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Exploring Faculty Perceptions of a Case Library as an Online Teaching Resource

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ABSTRACT

EXPLORING FACULTY PERCEPTIONS OF A CASE LIBRARY AS AN ONLINE TEACHING RESOURCE

by
Yuxin Ma

Professors need alternative programs to support their online teaching. This dissertation reports an initial study in a long-term research agenda for developing a faculty online teaching solution.

The primary purpose of the study is to explore faculty perceptions of a case library to help decision makers and researchers determine whether they would pursue the use of such a tool to support faculty online teaching. The secondary purpose of the study is to generate design knowledge to inform future development of and research on this or similar case libraries.

The methodology of this study includes three components: development research, rapid prototyping, and qualitative methods. Development research and rapid prototyping provided a three-stage framework for this study: conceptualization, development, and research. I synthesized the literature to create conceptual models of an Online Teaching Case Library (OTCL) at the conceptualization stage, built a prototype to implement the models at the development stage, and conducted research to evaluate the prototype at the research stage. Qualitative methods guided data gathering and analysis. I recruited seven faculty participants based on a purposeful sampling technique. To gather the data, I followed a three-step data collection process: initial interviews, contextual interviews,

and final interviews. This process allowed me to observe and interview faculty participants while they were exploring the prototype. I analyzed the data by following an 11-step procedure synthesized from the works of Miles and Huberman (1994) as well as LeCompte and Schensul (1999a).

This study found that on one hand, faculty members might use an OTCL, because they perceived that this tool could support their apprenticeship approach to learning to teach. On the other hand, however, their perceived decision to use an OTCL would also be influenced by the perceptions of the usefulness and usability of the tool.

The study identified the initial evidence supporting an OTCL as an online teaching resource and the challenges involved in developing and implementing such a solution. It provides a base for decision makers to determine whether they would adopt this tool. It also offers some design guidance for those who do want to pursue this solution to faculty development.

EXPLORING FACULTY PERCEPTIONS OF A CASE LIBRARY

AS AN ONLINE TEACHING RESOURCE

by
Yuxin Ma

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ABBREVIATIONS

CBR	Case-Based Reasoning
DOI	Diffusion of Innovation
EPSS	Electronic performance support system
GUI	Graphical user interface
HTML	HyperText Markup Language
INTIME	Integrating New Technologies into the Methods of Education
KITE	Knowledge Innovation for Technology in Education
KMS	Knowledge management system
MPDUO	The Model of Perceived Decision to Use OTCL
NEA	National Education Association
OTCL	Online Teaching Case Library
OTiS	Online Tutoring Skills
PT3	Preparing Tomorrow's Teachers to Use Technology
SCIED	Science Education Advisor
TAM	Technology Acceptance Model

CHAPTER 1

INTRODUCTION

The Problem

Several years after the National Center for Education Statistics (NCES) (1997; 1999) identified the growing trend of distance education and Internet-based technologies in colleges and universities, online learning has permeated many sectors of higher education. It is changing the landscape of community colleges and private universities, which have taken a lead in developing distance education (NEA Higher Education Research Center, 2001b). Moreover, a new report from the National Academy of Sciences predicts that information technology would also reshape research universities and push them to focus more on instruction (Kiernan, 2002). Online learning has evolved from the exotic practice of a few innovative instructors to a driving force transforming the teaching of the mainstream faculty (Hagner, 2000).

The expansion of online learning has provided opportunities for higher education. Some claim that online technologies can bring more interactive and student-centered learning experiences than lecturing (MacDonald, 2001; Newman & Scurry, 2001). Some other believe that Internet-based distance education has the potential to help address the problems encountered by colleges and universities: reduction of resources, competition for enrollment, and student diversity (Davidson-Shivers, 2002). Online learning emerged in the middle of the 1990’s information technology boom. When the dot-com economy collapsed at the turn of the century, one may wonder whether online learning has lived up

to its promise to revolutionize higher education. Although many studies indicate that online learning could be at least as effective as traditional classroom teaching (Russell, 2003), a recent report from the National Education Association (NEA) (NEA Higher Education Research Center, 2002) reveals that some online learning programs had problems, including low enrollment, high cost, excessive time requirement for faculty, and poor learning outcomes. This report also points out that these problems should not hide the fact that those online learning programs that emphasize student needs and program quality rather than profit-making and cost-saving have achieved great success.

What are the pressing issues in improving the quality of online learning? In the early days of Internet-based learning, technology infrastructure and technical support were the primary concerns. As information technology infrastructure has been established in many universities and as faculty members have gained more technological competence, pedagogical excellence has become a critical issue in improving the quality of online teaching. Green (2001) identifies technology integration in instruction as the most important information technology related issue on campus. Moreover, best-practice technology-integration universities have focused on teaching and learning issues rather than the technology itself (American Productivity & Quality Center, 1999).

Pedagogical excellence in online teaching is difficult to achieve. First, professors are generally not prepared for teaching. In higher education, faculty members usually play the role of both course designers and facilitators, but they have generally received inadequate preparation for teaching from their graduate education (Meacham, 2002; Thomas, 1997). Many new faculty members learn to lecture by following the model of their own professors. However, the lecturing tradition cannot be sustained when

challenged by online learning, which tends to amplify problems with traditional pedagogies and requires new instructional strategies (Carnevale, 2000; Petrides, 2002). Second, online learning places more responsibilities on faculty. In addition to problems generic to any learning environment, online teaching creates unique problems such as (a) setting up rules in the virtual classroom, (b) addressing students' frustration with technologies, (c) bridging the distance between students and faculty, and (d) experimenting with new pedagogies (Hara & Kling, 1999; Schmertzing & Schmertzing, 2001). Third, traditional faculty development activities such as workshops and newsletters typically have limited impact on faculty teaching because of the perceived lack of relevance and transferability (Davidson-Shivers, 2002; Fletcher & Patrick, 1998; Laga & Elen, 2001; Murray, 1999; NEA Higher Education Research Center, 2001a).

One approach to improving faculty online teaching is to enhance faculty development activities, which are crucial to the success of online learning programs (Hagner, 2000). A consortium of organizations conducted a benchmarking study to investigate innovations, best practices, and key trends of technology integration in 53 higher education institutions, businesses, and government agencies (American Productivity & Quality Center, 1999). This study reports that organizations which are successful in leveraging technology in teaching and learning have adopted project-oriented faculty development initiatives to help instructors acquire pedagogical knowledge through teaching rather than explicit training. This approach is very appropriate for faculty development in higher education for the following two reasons. First, current learning and instructional theories emphasize the role of situated problem solving in learning (for example, Brown, Collins, & Duguid, 1989; Lave & Wenger,

1990). Therefore, one would expect that learning about online teaching pedagogy from teaching and reflection would be more effective and transferable than learning about it from traditional activities such as workshops or newsletters. Second, faculty members' busy schedules of research, teaching and service render it almost impossible for them to learn about teaching via venues other than their own teaching experiences (Davidson-Shivers, 2002; Murray, 1999).

When faculty members learn about online teaching pedagogy from their actual experiences, on-demand support is the most desirable support mechanism for them (Laga & Elen, 2001; NEA Higher Education Research Center, 2001a). What type of on-demand support should be provided? Sample lessons and case studies of online teaching are usually considered as useful resources for faculty (Laga & Elen, 2001; Shapiro & Cartwright, 1998). However, studying cases can be time-consuming and may not be very efficient if the cases are not specifically relevant to the issues with which faculty need help. Domeshek and Kolodner (1997) argue that cases are most useful when users are ready for them – when users need to assess a situation or solve a problem similar to the one described in the case. Therefore, I contend that on-demand support can be provided by making the most relevant cases available to faculty in a just-in-time manner. A review of the literature indicates that a case library could offer this type of support. It matches the way faculty members learn to teach. Multiple case libraries (Chandler, 1994; Krueger, Boboc, & Cornish, 2003; The Online Tutoring Skills Project Team, 2000; F. Wang, Means, & Wedman, 2003) have been developed to help instructors improve their teaching. Details of these projects are provided in the next chapter. Based on the

literature, I proposed an Online Teaching Case Library (OTCL) as an alternative or additional faculty development program. The following section focuses on this solution.

The Proposed Solution

The case library stores faculty members' online teaching cases, which represent contextualized knowledge including experiences and lessons learned related to online teaching. It provides faculty with Web access to these cases to support their teaching. For example, if a faculty member needs pedagogical assistance on facilitating a chat session, s/he can conduct a search in the case library to view relevant cases to answer questions such as: What strategies have other professors adopted in leading a chat session? What strategies have been effective? What lessons have they learned? Related guidelines and principles on chat facilitation are also presented to help faculty connect theory with practice.

The following paragraphs provide a brief overview of the case library technology and offer some preliminary justifications for proposing a case library as an online teaching resource. More support for the case library technology will be provided in the next chapter.

Case library is a term used to describe both human cognition and a certain type of computer systems. As a concept that explains cognitive process, it is a "set of cases in one's memory," or a "library of cases" (Kolodner, Owensby, & Guzdial, 2003, p. 831). As human beings, we use the case library in our memory to help us solve problems. When we encounter a problem, we usually retrieve similar problem situations from our memory as templates to make sense of the new problem and to help us generate a solution. After the solution is tested in a new problem situation and when new lessons are

learned, we commit the new situation into memory. This is a cognitive process described in case-based reasoning (CBR), a cognitive theory emphasizing the role of episodic memory and analogical reasoning in human cognition (Kolodner, 1993; Schank, 1982). Human memory is limited in terms of the number of cases one can remember as well as the accuracy and speed of retrieving the most appropriate cases. Computer-based case libraries have been developed to augment human memory. All the case libraries mentioned in this study are computer-based case libraries.

A case library can be an appropriate tool for providing faculty with resources to address issues in online teaching. There are several reasons. First, several case libraries have been built to help faculty with teaching. For example, Chandler (1994) developed a case library that shares ideas and examples for teaching elementary science classes. More recently, a consortium of teacher education programs built a case library of stories which describe how teacher education faculty and in-service teachers integrated technology in their teaching (F. Wang, Moore, Wedman, & Shyu, 2003). Similar efforts have been made by researchers and developers outside of the CBR community. Another consortium of teacher education programs (Krueger et al., 2003) created a searchable database of video cases featuring technology integration. Developing case libraries to facilitate faculty development is also of international interest. A group of Scottish online teaching enthusiasts (The Online Tutoring Skills Project Team, 2000) gathered cases globally to stimulate discussion on online tutoring. The application of the case library technology in these related projects suggests that a case library may be a viable option in providing faculty with resources that support online teaching. Details of these projects will be provided in the next chapter.

