Specific	☑	Wt.	C.Sc	T.Sc	Total	Notes:
College Specific Links		1.0				
Technical Links		1.0				
Related website links		1.0				
Audio Links		1.0				
Video Links		1.0				

Content Specific	☑	Wt.	C.Sc	T.Sc	Total	Notes:
Web-Quests		1.5				
Audio Links		1.5				
Video Links		1.5				

Section Score:			C.Sc	T.Sc	Total	
Course Specific			0	0	0	
Content Specific			0	0	0	

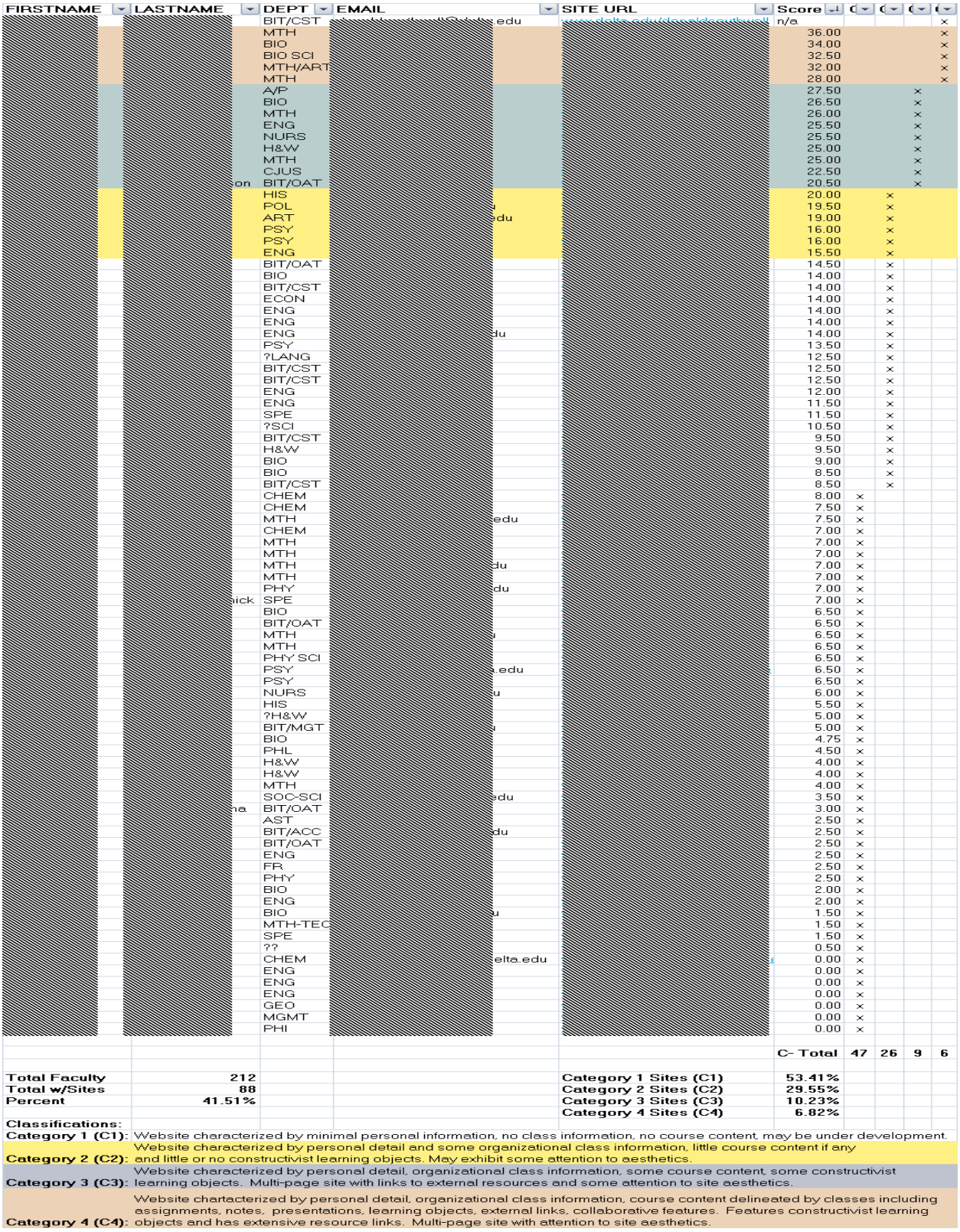
Constructivist Category 4 - Collaborative Features:
Facillitating Student - Student, Student - Faculty Interaction