The second justification for adopting the case library technology in faculty development is that CBR, the reasoning method that case libraries enable, is especially appropriate for domains such as online teaching. Kolodner (1993) theorizes that CBR allows those who are unfamiliar with the domain knowledge to generate quick problem solutions without completely understanding the domain. Knowledge stored in a case library is represented by stories and experiences that are readily reusable. A person or a machine can generate a problem solution by modifying and reusing existing solutions without a complete understanding of the domain. Solutions generated in this manner may not always be optimal, but CBR does help novices of a domain to solve problems. Faculty members' heavy workload calls for the least time-consuming but effective support mechanism in online teaching. CBR seems to be an excellent fit in this regard. Therefore, instead of spending extensive amount of time acquiring comprehensive knowledge on online teaching, most of which is not relevant at any given moment, a professor can start teaching online by learning from other professors' experiences. Moreover, Kolodner (1993) argues that CBR provides a means to guide problem solving when no algorithmic rules are available and when open-ended and ill-defined concepts abound in the domain. Unlike rule-based reasoning that depends on generalized rule-based knowledge to make decisions and solve problems, CBR reuses specific stories and experiences to generate problem solutions. When concepts are ill-defined, cases are used to interpret what the concepts mean in a certain context. Online teaching is a comparatively new practice in higher education. Although some knowledge in this area has been accumulated over the past several years, algorithmic rules are not available and

much of the knowledge is ill-defined in this domain. Therefore, CBR can be an appropriate reasoning method for online teaching.

Purposes of the Study

The previous section provided some justifications for choosing a case library as a faculty development tool that supports online teaching. The development and validation of such a solution is likely to be a long-term research project requiring a series of studies and multiple research strategies (Baldwin & Yadav, 1995). Individual research projects are needed to incrementally build a knowledge base for the solution. As a part of this long-term research effort, the current study aims to lay the groundwork for future research and development. Before making substantial commitment to developing such a tool, it is important to identify the initial evidence supporting or opposing the solution.

The purposes of the study are twofold. The first purpose is to determine initial support for or evidence against this solution by exploring faculty perceptions of a case library prototype. This focus may help researchers and stakeholders of faculty development determine whether to pursue this solution in improving faculty online teaching. Assuming an OTCL is worth pursuing, the second purpose of this study is to generate design knowledge, including a set of high-level design guidelines for future development work in the similar context and a methodology on how to develop a case library. As I mentioned in the previous paragraph, this study is the beginning piece of research in a long-term research agenda. Design knowledge synthesized from this study may enlighten future research in this or similar projects.

Research Questions

The following questions guided the direction of this study.

1. How do faculty members perceive a case library as a tool that supports online teaching?
    a. Is there a difference among faculty with different amounts of online teaching experience?
    b. Is there a difference among faculty with different levels of familiarity with case methods?
2. What tasks do faculty members perceive that they would accomplish with a case library that supports online teaching?
    a. Is there a difference among faculty with different amounts of online teaching experience?
    b. Is there a difference among faculty with different levels of familiarity with case methods?
3. What types of content do faculty members perceive that they would need in a case library that supports online teaching?
    a. Is there a difference among faculty with different amounts of online teaching experience?
    b. Is there a difference among faculty with different levels of familiarity with case methods?
4. What major system features do faculty members perceive that they would need in a case library that supports online teaching?

a. Is there a difference among faculty with different amounts of online teaching experience?

b. Is there a difference among faculty with different levels of familiarity with case methods?

The first research question investigates faculty members' overall perceptions of a case library that supports online teaching. Questions two and three examine two important concepts in developing the user interface of a case library: tasks and objects/data (Chandler, 1994; Ludolph, 1998; Stary, 2000). The term *content* was adopted to replace *objects/data* in this study, because as concepts from the software development community, *object* and *data* may not be meaningful for readers in the field of instructional technology. Content is a more familiar term in this context.

Once I determined what tasks faculty members would perform in a case library and what types of content should be provided to help them accomplish the tasks, the next logical step was to identify system features that would enable faculty to complete the tasks and access the content. Question four deals with major system features. In this study, a system feature is defined as "a subset of system requirements" (Turner, Fuggetta, Lavazza, & Wolf, 1999, p. 5) describing "application capabilities" (Kang et al., 1998, 151) or "an identifiable unit of system functionality from the user's perspective" (Mehta & Heineman, 2002, p. 418). There are functional and non-functional features (Kang et al., 1998). Functional features refer to services a system provides, whereas non-functional features include system properties and constraints related to how well the system meets the functional requirements. For example, in a course management system such as WebCT (2004), examples of functional features are discussion boards, chat room, and

private email; examples of non-functional features include system speed, security, and stability.

Methodological Overview

The purposes of this study are to determine levels of support for an OTCL and to generate design knowledge to inform the development of similar tools. These purposes could not be fulfilled without developing a prototype of this tool. Therefore, I adopted a developmental research methodology (Reeves, Herrington, & Oliver, 2004; Richey, Klein, & Nelson, 2003). To answer the research questions without making substantial commitment to what could be a faculty solution, I followed a rapid prototyping model synthesized from the works of Tripp and Bichelmeyer (1990) as well as Dorsey, Goodrum, & Schwen (1997) to conceptualize, develop, and research an OTCL (Figure 1). I developed the conceptual models of tasks, content, and features at the conceptualization stage, implemented the models at the development stage, and evaluated the models as well as the prototype at the research stage.

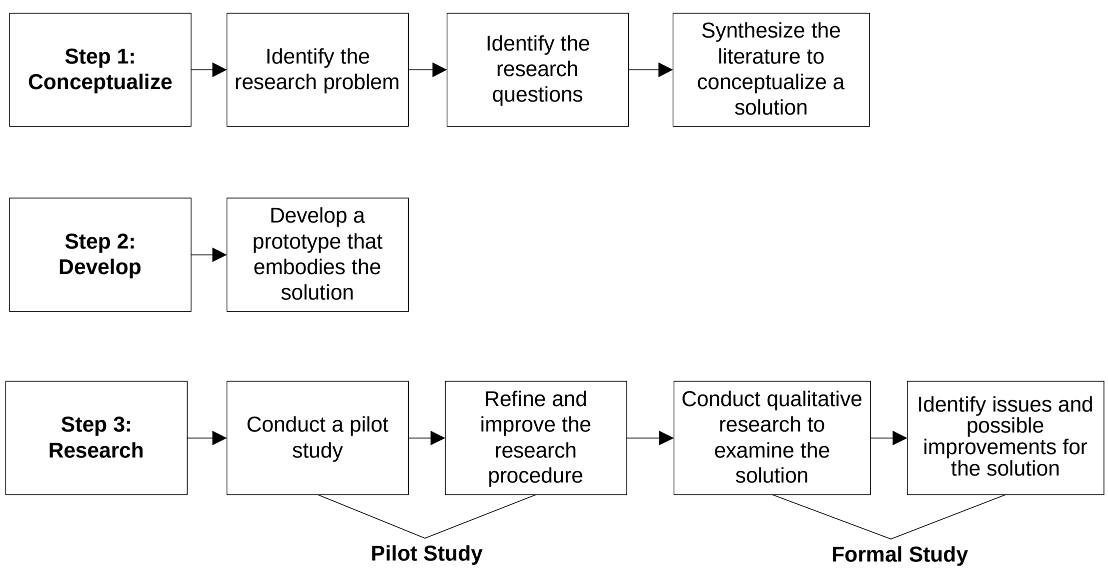


Figure 1. Development and research procedures for the dissertation project.

I chose qualitative methods to evaluate the prototype at the research stage because of the exploratory nature of the study (Creswell, 2004). Data collection included three steps: initial interviews, contextual interviews, and final interviews. During the initial interviews, I engaged faculty in retrieving their past teaching and online teaching experiences, as well as in providing initial feedback to the case library concept. At the contextual interviews, I first asked the faculty participants to review three conceptual models and two scenarios, and then involved them in accomplishing two tasks with the use of the prototype. I observed and interviewed them when they interacted with these design artifacts. At the final interviews, I examined faculty overall perceptions of an OTCL. The three data collection steps with each participant occurred in one setting and lasted for an average of two hours. Seven faculty members were selected based on the purposeful sampling technique.

The works of Miles and Huberman (1994) as well as LeCompte and Schensul (1999a) informed the data analysis in this study. I took an 11-step procedure to analyze the data. I started out by organizing the data into transcripts. I then reduced the data by coding and entering them into a database, running reports from the database, grouping codes into categories and associating them with research questions. Finally, I drew flow charts to make sense of the relationships among the categories and wrote up the findings.

Terms and Definitions

Terms related to this study are defined as follows:

1. Case

Practitioners and researchers from the communities of CBR (e.g. Kolodner, 1993) and case methods (e.g. Merseth, 1996) share the interest in the use of cases in learning. For the purpose of this study, I synthesized a definition of a case from these two communities. A case is “a contextualized piece of knowledge representing an experience that teaches a lesson” (Kolodner, 1993, p. 13) or multiple lessons. Cases vary in size. A large case may consist of multiple smaller cases. In this study, cases are used to assist with problem solving, decision making, and reflection.

2. Case library

Some researchers (Kolodner, 1993; Kolodner, Owensby et al., 2003) in the CBR community coined the term “case library” mainly to refer to computer-based repositories for cases. Case libraries in this community are usually concerned with technical issues such as case representation and indexing. In this study, the term “case library” is expanded to include any computer-based repositories that store cases. Case libraries reviewed in this project may or may not come from the CBR community, and they may or may not be concerned with the issues of case representation and indexing.

3. Online teaching

In this study, the terms “online learning” and “online teaching” are used interchangeably. They refer to “teaching and learning that takes place over a computer network of some kind (e.g., an intranet or the Internet) and in which interaction between

people is an important form of support for the learning process” (Goodyear, Salmon, Spector, Steeples, & Tickner, 2001, p. 68). I use this definition in this study to refer to teaching and learning that is totally online or hybrid/blended (with both face-to-face meetings and virtual sessions) (Young, 2002) as long as there are online interactions with the use of Internet communication software.

Framework of the Dissertation

This dissertation consists of nine chapters. This chapter provides a rationale for the study and presents the research questions that this dissertation intends to address. Chapter 2 reviews the related literature to offer support for the study and to inform the research methodology. Chapter 3 describes and justifies a three-phase research methodology employed in this dissertation. Chapter 4 portrays the participants to provide a context for the reader to understand the findings. Chapters 5 to 8 present the research data. Each of these four chapters focuses on one of the four research questions. Chapter 5 addresses faculty overall perceptions of an OTCL; Chapter 6 examines the tasks professors perceived that they would accomplish in this tool; Chapter 7 deals with the types of content professors envisioned that they would need; Chapter 8 examines the system features that they would want. Readers with a particular interest in one of the research questions may concentrate on the chapter devoted to the question. Chapter 9 answers the research questions, discusses the findings in the context of the literature, describes how the study fulfills the two purposes, and provides suggestions for future research.

Summary

Online teaching provides both opportunities and challenges for higher education. One of the keys to the success of online teaching is to improve faculty development activities. This study created a case library as an alternative resource to advance faculty online teaching. Should researchers or faculty development practitioners adopt such a solution? If so, how to build this tool to meet the needs of faculty? This study explores faculty overall perceptions of this solution and identifies design knowledge for developing such a tool.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

I conducted a literature review to achieve two goals. The first goal is to provide support for the current study. To reach this goal, I examined several bodies of related literature. In this chapter, I first describe the challenges that professors are faced with when teaching online and discuss the theoretical and empirical perspectives on how to meet these challenges. Both perspectives support the adoption of an Online Teaching Case Library (OTCL) in improving faculty online teaching. I then present the theoretical and empirical foundations as well as the related issues regarding case-based reasoning (CBR) and case methods. Case libraries originated from these two fields. These two bodies of literature offer more support for adopting an OTCL as a solution to support faculty online teaching. The second goal of this literature review is to inform the research methodology. I addressed this goal primarily by reviewing projects similar to an OTCL.

To summarize, six main areas of literature are examined: challenges that online teaching has placed on faculty, both theoretical and practical perspectives on helping faculty to meet the challenges, case-based reasoning, case methods, and related projects.

Online Teaching: Challenges for Faculty

The Internet can enable the creation and adoption of instructional methods that have the potential to fundamentally transform education (Hannafin, Oliver, Hill, & Glazer, 2003; MacDonald, 2001; Newman & Scurry, 2001; Reigeluth & Joseph, 2002).

Leaders on online teaching argue that essential pedagogical changes toward more student-centered collaborative learning are needed to ensure the success in the virtual classroom (Jones, Asensio, & Goodyear, as cited in Goodyear et al., 2001; Reeves et al., 2004; Sammons, 2003). To achieve this goal, online instructors should have a new set of knowledge and skills as compared to those in the traditional classroom (Cyrs, 1997; Goodyear et al., 2001; Schoenfeld-Tacher & Persichitte, 2000; Williams, 2003). For example, Goodyear (2001) reports that a group of online teaching experts identified eight roles for the online instructor and each role has four to twenty-three competencies. These roles include the process facilitator, advisor-counselor, assessor, researcher, content facilitator, technologist, designer, and manager-administrator. Although some teaching skills can be transferred from the face-to-face environment to the virtual space, successful online teaching requires many competencies unique to the online environment.

There is a significant gap between what is expected of online instructors and their current online teaching proficiency. Research shows that higher education faculty members generally are not very competent in online teaching. For example, in a study of professors from 26 colleges/schools of education, only 6% of the interviewees thought their faculty were highly proficient in Web-based instruction (Lan, 2001). In another study reported by Okpala and Okpala (1997), professors stated that they were comfortable with basic technologies related to word processing, email and Web browsing, but were not ready for more advanced applications. Faculty members not only have limited technical skills, their knowledge about online pedagogy is also inadequate. Many faculty members did not change their pedagogical approach when moving courses online, and their online teaching materials were simply “digitized text books on the Web”

(Navarro, 2000). One may argue that professors' lack of competencies in online teaching may explain in part why large scale distance education programs have experienced more failures than successes (NEA Higher Education Research Center, 2002).

How can professors acquire online teaching competencies? Learning to teach online is a difficult and long-term change process that needs sustained support. Chuang, Thompson, and Rosenbusch (2003) report how a faculty member spent eight years transforming from a professor with minimal computer knowledge and skills to one who has integrated many technologies in teaching and adopted constructivist pedagogical beliefs. A mentoring program and a community of learners were critical to the development of this professor.

The literature reviewed in this section indicates that sustained support should be made available to faculty members to help them adopt more student-centered approaches to teaching and to support the multiple roles that they play in the online environment. Such support is usually lacking in the traditional approach to faculty development (Emerson & Mosteller, 2000). A case library may be an alternative or additional solution to provide this type of support. The next section enhances this argument by examining the theories related to faculty change and faculty development.

Meeting the Challenges: Theoretical Perspectives

Faculty Change and Teaching Improvement

Online teaching challenges faculty to change their approaches to teaching. How does the change occur and what factors contribute to the change? The literature on the dynamics of faculty change and teaching improvement in higher education shed light on this issue. The following presents a metacognitive model of faculty teaching

improvement and discusses a component of the model that is most relevant to the current project.

Researchers have conducted a series of studies (Entwistle & Walker, 2000; Guskey, 1986; Hativa, 2000; McAlpine & Weston, 2000; McAlpine, Weston, Beauchamp, Wiseman, & Beauchamp, 1999) and found that teaching improvement is a sophisticated process involving the interactions of different types of knowledge, experiences and other elements over a substantial period of time. Among these studies, McAlpine and Weston (1999) provide a research-based metacognitive model underlying faculty change (Figure 2).

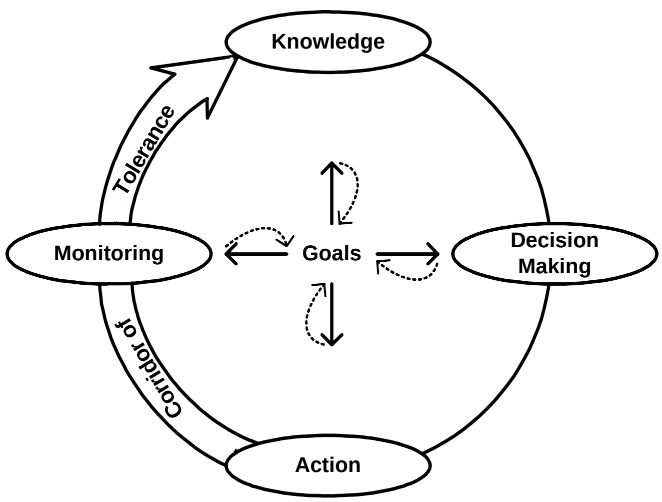


Figure 2. Model of reflection, recreated from McAlpine & Weston (2000).

This model describes how faculty teaching improvement occurs as a result of the interactions among six components: goals, knowledge, action, monitoring, decision making, and corridor of tolerance. Teachers improve their teaching in the ongoing iterative process in which “reflection is driven by goals, resulting in plans drawn from knowledge, leading to actions that are constantly being revised and updated as feedback

is monitored through the corridor of tolerance and decisions led to adjustments in actions" (McAlpine & Weston, 2000, p. 109). This illustrates how faculty members improve teaching and construct knowledge during reflective teaching. For example, prior to teaching a class, a professor may have the *goal* of using a certain instructional method to help students understand certain content. S/he may draw on existing *knowledge* to develop a *plan* on how to teach the class. The plan can guide the *action* (teaching) of the professor in the classroom. During and after teaching, the professor may use her/his *knowledge* to help *monitor* how successfully s/he is in achieving the goal. S/he may find evidence indicating whether progress toward the goal is within an acceptable range, *the corridor of tolerance*. This leads to the *decision making* in terms of whether and how changes should be made to the plan. The professor relies on knowledge to help her/him make the decision.

As an online teaching resource, a case library can enable the reflection and teaching improvement process by impacting the knowledge component of the model. The following paragraphs discuss (a) the importance of knowledge in teaching improvement and (b) the types of knowledge that contribute to teaching improvement.

Importance of Knowledge

Knowledge is both the input and output of teaching improvement (McAlpine & Weston, 2000; McAlpine et al., 1999). On one hand, professors draw upon their previous knowledge to make decisions, to develop and enact plans, and to monitor plan execution. On the other hand, new knowledge is created when actions are revised and feedback is monitored during the iterative process of reflection. The importance of knowledge in improving faculty teaching and student learning is corroborated by a body of research

(Hativa, 2000; Kember & Kwan, 2000; Martin, Prosser, Trigwell, Ramsden, & Benjamin, 2000; Trigwell & Prosser, 1999). These studies have found some initial connections among (a) faculty's thinking, beliefs and knowledge, (b) their teaching practice, (c) and student learning. These findings are not surprising, because studies on experts vs. novices in university teaching (Dunkin, 2002) and other domains (Chase, 1973) have established the role of knowledge in distinguishing experts from novices. Based on these studies, experts usually have much more extensive and deeper repertoire of knowledge than novices to guide them in decision making.

Types of Knowledge

What types of knowledge contribute to the reflection process? Both principled domain knowledge and emerging knowledge play important roles in improving faculty teaching (McAlpine & Weston, 2000; McAlpine et al., 1999). Principled domain knowledge exists in the format of principles or rules, whereas emerging knowledge provides "precursors to domain knowledge" (McAlpine et al., 1999, p. 123). It offers a knowledge base for professors to reflect upon and to develop principle based knowledge. The following paragraphs provide a brief description of these different types of knowledge.

The literature on teacher knowledge (Fennema & Franke, Grossman, Shulman, as cited in McAlpine & Weston, 2000) usually focuses on four domains of principled knowledge, including general pedagogical knowledge, pedagogical content knowledge, content knowledge, and knowledge of learners.

> Content knowledge refers to the subject matter per se. General pedagogical knowledge refers to broad general principles and strategies of classroom management and organization that transcend subject matter. Pedagogical content knowledge refers to the ways particular subject areas are formulated to make them

> comprehensible to learners. Knowledge of learners includes knowledge of the characteristics that students of different ages and backgrounds bring to the situation (McAlpine & Weston, 2000, p. 372).

In a study of the reflective processes of six university professors, researchers (McAlpine et al., 1999) found that when professors made decisions about teaching, they drew most heavily upon their general pedagogical knowledge, followed by knowledge of learners, pedagogical content knowledge, and content knowledge.

Experiential knowledge is a type of emerging knowledge important in the reflective process. It is rooted in faculty members' previous experiences. It is similar to *craft knowledge* (Van Driel & Verloop, 1997) or *wisdom of practice* (Weimer, 2001). McAlpine and Weston (2000) found that professors sometimes depend on their experiential knowledge in monitoring plan execution and making decisions. Other studies on teacher thinking in higher education (Entwistle & Walker, 2000; Hativa, 1997; Van Driel & Verloop, 1997; Weimer, 2001) have also confirmed the instrumental roles played by experiential knowledge in faculty teaching. This is consistent with findings in instructional design, a field related to teaching. Researchers (Dijkstra, 2001; Pirolli & Russell, 1992; Rowland, 1992) found that instructional designers use example/case-based knowledge as templates in problem solving and decision making.

Principled and emerging knowledge both contribute to teaching improvement. Linking these two is particularly important (McAlpine & Weston, 2000). On one hand, better principled knowledge does not necessarily improve teaching. It needs to be connected with previous experiences and future practice to make it useful. On the other hand, emerging knowledge alone may not improve teaching when there is no alternative principled knowledge available (McAlpine & Weston, 2000). For example, if a faculty

member finds that an instructional strategy does not work, teaching improvement may not occur unless s/he has alternate strategies to guide her/him.