Static Interactions	☑	Wt.	C.Sc	T.Sc	Total	Notes:
Email link		1.0				
Discussion Board		2.0				
Audio Greeting/Announcements		1.0				
Video Greeting/Announcements		1.0				
Collaborative Editing		1.5				
Blogs/Journals						

Dynamic Interactions	☑	Wt.	C.Sc	T.Sc	Total	Notes:
Chat/Instant Messaging		2.0				
Whiteboarding		2.0				
Live Audio/Video		2.0				

Section Score:			C.Sc	T.Sc	Total	
Static Interactions			0	0	0	
Dynamic Interactions			0	0	0	

Appendix B: Faculty Website Analysis Matrix



FIRSTNAME	LASTNAME	DEPT	EMAIL	SITE URL	Score	C1	C2	C3	C4
[redacted]	[redacted]	BIT/CST	[redacted].edu	[redacted]	n/a				x
		MTH			36.00				x
		BIO			34.00				x
		BIO SCI			32.50				x
		MTH/ART			32.00				x
		MTH			28.00				x
		A/P			27.50			x	
		BIO			26.50			x	
		MTH			26.00			x	
		ENG			25.50			x	
		NURS			25.50			x	
		H&W			25.00			x	
		MTH			25.00			x	
		CJUS			22.50			x	
		BIT/OAT			20.50			x	
		HIS			20.00		x		
		POL			19.50		x		
		ART			19.00		x		
		PSY			16.00		x		
		PSY			16.00		x		
		ENG			15.50		x		
		BIT/OAT			14.50		x		
		BIO			14.00		x		
		BIT/CST			14.00		x		
		ECON			14.00		x		
		ENG			14.00		x		
		ENG			14.00		x		
		ENG			14.00		x		
		PSY			13.50		x		
		?LANG			12.50		x		
		BIT/CST			12.50		x		
		BIT/CST			12.50		x		
		ENG			12.00		x		
		ENG			11.50		x		
		SPE			11.50		x		
		?SCI			10.50		x		
		BIT/CST			9.50		x		
		H&W			9.50		x		
		BIO			9.00		x		
		BIO			8.50		x		
		BIT/CST			8.50		x		
		CHEM			8.00	x			
		CHEM			7.50	x			
		MTH			7.50	x			
		CHEM			7.00	x			
		MTH			7.00	x			
		MTH			7.00	x			
		MTH			7.00	x			
		MTH			7.00	x			
		PHY			7.00	x			
		SPE			7.00	x			
		BIO			6.50	x			
		BIT/OAT			6.50	x			
		MTH			6.50	x			
		MTH			6.50	x			
		PHY SCI			6.50	x			
		PSY			6.50	x			
		PSY			6.50	x			
		NURS			6.00	x			
		HIS			5.50	x			
		?H&W			5.00	x			
		BIT/MGT			5.00	x			
		BIO			4.75	x			
		PHL			4.50	x			
		H&W			4.00	x			
		H&W			4.00	x			
		MTH			4.00	x			
		SOC-SCI			3.50	x			
		BIT/OAT			3.00	x			
		AST			2.50	x			
		BIT/ACC			2.50	x			
		BIT/OAT			2.50	x			
		ENG			2.50	x			
		FR			2.50	x			
		PHY			2.50	x			
		BIO			2.00	x			
		ENG			2.00	x			
		BIO			1.50	x			
		MTH-TEC			1.50	x			
		SPE			1.50	x			
		??			0.50	x			
		CHEM			0.00	x			
		ENG			0.00	x			
		ENG			0.00	x			
		ENG			0.00	x			
		GEO			0.00	x			
		MGMT			0.00	x			
		PHI			0.00	x			
					C- Total	47	26	9	6

Total Faculty	212	Category 1 Sites (C1)	53.41%
Total w/Sites	88	Category 2 Sites (C2)	29.55%
Percent	41.51%	Category 3 Sites (C3)	10.23%
		Category 4 Sites (C4)	6.82%

Classifications:

Category 1 (C1):	Website characterized by minimal personal information, no class information, no course content, may be under development.
Category 2 (C2):	Website characterized by personal detail and some organizational class information, little course content if any and little or no constructivist learning objects. May exhibit some attention to aesthetics.
Category 3 (C3):	Website characterized by personal detail, organizational class information, some course content, some constructivist learning objects. Multi-page site with links to external resources and some attention to site aesthetics.
Category 4 (C4):	Website chartacterized by personal detail, organizational class information, course content delineated by classes including assignments, notes, presentations, learning objects, external links, collaborative features. Features constructivist learning objects and has extensive resource links. Multi-page site with attention to site aesthetics.