The theoretical perspectives on faculty change and teaching improvement provide support for adopting a case library in assisting faculty with online teaching. Reflection is central to teaching improvement. It can be encouraged by enriching the knowledge base of professors and by linking theoretical knowledge with experiential knowledge. Several case libraries developed in areas related to teaching support this process (Chandler, 1994; Domeshek & Kolodner, 1997). They provide both theoretical and experiential knowledge to support problem solving. If these case libraries can facilitate the reflection process, one has reason to believe that a case library may help improve faculty online teaching.

The literature on teaching improvement provides descriptive theories on how teachers change and improve their teaching. Have these theories been applied in online teaching related faculty development programs? The next section reviews the literature in this area.

Faculty Development

Three faculty development frameworks provide vantage points to conceptualize the case library as an online teaching resource. Lan's (2001) systemic view of faculty development provides a big picture of what is needed to promote online instruction at the strategic level; Hodgson and Kay (2003) borrowed the process view of instructional design to identify the different support faculty need during multiple stages of online teaching; Orill's (2001) theory on faculty development focuses on the micro-level of what should be provided to teachers to facilitate changes. The following provides more

details of these models and discusses how they offer multiple frameworks to conceptualize an OTCL and provide support for this solution.

Lan (2001) employs Rossett's (1995) needs assessment model to examine the types of faculty development programs needed to support online teaching. This model suggests that performance improvement usually requires interventions on one or several of the following four dimensions: environment, incentives, motivation, and skill/knowledge. After comparing 26 teacher education programs, Lan (2001) finds that all four dimensions are important, and a multidimensional approach would be needed to develop the technology infrastructure, policy and administrative initiatives, innovative and supportive culture, as well as a training and support mechanism to promote Web-based instruction. To provide required skills and knowledge, the exemplary universities in the study have a variety of support mechanisms including workshops and individualized support for instruction design and development. This systemic view of faculty support is shared by many others involved in developing faculty (Dickey & Davis, 1998; Gillespie, 1998; Irani & Telg, 2001; Ring, Cilesiz, Ali, & Chen, 2002). It is also consistent with the findings in a couple of benchmark studies (American Productivity & Quality Center, 1999; The Institute for Higher Education Policy, 2000), showing that a variety of strategies is needed to support a culture of technology use.

Hodgson and Kay (2003) categorize faculty development needs in five phases: planning, design, development, delivery, and evaluation. Faculty members wear "multiple hats" and play different roles at different stages. Support for faculty is needed throughout the process. At the planning stage, programs should be available to help faculty understand theories on course design and distance learning so that they could

identify the objectiveness of the class, select instructional strategies and class delivery media. At the design and development phase, professors may need assistance for them to apply educational theories to chunk information, design activities that facilitate learning and assessment, and to use appropriate media to present information. They would also need help with the technical aspects of class design and development. During the delivery phase, support should be provided to faculty to help them manage course Websites and facilitate online discussions. Finally, at the evaluation stage, faculty may need assistance to assess the quality of learning in order to refine and modify their instruction.

Orill (2001) develops a theory on professional development (Figure 3) to facilitate teacher change in the middle school environment. It is reviewed here because it has some similarity with McAlpine and Weston's (1999) model on higher education faculty reflection presented earlier in this chapter. At the center of the model is a triad of core building blocks: goal setting, enactment, and reflection. The framework revolves around reflection, which occurs when teachers think about their enactment – what they have just experienced in class – to examine whether they have met their proximal goals,

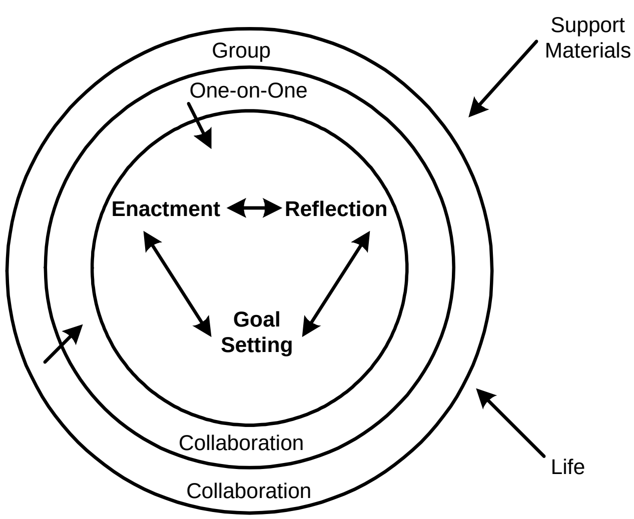


Figure 3. Professional development framework, adapted from Orrill (2001).

"which are small, easily achieved goals that help move the learner toward a larger, distal goal" (Orrill, 2001, p.18). Problems with proximal goals and the enactment are identified in reflection and modifications are made consequently. To facilitate the process, the following should be provided to teachers: one-on-one support, collegial collaborations, and supporting materials. Orrill's (2001) framework as well as McAlpine and Weston's (1999) model both emphasize the role of reflection, experience, goals, knowledge and feedback in teaching improvement and the iterative nature of the process. Orrill's (2001) framework is a prescriptive model providing guidance on how to improve teaching, whereas the model developed by McAlpine and Weston (1999) is a descriptive theory illustrating the faculty improvement mechanism. These two models are informed by different groups of literature, but they have arrived at similar conceptual models. This may indicate validity of both models.

These models on faculty development provide multiple frameworks to put the current study into perspective. A case library cannot replace all the current faculty development activities. Instead, it can serve as an important component of a systemic approach to faculty development. It can encourage reflection by providing one-on-one case-based advice to faculty in one or several stages of the instructional design process.

Meeting the Challenges: Practical Perspectives

Faculty Needs

The last section presented the support mechanism faculty members would need in online teaching from the perspectives of teaching improvement and faculty development theories. What do professors say about their needs then?

A few studies have been conducted to examine the needs of faculty members. Findings in this area are consistent with the adult learning theory (Knowles, Holton, & Swanson, 1998) and the literature on teaching improvement and faculty development. Faculty members generally prefer learning about technologies in the context of their own instructional problems (Goodale, Carbonaro, & Snart, 2002; Laga & Elen, 2001). They want to acquire relevant knowledge that addresses their specific concerns about teaching (Laga & Elen, 2001) and that can be applied immediately (Goodale et al., 2002). They are especially interested in learning from concrete examples provided by experienced peers (Goodale et al., 2002; Laga & Elen, 2001). Ongoing support such as resources, services and a community of learners are needed (Goodale et al., 2002; NEA Higher Education Research Center, 2001a). Just-in-time individual support and small group learning are desirable (Laga & Elen, 2001; NEA Higher Education Research Center, 2001b).

A case library seems to be able to address these needs. Knowledge is represented primarily in the format of cases in case libraries. With the search function, knowledge relevant to the user's problems can be retrieved in a just-in-time manner (Kolodner, 1993). Cases representing others' experiences are more readily applicable in problem solving than guidelines and rules (Kolodner, 1993). In addition, case libraries can provide ongoing support to multiple stages of problem solving (Domeshek & Kolodner, 1997).

Best Practices and Innovative Approaches

Best practices in the field are in agreement with the theoretical models of faculty development and research findings on faculty needs. A large-scale benchmark study on quality Internet-based education identifies training, peer mentoring and written resources

provided throughout the progression of the course as benchmarks for pedagogical support for faculty (The Institute for Higher Education Policy, 2000). As mentioned in chapter 1, another benchmarking study on technology use in teaching and learning found that best-practice institutions use project-based approaches toward faculty development (American Productivity & Quality Center, 1999).

Technology is not only changing the landscape of teaching and learning, it is also renovating faculty development programs. Gillespie (1998) describes several innovative faculty development programs with the use of technologies. In these programs, traditional faculty development activities have been moved online and creative approaches were devised. Faculty members took online courses to learn pedagogy. They read literature related to online teaching and worked with other faculty members on group projects. The Internet provided them with instant access to resources and other professor's work. They learned from electronic mentors and collaborated with peers in the electronic salon. These characteristics are shared by some other faculty development programs (Bates, 2000; Bernath & Rubin, 2001; Shea, Sherer, & Kristensen, 2002; Sommer, 2002).

The literature on best practices and innovations in faculty development indicates that a Web-based case library that supports online teaching fits in the current faculty development trend that emphasizes project-based learning and technology-enabled support. One of the problems with current faculty development programs is the lack of well-prescribed, theory- and research-based methods on how to provide on-demand support to faculty with regard to online teaching pedagogy. This study is an effort to provide such knowledge.

Case-Based Reasoning

Case libraries are rooted in the theoretical foundation of case-based reasoning (CBR). This section provides support for an OTCL by examining the theoretical perspective of CBR as well as the related research and applications.

Theoretical Foundation

As a cognitive model, CBR has a strong theoretical background. It originates from day-to-day observations and psychological research findings (Ross as cited in Aamodt & Plaza, 1994) that people rely on their concrete past experiences in solving problems. It derives from theories on scripts and dynamic memory (Schank, 1982, 1999), and its emphasis on concrete experiential knowledge in learning and problem solving is shared by many other cognitive theorists and researchers. For example, cases have been found to be important in the problem solving processes (Anderson, 1983). They can serve as analogies for use in new problem situations (Gentner, 1983), as flexible knowledge structures that can be reassembled to solve new problems (Spiro, Feltovich, & Jacobson, 1991; Spiro & Jehng, 1990), as components of authentic context to situate learning (Brown et al., 1989; Lave & Wenger, 1990) or to anchor instruction (Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1990).

Kolodner's (1993) definition of a case is the most widely used in the CBR community. "A case is a contextualized piece of knowledge representing an experience that teaches a lesson fundamental to achieving the goals of the reasoner." (p.13) A reasoner can be a person or machine that is engaged in reasoning. There are two major parts to a case: lessons it teaches (the content of a case) and the context in which a lesson is taught. The content of a case consists of three components: a problem/situation

description, a solution, and an outcome. Cases record knowledge at an operational level. They can have varying sizes and shapes, but not all of them are worthy of recording. Only those that teach a lesson are useful. The other part of a case, the context in which a lesson is useful, is represented by the indexes of the case. Indexes enable case retrieval just like books in the library are indexed so that they can be easily located.

Case-based reasoning describes a cognitive cycle revolving around cases (Aamodt & Plaza, 1994). Figure 4 illustrates the process. The cycle starts with a problem, which is referred to as a *new case* in the model. The challenge of a new problem stimulates retrieval of the most similar case or cases from a collection of *previous cases* in memory. The *retrieved case* is re-used to generate a solution to the new problem. The solution becomes the *solved case*, which is applied in the real world to evaluate its effectiveness.