Appendix G: Sample Faculty Research Invite

Hi xxxxxxx,

My name is Don Southwell and I teach in the CST discipline. I've been working on my PhD for some time now and have finally gotten to the dissertation research stage. Your faculty website caught my eye.

My research topic involves student and faculty perceptions of faculty developed websites (such as yours). I believe that our websites provide a valuable resource for our students and, as an aspect of technology usage in education, should be explored from a research perspective. The goal here is to gather the opinions and impressions of site usage from students and compare that with the developmental strategies employed by faculty (e.g. what were we/they thinking when they built their website). There are no "right" or "wrong" answers here, the important thing is that I capture how specific sites are being used within the community college environment. To do this, I've decided to use a qualitative research design utilizing case study, supported by student and individual faculty interviews.

One of my tasks for the last month or so has been to analyze the 88 faculty websites currently in use at Delta College. Yours was one of the better examples of how this technology can be used to help Delta students and I'm hopeful that you would be willing to volunteer for study participation. I can ensure you that I will make this as painless as possible with a minimal time commitment on your part.

What I would need from you is permission to use your website in the study, about 1.5 hours of your time for a one-on-one interview (after the first of the year), and a willingness to allow me to solicit 5-6 of your students to participate in interviews to answer questions about site usage. To acknowledge the value of their participation, each of the student volunteers will receive cash compensation of $20. (In addition to this, I might come up with a grand prize of a college shirt or something yet to be determined.)

I'm hoping to get the interviews scheduled for the week after our classes end (to avoid conflicting with finals etc.). To do this, either you or I would need to approach your classes and solicit the volunteers.

Once again, you have a wonderful site and I think your input would really add value to the study. Hopefully, you'll agree to participate. What do you think?

Don Southwell

Appendix D: Project Phases and Timeline

Phase	Description	Start	End
Pre-study Activities	Human subjects approval, etc.	6/1/2007	8/30/2007
Site Classification	Develop strategy for classifying faculty websites	9/1/2007	10/31/2007
Site Evaluation	Examine and classify sites based on site classification strategy	11/1/2007	12/01/2007
Participant Selection	Select participants for focus group, case study participation	12/1/2007	12/15/2007
Conduct Focus Group and Individual Interviews	Schedule and conduct focus group and individual interviews with target students and faculty	12/15/2007	01/15/2008
Transcribe	Transcribe and code focus group discussions and observation notes.	01/15/2008	3/15/2008
Data Analysis and Distillation	Analysis of study data Categorization and coding analysis. Identification and labeling.	3/15/2008	6/1/2008
Study Write-up	Summarize and document results	3/1/2008	7/15/2008

Appendix E: Human Subjects Consent Form

Hello!

I would like to invite you to participate in a research study about how students and faculty view faculty-developed course websites. Participation is completely voluntary, there are no foreseeable risks, and you will be assured of complete confidentiality if you choose to participate. While there are no direct benefits to you for participating in the study, your participation will help me develop understandings necessary for completing a dissertation.

If you would like to participate, please read and sign the consent form on the following page:

Don Southwell (Principal Investigator)
1961 Delta Dr. Office #A071
University Center, Mich. 48710
Tel: 989-686-9137
donaldsouthwell@delta.edu

Research Project Consent Form

I agree to participate in one or more interviews conducted by Don Southwell as part of a dissertation research project about faculty-developed course websites. I understand that the interview(s) will last approximately 45-60 minutes and that the interview(s) will focus on my perceptions and experiences developing or using faculty-developed course websites. I will be asked questions about site development and usage and any other relevant issues involving faculty web sites. I understand that follow-up interviews may be required and all interview activities will be completed within a four month period spanning December 1st, 2007 through March 31st, 2008.

I understand that my participation in the interview(s) is completely voluntary and involves no foreseeable risks; that I may choose not to answer certain questions, and that I may withdraw and discontinue participation at any time if I choose to do so. I further understand that my confidentiality will be protected at all times and that a fictitious name will be assigned to me after the interviews are completed, and that any identifying characteristics will be deleted. The USB drive containing the digital interview file and the interview transcripts, with an assigned numerical code, will be kept in a locked file in the locked office of the Principal Investigator. I further understand that if I decide at any point after the interview that I do not wish to participate, my digital interview file will be deleted, my transcript will be destroyed and no material will be used from the interview(s).

I understand that the information from the interviews will be written up in the Principal Investigator's dissertation and may also be published in other academic or scholarly journals.

I have read all of the above information regarding this study. The procedures and requirements have been explained to me, and I understand them. I freely and voluntarily consent to be a participant. For my records, I have been provided with a copy of this consent form.

Signature of Interview Respondent: Date:

For further questions please contact:
Don Southwell (Principal Investigator)
1961 Delta Dr. Office #A071
University Center, Mich. 48710
Tel: 989-686-9137
donaldsouthwell@delta.edu

This research protocol and informed consent document has been reviewed and approved by the Eastern Michigan University Human Subjects Review Committee for use from 09/01/2007 to 05/31/2008. If you have questions about the approval process, please contact Dr. Deb de Laski-Smith (734.487.0042, Interim Dean of the Graduate School and Administrative Co-chair of UHSRC, human.subjects@emich.edu).

Appendix F: Student Interview Discussion Questions

Perceived Value of Faculty Developed Course Websites – A Student Faculty Comparison
Student Interview Procedures and Questions

To provide further context for the sample questions, these are some of the basic, underlying, assumptions I'll make when creating and conducting focus groups and interviews.

- The group will meet for 60-90 minutes.
- The groups will be of various sizes.
- Group members can be selected randomly or intentionally. Either way, the selection method will be documented in the data analysis. This is going to be dependent on the volunteer pools.
- The *goal* for groups composition is to find individuals who are highly representative of the total (role-alike) population for each specific case study (e.g. website, faculty member, class participants) .
- Groups will be comprised of students only. Faculty participants will be interviewed individually and not be informed of focus group discussions.
- Groups may be conducted with two evaluators...one to ask the questions and the other to record actual conversation *and* his/her observations of group behavior.

Beyond the context, the following points/topics will be discussed with the focus groups prior to starting the actual questions...

- Welcome everyone to the focus group.
- Thank everyone for taking the time to meet with me.
- Get permission from everyone for audio recording. Explain that these recordings will not be shared with anyone other than those involved in the study.
- Explain the purpose of the study (5 minute overview).
- Explain that all information we collect is confidential as to who provided it. For example, we will not disclose who actually participated in this focus group nor will our final report make any attributions for quotes. The intent is to encourage everyone to speak freely.
- Explain that the evaluation will result in a written report in the form of a dissertation.
- Ask for any questions before starting.
- Finally, make sure that everyone signs and completes the consent agreement**.**

Interview Questions:

Theme: ***Background characteristics. Who are you? Intent is to put the students experience in context with site usage.***

1. Student level. Courses being taken.
2. Computer experience.
    a. How long have you used computers?
    b. What types of activities do you use computers for?
    c. How long have you had Internet access?
    d. How do you use the Internet? Do you have a homepage?
3. Regarding faculty sites.
    a. How many of your instructors have course related websites?
    b. Did you attend other institutions where instructors had course websites? What was experience with these sites?
4. Of other sites you use, which is the best? Why?
    a. What type of information is being provided?

b. How do you find that useful? Why?

5. Of other sites you use, which is the worst? Why?
    a. What type of information is being provided?
    b. What do you find particularly distracting? Why?

Theme: ***What is happening in the specific setting? Intent here is to get at the physical experience of interacting with the course website.***

6. How do you access <insert Instructor's name> course website? Is it easy to access the sites? Have you had problems getting to the site? What type of problems?
7. Where do you access the site from? (Home, school, work, etc…)
8. Does site usage require any special technical skills, software, or hardware? Any location issues?
9. Are you required to enter a userid or password to access the faculty website? How do you feel about that? Do you have security concerns regarding the site?
10. What's the first thing you see/experience when accessing the site?
11. Describe your typical experience when accessing the site.
12. Does using the course website make you more motivated regarding class?
13. Is site content displayed on a single page or do you have to navigate to different pages to get to information?
14. If you are using links, are they good links? Are there issues with broken links or misdirected links? How do you feel when links don't work? What does that make you think about the site or the instructor?

Theme: What content is provided? How do students perceive the value of the content?

15. What type of content is provided by the site? Instructor info? Course info? Course documents? Schedules? Assignments? Resources? (Discuss each item)
16. What is the most important content provided? (Can't live without.) Why?
17. What is the least important content provided? (Never used…doesn't matter if it's there.) Why?
18. Does the provided content contribute to your learning? Why? Why not?
19. Does the instructor provide resource links or supplemental information to support classroom lectures? Do you view/read/utilize this supplemental information?
20. Does the instructor provide interactive content? What form does the interaction take? How do you feel about this?
21. Does the site utilize any audio or video technology? Do you watch the videos or listen to the recordings?
22. What content is missing? What should be there that currently is not?
23. Would you say that your learning experience is enhanced by the course website? If so, why? If not, why?
24. Would you say that you feel more connected to the class by having access to the course website?