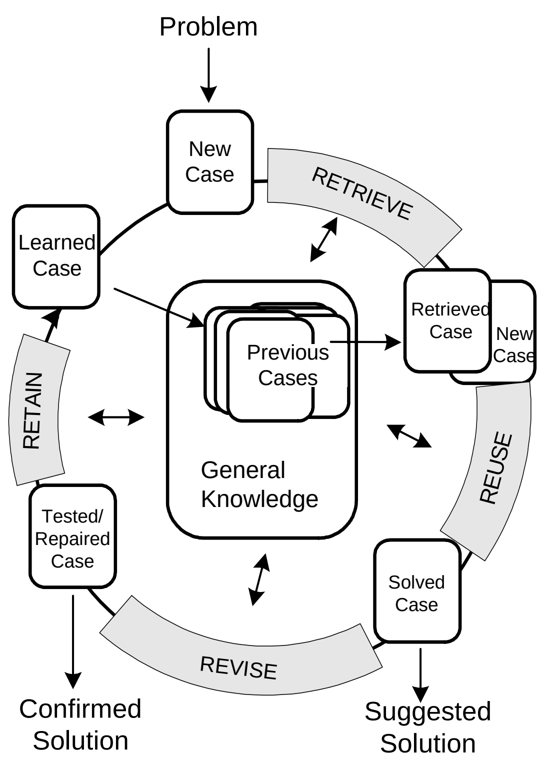


Figure 4. The CBR cycle, recreated from Aamodt & Plaza (1994).

The new situation rarely completely matches the old ones; the ballpark solution may fail to meet the needs of the new problem. The solved case is revised and then becomes a *tested/repaired case*. Learning usually occurs in this process. The tested/repaired case is stored in the memory as a *learned case* for future reuse.

Dynamic memory (Schank, 1982), a theoretical base for CBR, has the premise that experiencing, remembering, understanding, and learning are concurrent and inseparable events in human cognition. The CBR cycle described here reflects this principle. When a person *experiences* a problem, similar cases are *remembered* in order to create expectation and to help *understand* the new situation. If the expectations generated by the cases fail to explain the situation or solve the problem, *learning* may occur.

Research and Applications

CBR has been applied in two broad areas. One area of research aims to improve machine learning, and the other focuses on human learning. The former is interested in the use of CBR as a methodology in building expert systems, and the latter involves developing instructional strategies and tools based on CBR.

Most of the work on CBR has focused on the development of machine reasoners, which are expert systems that generate problem solutions based on case-based algorithms. Relatively little research has been conducted on the use of CBR in education. Interestingly, Schank (Schank, 1998, 1999; Schank & Cleary, 1994) and Kolodner (Kolodner, 2003; Kolodner, Camp et al., 2003; Kolodner, Crismond, Gray, Holbrook, & Puntambekar, 1998), who laid the theoretical foundation for CBR and developed some of the earliest case-based expert systems, both shifted their research focus from expert

systems to education. Their work has opened up a new area of CBR related theory and research in education.

The use of case libraries has been one of the most common approaches to applying CBR in teaching and learning. Kolodner and Guzdial (2000) state that case libraries can facilitate learning in multiple ways. First, the most obvious benefit of case libraries is that they can provide advice in the form of stories rather than abstract knowledge. The former is more operational than the latter (Kolodner, 1993). Second, case libraries can facilitate the learning of a concept or skill via vicarious experiences. Third, stories in case libraries can teach problem solving strategies by providing advice in terms of where to start and how to proceed in solving problems. Fourth, the indexing structure of online case libraries can scaffold students on what to think about in a knowledge domain. For example, for someone new to meal planning, the CHEF indexing scheme (Hammond as cited in Kolodner, 1993) can provide him/her with an organizer regarding the issues to look for when creating recipes. Fifth, reusing and learning from cases is a complex metacognitive skill that many people do not have. Case libraries that contain stories about applying someone’s experiences can help learners understand how experts solve problems with the use of existing cases.

Case libraries have been constructed to support design by providing relevant cases (Heylighten, 2000; Maher & Pu, 1997). Archie-II is a representative project. It provides guidance on multiple stages of architectural design. It will be reviewed later in this chapter. Case libraries have also been developed to support teaching improvement. The Science Education Advisor (SCIED) (Chandler, 1994; Kolodner, 1991) and the Knowledge Innovation for Technology in Education (KITE) (F. Wang, Moore et al.,

2003) are case libraries that advise teachers on science teaching and technology integration. The details of these two systems will be presented later to inform the current project.

A review of the literature on CBR provides support for the study. Case libraries have a sound theoretical foundation that has grown and evolved over the years. The adoption of case libraries in areas related to teaching and learning offers more justification for examining the use of a case library in the domain of online teaching.

Case Methods in Teacher Education

The use of cases in facilitating learning is also the primary focus of another line of research – studies on case methods in teaching. Cases have been used extensively in law, business, and medical education (McAninch, 1993; Merseth, 1991), and they have also been adopted in teacher education (Merseth, 1996).

A series of research findings support the use of case methods in teacher education. These studies show that teacher knowledge is context-specific, situation-dependent (Calderhead, Clark & Peterson, Clark & Yinger as cited in Merseth, 1996), and always evolving (Clark & Lampert, Lampert, as cited in Merseth, 1996). Researchers argue that teachers operate more from "induction from experiences" rather than "deduction from theoretical principles" (Merseth, 1996, p. 724). The following section first presents the research and application of case methods in teacher education, and then discusses the similarities and differences between CBR and case methods.

Research and Application

The following paragraphs describe the types of learning that case methods facilitate and point out a contribution that the case methods community can make to the

understanding of how to structure learning environments with the use of cases. It also introduces case libraries informed by case methods in the field of teacher education.

Studies on the use of case methods in teacher education fall into two categories: studies examining the types of learning fostered through case methods and research on how to structure learning environments with cases (Lundeberg, Levin, & Harrington, 1999; Merseth, 1996). The first category investigates the influence of cases on what teachers think and how they think. Cases have been used in a variety of teacher education areas such as multicultural education, knowledge about motivation, formal authority and management, theoretical principles of pedagogy, and content specific pedagogical knowledge. Cases have positive influence on several aspects of teacher thinking, including problem-solving and decision-making skills, awareness of unfamiliar educational settings and the generation of multiple perspectives, beliefs about authority and personal efficacy, and habits of reflection.

The second category of research on case methods centers on how to structure the learning environment with cases. A major contribution from this body of literature emphasizes the importance of using cases to facilitate discussions in teacher education classrooms. This has been ignored by most of the CBR community except in the Learning by Design model, an instructional design model based on CBR (Kolodner, Camp et al., 2003; Kolodner et al., 1998; Kolodner, Gray, & Fasse, 2002). The next chapter will provide more details on this issue.

The effectiveness of case methods in teacher education and other fields has encouraged the application of case methods to faculty development in higher education.

Some anecdotal evidence of the effectiveness and strategies of case use in improving college teaching has been recorded (Hutchings, 1993).

Another body of literature that is particularly relevant to the current study is concerned with developing online case libraries to assist technology integration in k-12 settings (INTIME Project Team, 2003; Krueger et al., 2003) or to improve online teaching in higher education (The Online Tutoring Skills Project Team, 2000). The later part of this chapter will review these two projects to inform the methodology for the current study.

The literature in case methods supports an OTCL as an online teaching resource. Researchers in this area have used cases to support the development of different types of teacher knowledge and in facilitating teacher reflection and teacher thinking. This community has also made efforts to develop repositories of cases related to technology integration and online teaching. However, empirical research in the use of cases in faculty development and online teaching is limited. This study is an effort to add to this body of literature.

Case-Based Reasoning vs. Case Methods

The CBR and case methods communities share similar interests in the use of cases to promote learning. However, there are differences between these two areas with regard to the guidance they provide in building case libraries. First, CBR has a strong focus on the use of cases in guiding problem solving (J. L. Kolodner, personal communication, December 9, 2003), whereas case methods has a broader use of cases in facilitating teacher knowledge acquisition and thinking skills in a variety of areas. (The last section listed these areas.) Second, the field of CBR has developed and evolved

methodologies for building case libraries over the years. However, there is no specific methodology for developing such tools in the field of case methods. In summary, CBR and the case methods communities provide an overlapping and complementary knowledge base related to case libraries. In this study, I drew from both areas to guide the development of an OTCL.

Related Projects

The fields of CBR and case methods both consider cases as an important source of knowledge. Therefore, I examined projects/cases similar to an OTCL to guide the current study. I chose these projects based on the following criteria. First, the projects support human learning and design (rather than automating the design process) with a library of cases. Second, cases are stored in an electronic format. Third, the projects have the goal of promoting good teaching practice. The only exception is Archie-II (Domeshek & Kolodner, 1991, 1992), an architectural design aid. It is reviewed here because it is a classic case library with a sophisticated design that could benefit this project.

The following presents a review of five similar projects. Each review starts with a brief introduction to the project scope and tasks supported, followed by a discussion of the content and features, the system development process, and the contributions of the project to the current study. Some projects do not have documentation on some of these topics. In those situations, related sections are omitted.

KITE

The Knowledge Innovation for Technology in Education (KITE) project (Jonassen, Wang, Strobel, & Cernusca, 2003; F. Wang, Means et al., 2003; F. Wang, Moore et al., 2003) was claimed to be a pioneering effort in applying CBR in a large

scale instructional technology project. A consortium of eight teacher education programs were involved in developing KITE, a CBR knowledge repository built to store technology integration cases from which in-/pre-service teachers could learn technology integration through case studies. A Preparing Tomorrow's Teachers to Use Technology (PT3) grant from the U.S. Department of Education supported this project. The mission of the project is "to build a K-16 learning community through a CBR knowledge repository that enables learning through sharing, communal understanding through storytelling, continuous exchange and creation of new knowledge, and collective problem solving among K-12 schools and teacher education programs." (F. Wang, Moore et al., 2003) The project has five major milestones: developing the knowledge repository, collecting knowledge, conducting formative evaluation, enhancing the repository and its knowledge, as well as disseminating the project and conducting summative evaluations. At the time of this writing, KITE includes more than 1000 technology integration cases.

Tasks

KITE purports to help teachers answer specific questions concerning technology integration by providing stories of other teachers' practice. However, more detailed and explicit reports on the tasks that KITE supports are not available in articles related to this project (Jonassen et al., 2003; F. Wang, Means et al., 2003; F. Wang, Moore et al., 2003).

Content

In KITE, the primary type of content is the case. A case has a case summary and a whole story. A case summary includes several types of information about a case: general context, story context, goals in story, story activities, and outcomes. A whole story is presented as an interview transcript about a teacher's technology integration experiences.

Features

Three types of search mechanisms are available to the user: keyword search, super search and browsing. Keyword search is similar to features found in common search engines. It asks for the keyword, the grade level, and subject/unit. The super search allows the user to make selection on multiple fields, such as school location, student grade level, subject/unit, technologies used in the lesson, planned activities in the lesson, etc. The browsing screen provides a tree structure of the indexes. The user can navigate to one index, for example, grade level of students, and select a grade to view the cases associated with it. Result screens are similar no matter what search mechanism the user chooses. The result screen provides a list of cases that best match the query. Each case has a case number, similarity score (a number indicating how closely the result case matches the requirement of the query), grade level of students, subject/unit, and a brief summary describing the activities in the case. If the user is interested in a case, s/he can click on the case number to view the detail. A case summary is presented on the top of the case detail screen. All the indexes and the associated values are listed in the case summary in a table format (Figure 5). The second half of the screen provides the whole story of the case in the format of an interview transcript between an interviewer and a teacher (Figure 6).