Theme: Is there an ongoing dialogue between the instructor and student to support future site development? Are the students involved in the process of site design/development? Do they want to be?

25. Does the instructor ever ask for user input on site specifics?
26. Do you ever give feedback on site design, information provided, organization, navigation, etc? What do the instructors say?
27. Do you ever talk to each other about the course website? Why?
28. Does the usage of this technology enable interactions that were not possible without course websites?
29. What would you change about the course websites you utilize?
30. Do you wish your other instructors had course websites?
31. Anything you'd like to add?

Theme: Other Focuses. Online course management systems.

32. Does your instructor use a course management system? If so, what information is provided via this focus?
33. How does this differ from the information that is provided in the faculty website?
34. Do you have a preference for information delivery, one over the other? Is one better than the other?

Student questions categorized based on focus areas and theoretical linkage:

Question Category	**Question**
Background Information – General/Technical	1, 2a, 2b, 2c, 2d,
Course Website Technology	6, 7, 8, 9, 13, 14, 25, 26, 27,
Perceived Value	4a, 4b, 5a, 5b, 10, 12, 16, 17, 19, 20, 21, 22, 27, 28, 29, 30
Constructivist Features	15, 18, 19, 20, 21, 23, 24, 28
Other Information	3a, 3b, 11, 31, 32, 33, 34

Site demo? Have them show you how they use the site.

Appendix G: Faculty Interview Discussion Questions

Perceived Value of Faculty Developed Course Websites – A Student Faculty Comparison
Faculty Interviews Procedures and Questions

To provide further context for the sample questions, these are some of the basic, underlying, assumptions I'll make when creating and conducting the interviews.

- Interviews will last approximately 60 minutes.
- Faculty members interviewed are those responsible for the individual case units (three).
- Faculty members will be allowed to discuss areas outside faculty websites (e.g. course management systems)

Beyond the context, the following points/topics will be discussed with the faculty members prior to starting the actual questions...

- Welcome them to the interview.
- Thank them for taking the time to meet with me.
- Get permission from them for audio recording. Explain that these recordings will not be shared with anyone other than those involved in the study.
- Explain the purpose of the study (5 minute overview).
- Explain that all information collected is confidential as to who provided it. For example, we will not disclose who actually participated in the study nor will our final report make any attributions for quotes. The intent is to encourage faculty members to speak freely.
- Explain that the evaluation will result in a written report in the form of a dissertation.
- Ask for any questions before starting.
- Finally, make sure faculty member signs and completes the consent agreement**.**

Interview Questions:

Theme: ***Background characteristics. Who are you? Intent is to put the instructors experience in context with site usage.***

1. Instructor level. Courses being taught. How long teaching?
2. Computer experience.
    a. How long have you used computers?
    b. What types of activities do you use computers for?
    c. How long have you had Internet access?
    d. How do you use the Internet? Do you have a homepage other than your course website?
3. Regarding faculty sites.
    a. How long have you had a course website?
    b. How did you develop your site? What tools did you use? How many hours of effort did it require?
    c. What were your intentions when you created your site?
    d. Did you research site design specific to supplying educational information? If so, what did you learn? If not, why?
    e. Did you receive any training for site development? Who provided the training?
    f. Do you recall professional development opportunities that support faculty developed course websites? Did you take advantage of these opportunities?
    g. Technology is always changing, what do you do to keep up?
    h. Would you consider site development technically challenging? Why or why not?

i. Have you looked at other faculty members websites? How did this affect your site?

Theme: ***What is happening in the specific setting? Intent here is to get at the physical experience of interacting with the course website.***

4. How do students access your course website? Is it easy to access the sites? Are you aware of any students having problems getting to your site? What type of problems?
5. Where do students access your site from? (Home, school, work, etc…)
6. Does site usage require any special technical skills, software, or hardware? Any location issues?
7. Are students required to enter a userid or password to access the website? Are there any security concerns regarding the site?
8. Do you provide a course webpage for all of your classes? Why or why not?
9. What's the first thing the students see/experience when accessing the site? Why did you put this up front?
10. Describe the students' typical experience when using your website. Do you expect the students to access/use your site daily? Weekly? As needed?
11. Do you think using the course website make your students more motivated regarding class?
12. How is your site laid out? What is the design strategy? Is site content displayed on a single page or do you have to navigate to different pages to get to information?
13. Do you provide links to internal and external content within your site? Do you have issues with broken links or misdirected links? How often do you test links to determine whether they remain active?

Theme: What content is provided? How do students perceive the value of the content?

14. What type of content do you provide on your site? Instructor info? Course info? Course documents? Schedules? Assignments? Resources? (Discuss each item)
15. Why are these items supplied and not others? Did you model your site after others you have seen?
16. What is the most important content provided? (Student can't live without.) Why?
17. What is the least important content provided? (Likely never used…doesn't matter if it's there.) Why?
18. Do you think the provided content contribute to your students learning? Why? Why not?
19. Does any of the provided content serve a constructivist role? Which ones? How do they help the learner construct knowledge?
20. Do you provide resource links or supplemental information to support classroom lectures? Do the students use this information? How can you tell?
21. Do you provide any interactive content on your site? What form does the interaction take? How did you develop this content? What kind of feedback do you receive from the students regarding this type of content?
22. Does your site utilize any audio or video technology? Do the students watch the videos or listen to the recordings? What kind of feedback do you receive from the students regarding this type of content?
23. What content is missing? What should be there that currently is not?
24. Would you say that your site enhances your students learning experience? If so, why? If not, why?

25. Would you say that your site helps your students feel more connected to the class?

Theme: Is there an ongoing dialogue between the instructor and student to support future site development? Are the students involved in the process of site design/development? Do they want to be?

26. Do you ever ask the student for feedback/input on site specifics?
27. Do the students ever give feedback on site design, information provided, organization, navigation, etc? What do they say?
28. Do you ever talk to the students about the course website? Why?
29. Would you say that the usage of this technology enable interactions that were not possible without course websites?
30. Now that your site is developed and being used, what would you change about the course websites you utilize? Why?

Theme: Other Focuses. Online course management systems.

31. Do you use a course management system? If so, what information is provided via this focus?
32. How does this differ from the information that is provided on your faculty website?
33. How is this similar to what is being provided on your faculty website? Overlap?
34. Do you have a preference for information delivery, one over the other? Is one better than the other? Why?
35. Do you teach distance learning courses? If so, do you use the same course websites for both distance learning and face-to-face courses?
36. Where do you direct your continued development efforts?
37. Are there any departmental or division level requirement for course websites within the area you teach?
38. Which other departments in the college did you work with when developing course website(s)?
39. What was this experience like?
40. Did you experience any problems that interfered with or slowed down course website development?
41. Do you have any recommendations for how the course website development process can be improved in the future?
42. Are you staying with your website or are you actively using a blended (cws and cms) strategy for information delivery? Are you moving away from your course website and enabling more and more content within the course management system? Why?
43. Where do you think things are going? Why?
44. Anything you like to add?

Faculty questions categorized based on focus areas and theoretical linkage:

Question Category	**Question**
Background Information – General/Technical	1, 2a, 2b, 2c, 2d,
Course Websites (Technology, Development, and Design)	3a, 3b, 3c, 3d, 3e, 3f, 3h, 4, 5, 6, 7, 8, 12, 13, 26, 27, 28, 30, 36, 37, 38, 40, 41, 42, 43
Perceived Value	3c, 3d, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 29, 30, 34, 43,
Constructivist Features	14, 18, 19, 20, 21, 22, 24, 29,
Course Management Systems	31, 32, 33, 34, 42,
Other Information	3e, 3f, 3g, 3i, 26, 27, 28, 35, 36, 37, 38, 44

Appendix H: Thematic Code Categories and Sub-Categories

Code System

- Educational Contribution
  - Student success
  - Site's contribution to sense of community
  - Site contribution to learning
  - Motivated by site availability of information
  - Site effort reflected in student appreciation
- Faculty Facilitation
  - Helps students and faculty connect
  - External link to site
  - How site reflects instructor
  - Site access to other courses
  - Instructor provided info for site access
  - Site feedback to instructor
  - Future site usage
  - Site links
  - Faculty usage of technology
  - Site compliments
  - Faculty usage promotes student usage
  - Prospecting for students
- Features and Benefits
  - Relevance of information
  - Least important features
  - Most important feature
  - Most important features
  - Site best features
- Information Access via Course Website
  - Site access to course info
  - Site access to syllabus
  - Site access to personal info
  - Site access to professional info
  - Site access to contact info
  - Site access to grading info
  - Site access to assignments
  - Site access to handouts
  - Site access to other resources
  - Site access to interactive content
- Institutional Facilitation
  - Departmental sites
  - Course Management Systems
    - Security online information
    - Educator usage as compared to site
- Student Experience with Site
  - Ease of information access
  - Typical site experience
  - First Impressions
  - Ease of site access
  - Ease of use
  - Organizational assistance
  - Confusion
  - Limited interest in site content
  - Finding resources
  - Convenience
  - Enabling student connections
- Technology Experience
  - Site access in high school
  - Computers in the classroom
  - Need for technology
  - Technology integration Internet usage

Appendix I: Sample MaxQDA Retrievhal Query

Text: **Chase Case\Chase1**
Weight: **0**
Position: **245 - 249**
Code: **Most Important Feature**

D That was a different course. What's the most important content? What's the most important thing that's on that website?