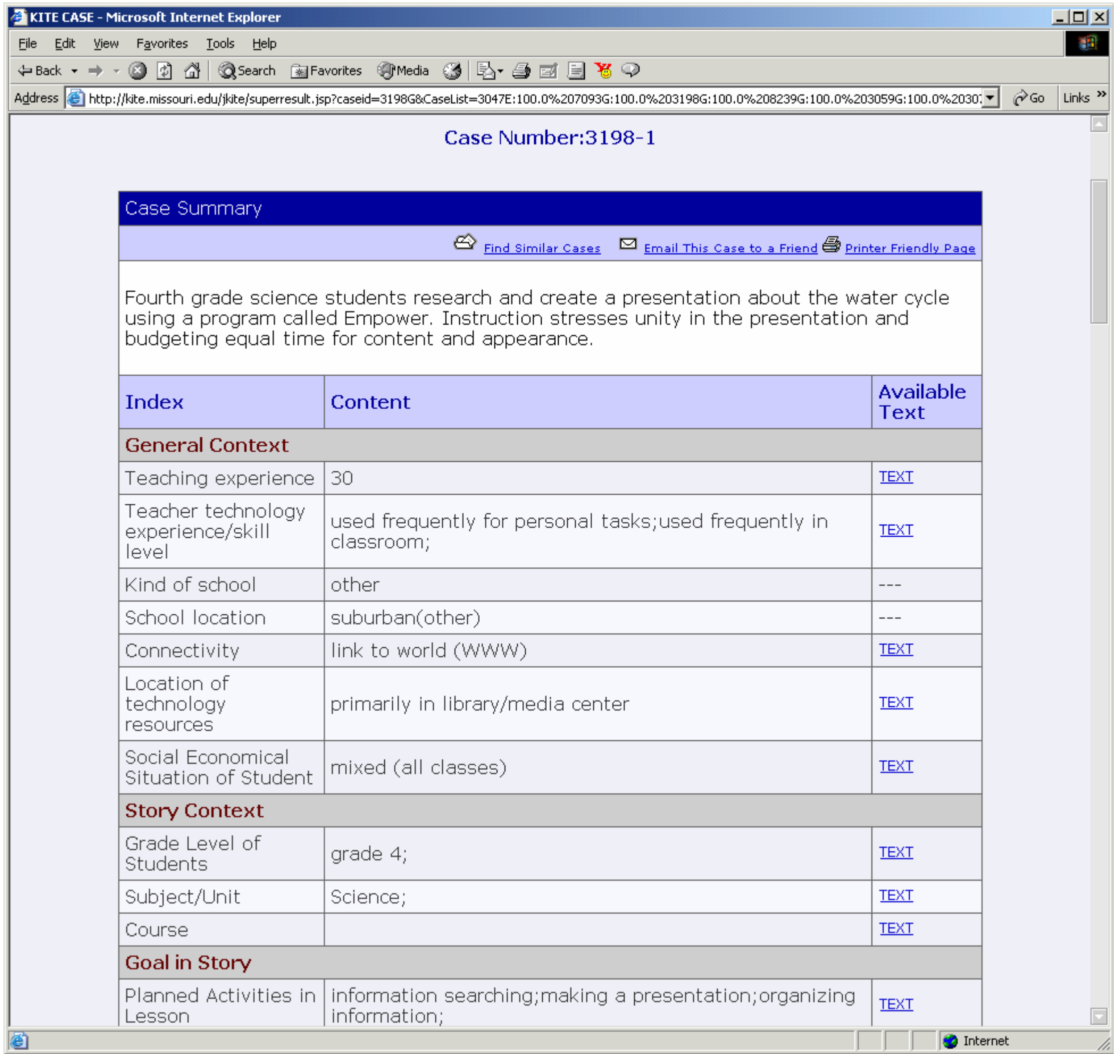


Figure 5. KITE screen capture: A Case Summary, developed by the KITE Project Team (2001).

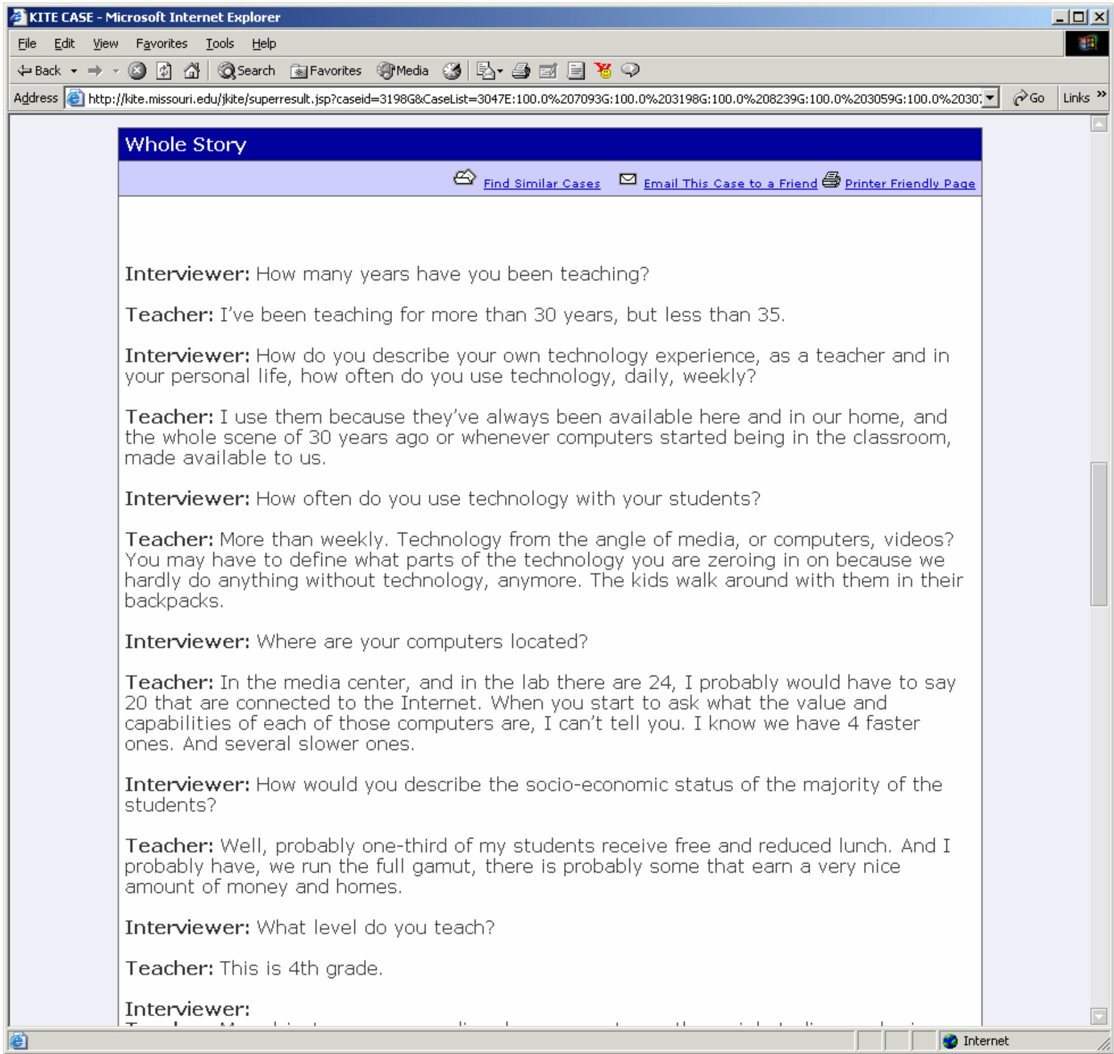


Figure 6. KITE screen capture: A Whole Story, developed by the KITE Project Team (2001).

System Development Process

The KITE team adopted the rapid application development (Robinson, as cited in F. Wang, Moore et al., 2003) and participatory design approach (Kuhn & Muller, Schuler & Namioka, as cited in F. Wang, Moore et al., 2003) in developing the user interface. The team involved all stakeholders in the iterative design and development process. They went through five iterations of modification of the interface based on panel reviews and

usability tests by in-/pre-service teachers. For example, they found in the usability tests that users were not familiar with the concept of CBR, and the super search function developed based on CBR indexes was too complex for them. Keyword searching and browsing functions were added as a result of the initial usability testing.

Discussion

KITE is relevant to the current study. Cases in KITE focus on technology integration in the classroom and the project goal is to improve technology integration in teachers. The current study focuses on providing support for online teaching, which could be thought of as an area of technology integration.

Experiences and insights from KITE informed the current research in two ways. First, lessons that the KITE project team learned from their experiences guided the current project. For example, their finding about the super search function and their decision to add keyword searching and browsing functions were taken into consideration in developing the prototype of an OTCL. Second, the KITE project team employed an iterative approach for the system development, and they conducted usability testing and formative evaluation to improve the system. These approaches guided the prototype development process in this OTCL.

However, KITE does have its limitations. A major problem is with its case representation. Each case is simply represented by one interview transcript. There is no annotation or guidelines to link theories with practice, which is important in facilitating teaching improvement.

SCIED

SCIED (Chandler, 1994; Kolodner, 1991), the Science Education Advisor, is a case-based hypertext browsing system that shares ideas for teaching elementary school science. The tool consists of 150 guidelines, 70 cases annotating 30 activities and 5 pedagogical themes. There is limited evaluation to determine the effectiveness of the system, but some evaluation data is available in the format of issues or lessons learned from the project. The prototypes, AI-Ed (Kolodner, 1991), and its successor, SCIED (Chandler, 1994) are part of a 3-year project. The research team spent the first year gathering content. They dedicated a large part of the second year organizing and indexing activities, stories, and guidelines related to science education. During the third year, the project team focused on applying a user-centered design approach to the development of the system.

Tasks

The main goal of the project is to support the transition of elementary teachers from non-science teachers to capable science teachers. It provides teachers with guidelines and themes as well as concrete cases and activities. It claims to support three main tasks: (a) identifying appropriate activities to use, (b) implementing the activities, and (c) using strategies for meeting objectives and managing the class.

Content

In SCIED, content is indexed and organized by three types of objects – index objects, organizing objects and contributing objects (Figure 7). The index objects are used for case search. They consist of learning objectives, pedagogical guidelines, and class context. Organizing objects such as units, activities, themes, and approaches

structure case information for presentation. They are linked to index objects. They also subsume contributing objects including stories, background, learning methods and activity context. A case consists of a guideline and its associated story. A guideline is equivalent to a “lesson learned” in science teaching, and a story illustrates the guideline.