1 The study guides for me.

3 I'd have to say the schedule of when assignments are due.

4 The exam packets. He put in a PDF file every quiz that was going to relate to the test. So you could click on one link and see what was going to be on the test.

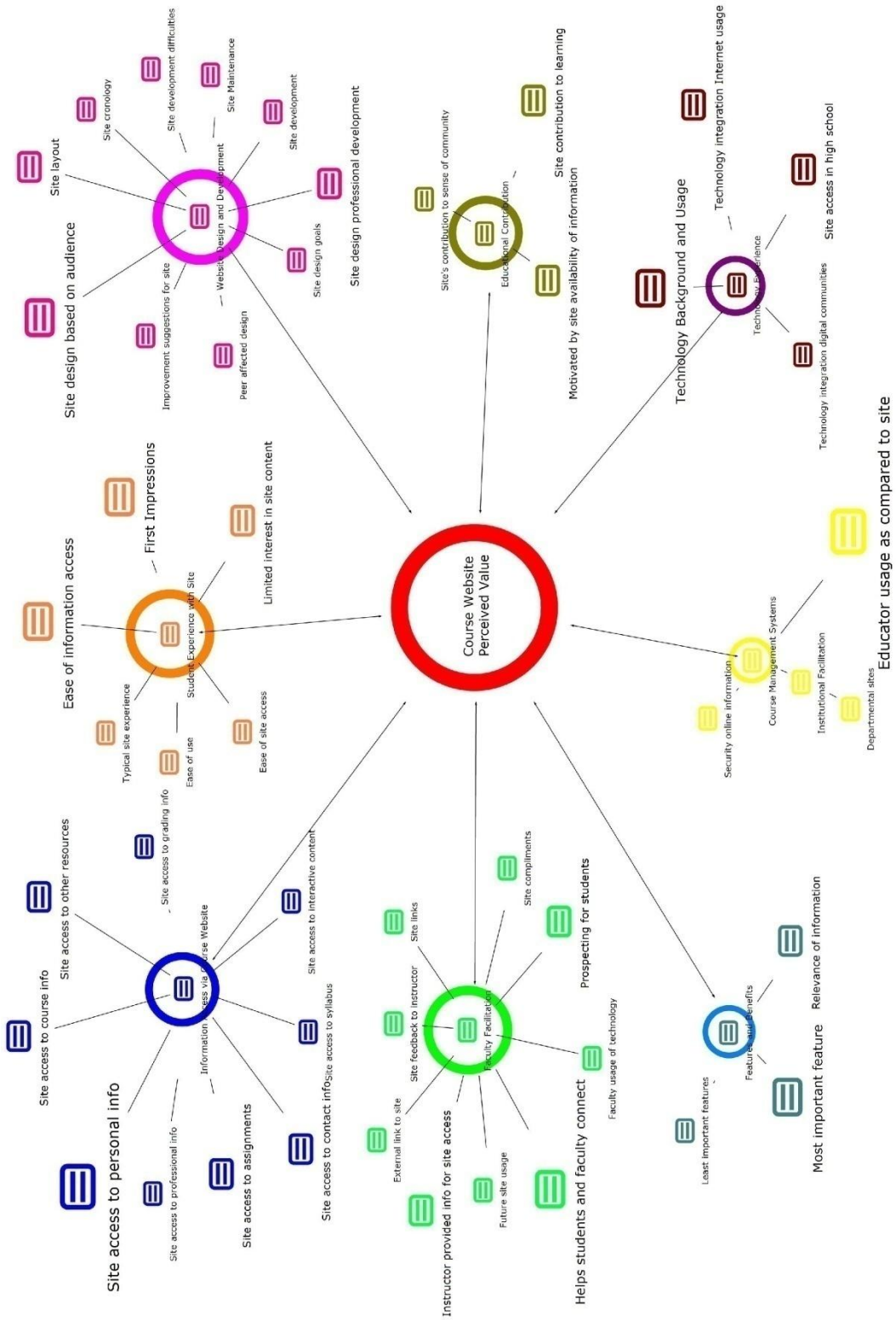
2 I liked those, but I wish that he had one that was blank and then…Because he would give them to us solved already to show us how he did it, but I wish that we could have a clean quiz, take it, and then see if our answers are right and if they weren't we could see what we did wrong.

Text: **Chase Case\Chase Interview**
Weight: **0**
Position: **192 - 193**
Code: **Most Important Feature**

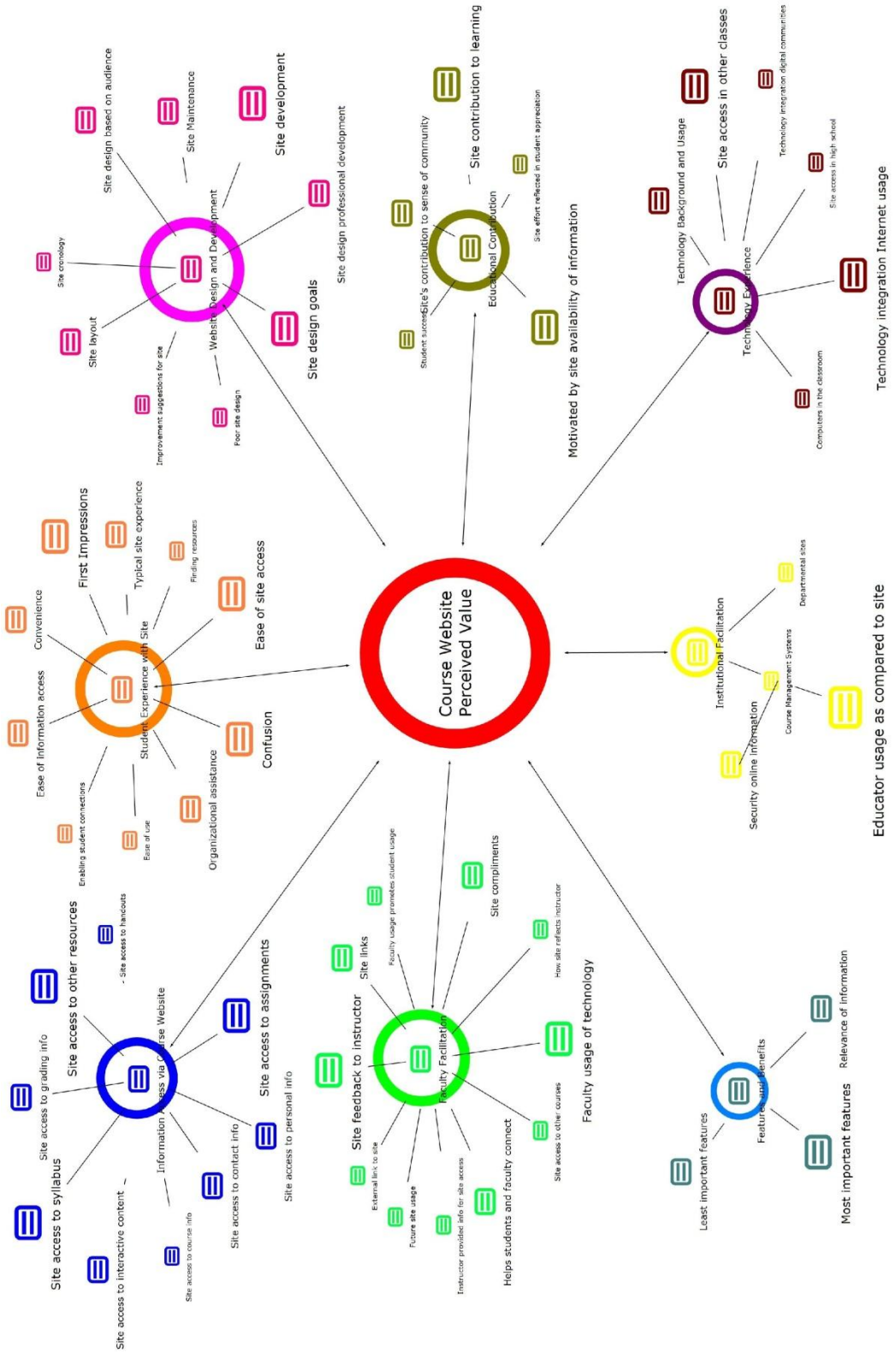
D What's the most important content that you provide? What would you say is the most important content?

R First thing I would say specific to mathematics is solutions to problems. Because people have to see, it's not enough to hand back a paper and say 8 out of 10. They got to know why, they got to know what went wrong, and then the downside is they got to make the effort to go find out why. I can hand back the paper and say 8 out 10 and they say I'm satisfied. And they never come to my site. But the ones who want to know will go find out.

Appendix J: Reardon Case Code Map



Appendix K: Small Case Code Map



Appendix L: Chase Case Code Map