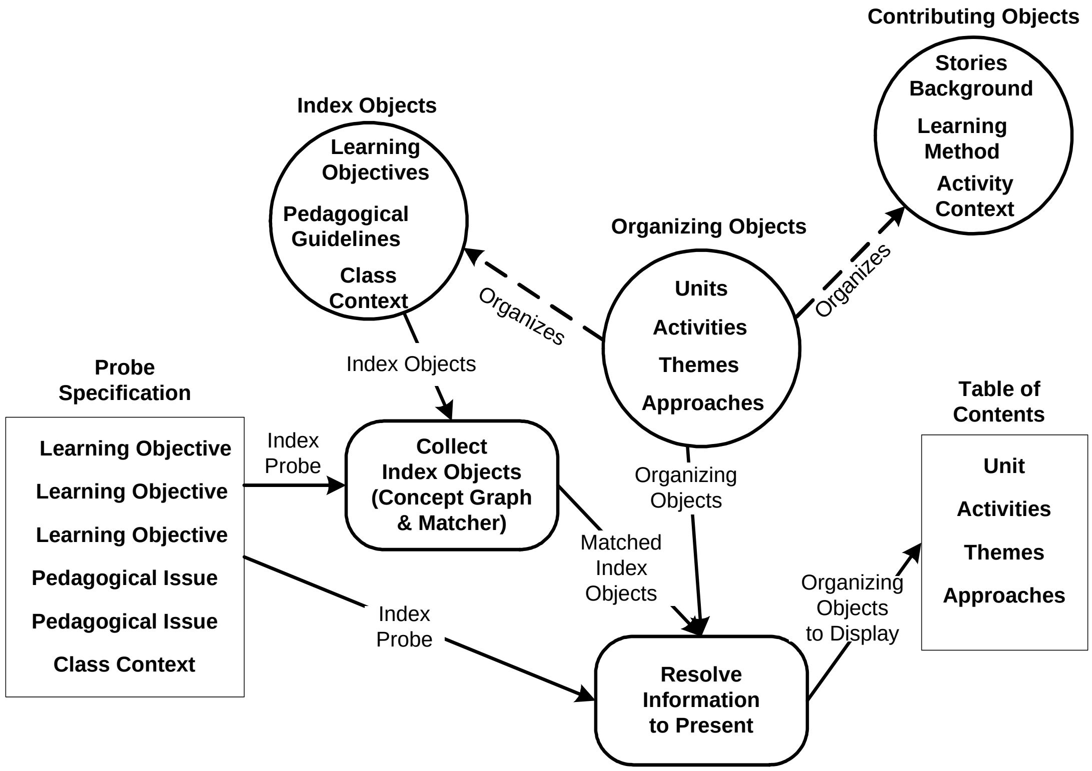


Figure 7. SCIED indexing and information retrieval scheme, recreated from Chandler (1994).

Features

To retrieve a case, a user specifies a case retrieval “probe” including class objectives, pedagogical issues, and the classroom context on the query screen. The system presents to the user a personalized table of contents consisting of a list of activities and themes/issues. The user can navigate to a specific activity or a theme/issue, and come back to the table of contents to explore another activity or theme. When the

user selects an activity, the system displays a description of the activity as well as the teaching approaches and related stories. Similarly, a theme/issue screen groups related issues and provides guidelines and stories related to these issues. In addition to viewing an issue, the user can also contribute a story to an issue by switching from the browsing mode to the editing mode.

System Development Process

The project team adopted a user-centered design approach to develop SCIED. This approach consists of developing three models: a user model of elementary science teachers, a task model of what steps or processes the system supports, and a domain model of elementary school science. These three models are roughly equivalent to the three types of analyses familiar to the audience in the field of instructional technology: user analysis, task analysis, and content analysis. These three models provide a general understanding of the role of the user, the task, and the domain covered by SCIED. The team went through six interface design cycles on paper when developing SCIED.

Discussion

As a case library, SCIED guided the current project in several aspects of system development. First, an important asset of SCIED is its focus on linking activities and stories with guidelines, issues and themes. This facilitates the connection between experiential and theoretical knowledge. I borrowed this feature in designing this OTCL. Second, the development of SCIED lasted three years and went through six interface design cycles. This iterative approach supports the prototyping strategy adopted in the current study. Third, conceptual models of tasks, users and the domain guided the interface design for SCIED. This model-based approach is common in the interface

design community (for example, Ludolph, 1998). These models informed the development of this OTCL.

The limitation of SCIED is that its scope is restricted to a narrow domain: science education in the elementary school. Although this allows the project to provide pedagogical advice on specific content, this level of detail would be difficult to achieve in a large scale project.

Archie II and Its Descendents

Archie-II (Domeshek & Kolodner, 1991, 1992; Domeshek & Kolodner, 1993, 1997; Kolodner, 1993) is a case-based design aid (CBDA) developed to support architects with the conceptual design of buildings. It is a collaborative effort between two groups from the Georgia Institute of Technology: the artificial intelligence (AI) lab in the College of Computing and members from the College of Architecture. Archie-II holds cases of several courthouses and libraries. The system was developed to raise design issues, propose responses to the issues, and identify pitfalls and opportunities. Some initial evaluations of the system occurred when students in two studio sections used Archie-II in a library design competition. Researchers found mixed but encouraging results.

Tasks and Features

Archie-II organizes the contents and user access by considering a likely browsing sequence reflecting different phases of the conceptual design. The user can go from an initial undirected survey of related cases to a more detailed examination of the lessons that one can learn from the cases. Archie-II supports the following browsing sequence reflecting four phases of the conceptual design: orientation and issue discovery, issue

understanding and elaboration, issue and tradeoff exploration, and proposal critiquing and evaluation. These phases describe the general conceptual design process. The following provides the details of these four phases.

First, when a designer starts a new project, s/he needs to get oriented and to identify issues by reviewing similar completed projects. For example, to build a new courthouse, a designer can start by reviewing the designs of existing courthouses. S/he can review the entire cases and related issues. Second, after the designer acquires a general understanding of what is involved in this type of projects, s/he usually explores individual issues to obtain a more in-depth understanding. Archie-II provides not only specific stories, but also guidelines related to stories. Third, a more focused mechanism helps the designer to find lessons and explore tradeoffs among different problem solutions. This also allows the designer to express multiple concerns at the same time. For example, a user can explore the tradeoff by choosing *layout for efficient circulation* as the issue, *normal use* as the artifact's life cycle, *users* as the stakeholder, *circulation system and vertical transport* as the subsystem of the artifacts, and *calendar court in basement* as the physical part of a building. Fourth, after the designer develops the sketchy proposal, the system offers focused critiques. However, Archie-II and similar projects are weak on this feature.

Content

In Archie-II, a case consists of design artifacts and issues related to the design of a building (Figure 8). Design artifacts include blue prints and specifications. Interesting issues of a building design are organized into "problems", "responses", and "stories". A problem refers to an issue along one or more of these five dimensions: design issue,

building space, functional component, stakeholder, and life cycle. A response provides a guideline with regard to how to address the issue. A story illustrates the guideline with concrete description.

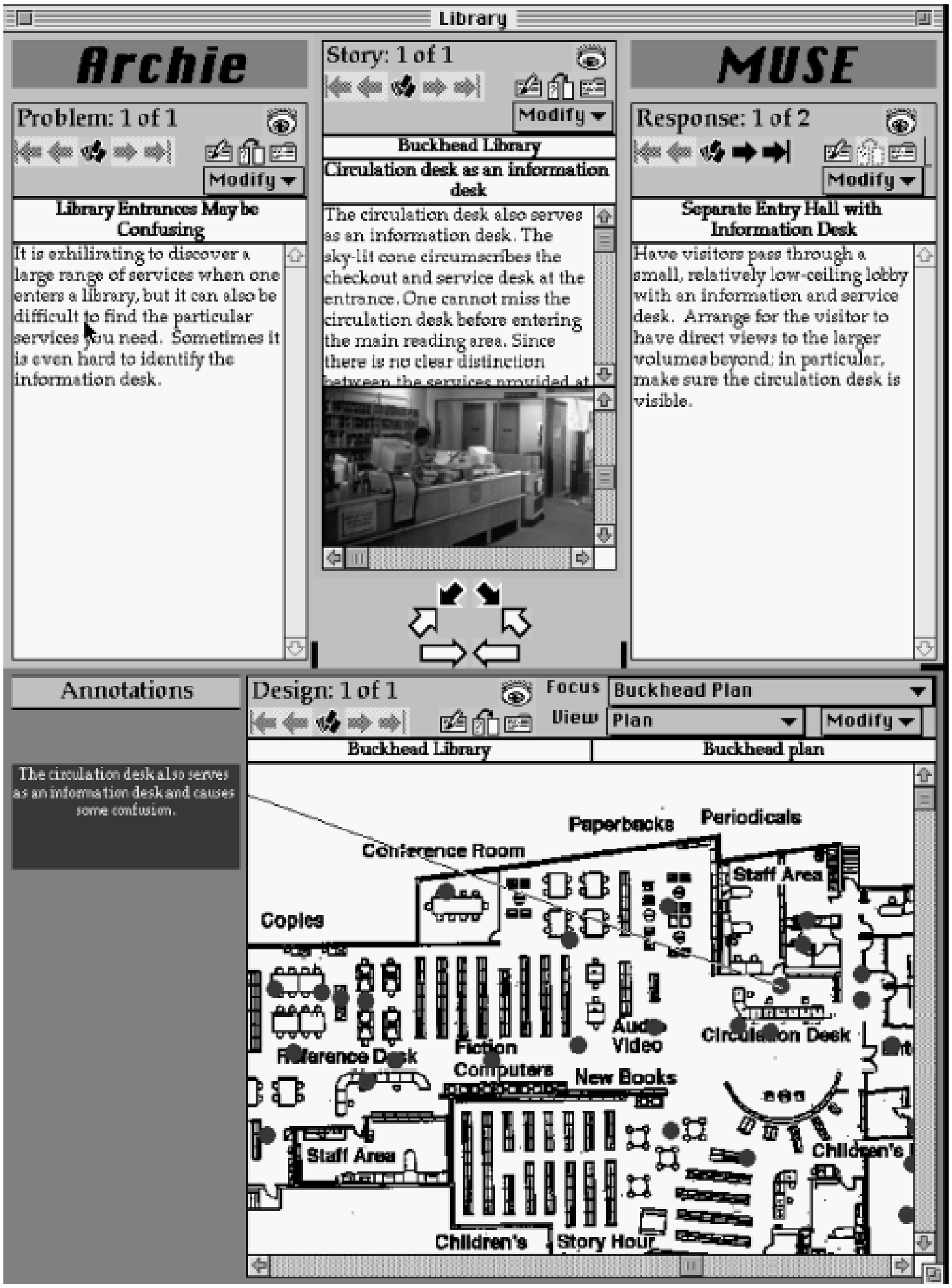


Figure 8. An ARCHIE-II screen capture from Kolodner, Owensby et al.(2003).

Cases in Archie-II include not only descriptions of the building blueprints and specifications, but also evaluations of how the design has turned out. Evaluations come from survey data of how stakeholders perceive the buildings.

Cases that include design details of buildings are usually large, and it is difficult to provide the right assistance to the user when the huge case itself needs some kind of search mechanism. The solution in Archie-II is to break design cases into appropriate stories so that they could be presented to address specific design issues in particular parts of the building. For example, one story in Archie-II focuses on the circulation around the calendar courtrooms in a building.

Discussion

As a classic and widely cited CBR system developed by the early leaders of CBR, Archie-II has some strengths as compared to other projects reviewed in this chapter. First, the tool supports the multiple phases of the conceptual design. Teaching is similar to architectural design in that both are domains of design (Simon, 1996). Therefore, one can argue that teaching and architectural design may follow a similar design process at the high level. I considered the browsing sequence in Archie-II when conceptualizing the task model for the current project. Chapter 3 will provide the details of this consideration. Second, another interesting aspect of Archie-II is its approach of breaking large cases into snippets. Traditionally, a case refers to something that teaches one lesson. This is different from what is referred to as a case in Archie-II. A case in Archie-II encompasses all the small cases associated with one building design. This definition makes sense in that a case of a building links all the snippets together and provides the designer with a complete picture of the design. It provides flexibility for the architect to learn about the

design of a whole building or specific issues. This is relevant to the current study, because an instructor may be interested in the design of a whole course or individual issues encountered in teaching the course. The design of a course is similar to the design of a building in that they serve as a large case that connects related issues. Third, Archie-II integrates the evaluations of existing designs as part of the design knowledge. Similarly, one can argue that embedding evaluation results in online teaching cases can provide more substantiated evidence on what strategy worked and what did not. Fourth, like SCIED, Archie-II connects experiential knowledge (stories) with principled knowledge (problems and responses). This feature guided me in providing such linkage in this OTCL.

The sophisticated approaches to case representation, indexing and retrieval in Archie-II may have its cost on the user and the developer. The user probably needs some initial training to understand the complex case representation on the screen. Linking different stories, guidelines and cases and assigning proper indexes incurs a large amount of work on the part of the developer. Such complexity may also create confusion on the part of the user.

INTIME Video Resource

Like KITE, Integrating New Technologies into the Methods of Education (INTIME) (INTIME Project Team, 2003; Krueger et al., 2003; Krueger, Boboc, Smaldino, Cornish, & Callahan, 2004) is another PT3 project conducted by a consortium of five teacher education programs aiming to help educators improve student learning at all levels (PreK to university) through technology integration. One of the important components of the project is the development of a library of video cases featuring

technology integration. INTIME’s online database has about 600 video vignettes featuring 60 lessons from14 subject areas, covering pre-kindergarten to the 12th grade. These vignettes range from 2 to 20 minutes in length, and they depict real classroom activities.

A theoretical model called Technology as Facilitator of Quality Education (TFQE) (Callahan & Switzer, 2001) provides a framework for the project. The model consists of seven major dimensions: students at the center of learning, principles of good learning, information process, standards from content disciplines, citizenship in a democracy, teacher knowledge and behavior, and technology. These dimensions examine the teaching and learning process from multiple perspectives. The video case library was developed based on this model. Each of the 60 lessons featured in the database has seven video vignettes illustrating these seven perspectives. Another two vignettes provide the activity overview and the teacher interview.

Tasks

Published articles on INTIME (Krueger et al., 2003; Krueger et al., 2004) did not provide an explicit list of tasks that this tool supports. Feedback from faculty shows that teacher educators use the tool to choose appropriate case studies for use in classes that leverage case methods. These case studies are used to illustrate exemplars, and encourage analysis, personal reflection, and the understanding of different perspectives.

Content

In INTIME, a case is a lesson, which consists of the nine video vignettes associated with it. Narrations and annotations are provided for the videos. A lesson also

has a lesson plan, a discussion area, some probing questions, and a tool for faculty to build case studies.

Features

The TFQE model serves as a framework for the user to search the video database. The user can search for a vignette or a lesson by selecting a value along one of the seven dimensions or by browsing other criteria such as content area, grade level, teacher name, state, video title, video code, software or hardware. The result screen displays a list of lessons. Each lesson has descriptors along the seven dimensions illustrated in the TFQE model. Additional descriptors such as teacher name, activity overview, software and hardware are also presented. The user can click on a descriptor, for example, teacher knowledge, to view a vignette depicting the kind of teacher knowledge required in the lesson. This takes the user to the specific vignette screen (Figure 9). The left hand side of the vignette screen is taken up by the streaming video, and the right hand side of the screen is the lesson plan. Links to the following screens are also provided: a discussion area where faculty and students can share thoughts related to the video, probing questions one can use in reflecting on the case, as well as a tool that faculty members can use to build a case study based on the video.

Discussion

The following aspects of the INTIME video database are relevant to the current project. First, videos provide high fidelity representations of the cases and they are an alternative to text-based case representations. However, I did not adopt this feature for this OTCL, because video is probably not the best media to capture the course design and implementation for online courses. Second, large cases are broken down into small video

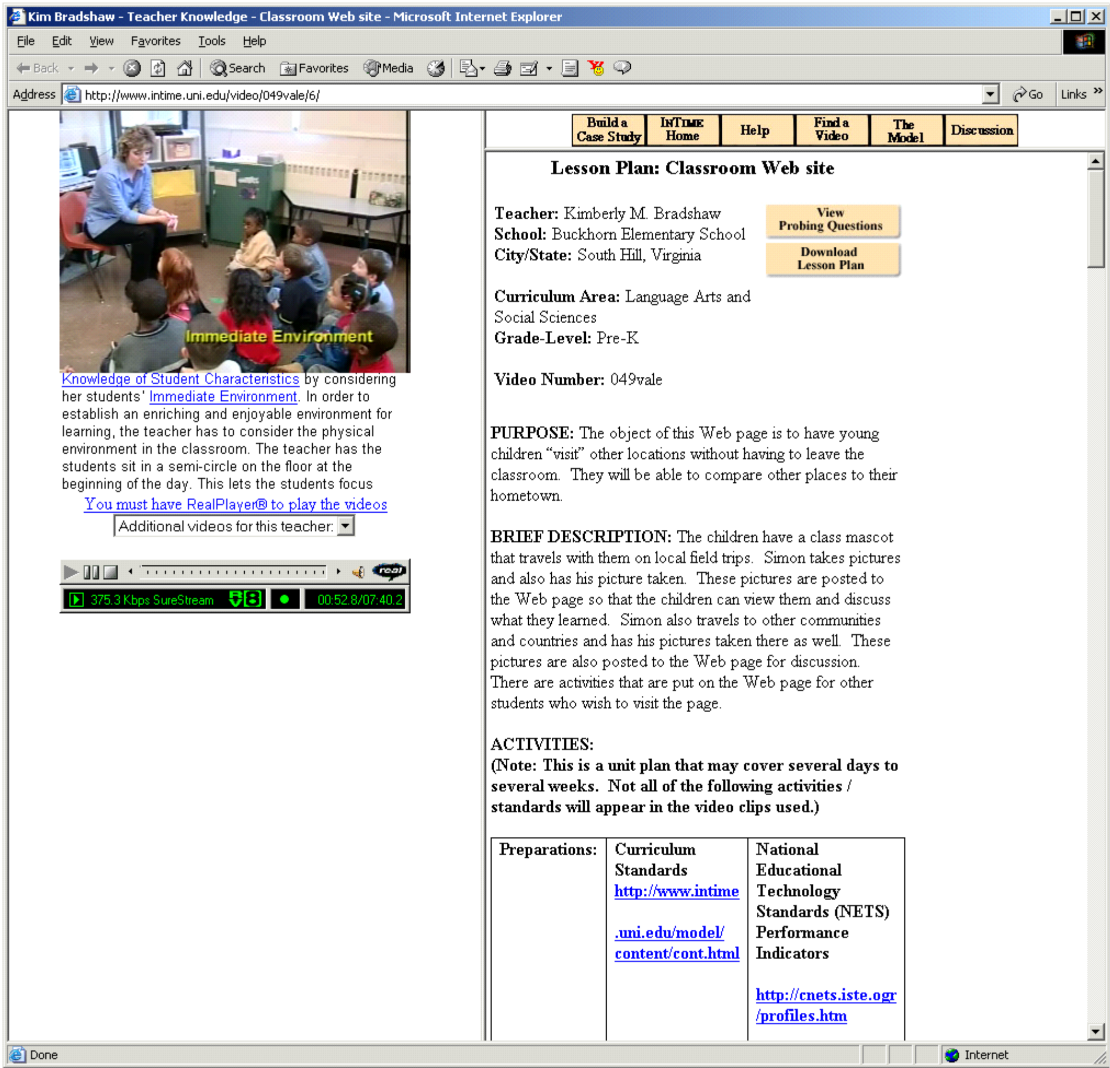


Figure 9. An INTIME screen capture, developed by the INTIME Project Team (2003).

vignettes. Researchers (Spiro, Coulson, Feltovich, & Anderson, 1988; Spiro & Jehng, 1990) argue that small cases help the learner to construct a flexible cognitive structure that can be reassembled in problem solving. This approach is similar to the use of large cases and the associated snippets in Archie-II, which is reviewed in this chapter. Third, narrations and annotations in the cases provide a means for making connections between cases and pedagogical principles. This feature, together with similar features in SCIED

and Archie-II, guided me in creating this connection in this OTCL. Fourth, an online discussion area enables discussions related to the video cases. This feature encouraged me to provide similar tools in this OTCL.

The INTIME video database also has its weaknesses. First, the use of videos requires an enormous amount of work. Resource requirements may prohibit similar efforts. Second, each lesson is broken down into numerous vignettes. This provides an in-depth view of the lesson. On the other hand, however, one can argue that this design may reduce the coverage of grade levels and subject areas. Teachers looking for cases related to a specific content area for a specific grade may not find the most pertinent cases needed. Third, unlike KITE and SCIED, the INTIME video database does not allow concurrent searching on multiple features, and cases are not ranked based on their relevance to the query.

OtiS Case Studies

The Online Tutoring Skills (OtiS) (The Online Tutoring Skills Project Team, 2000) project aims to develop and support online tutors in Scottish higher education institutions. The project is a partnership between two universities in Scotland. It is composed of three types of resources: tutor guidelines, staff development guidelines, and a resource pool. Tutor guidelines include case studies, Q&A, as well as hints and tips for online tutors. Staff development guidelines consist of ideas, problems, best practices, and other issues related to staff development. A resource pool contains materials, tools and resources on online teaching. The set of case studies is an important component of the project. A total of 65 case studies are available online.

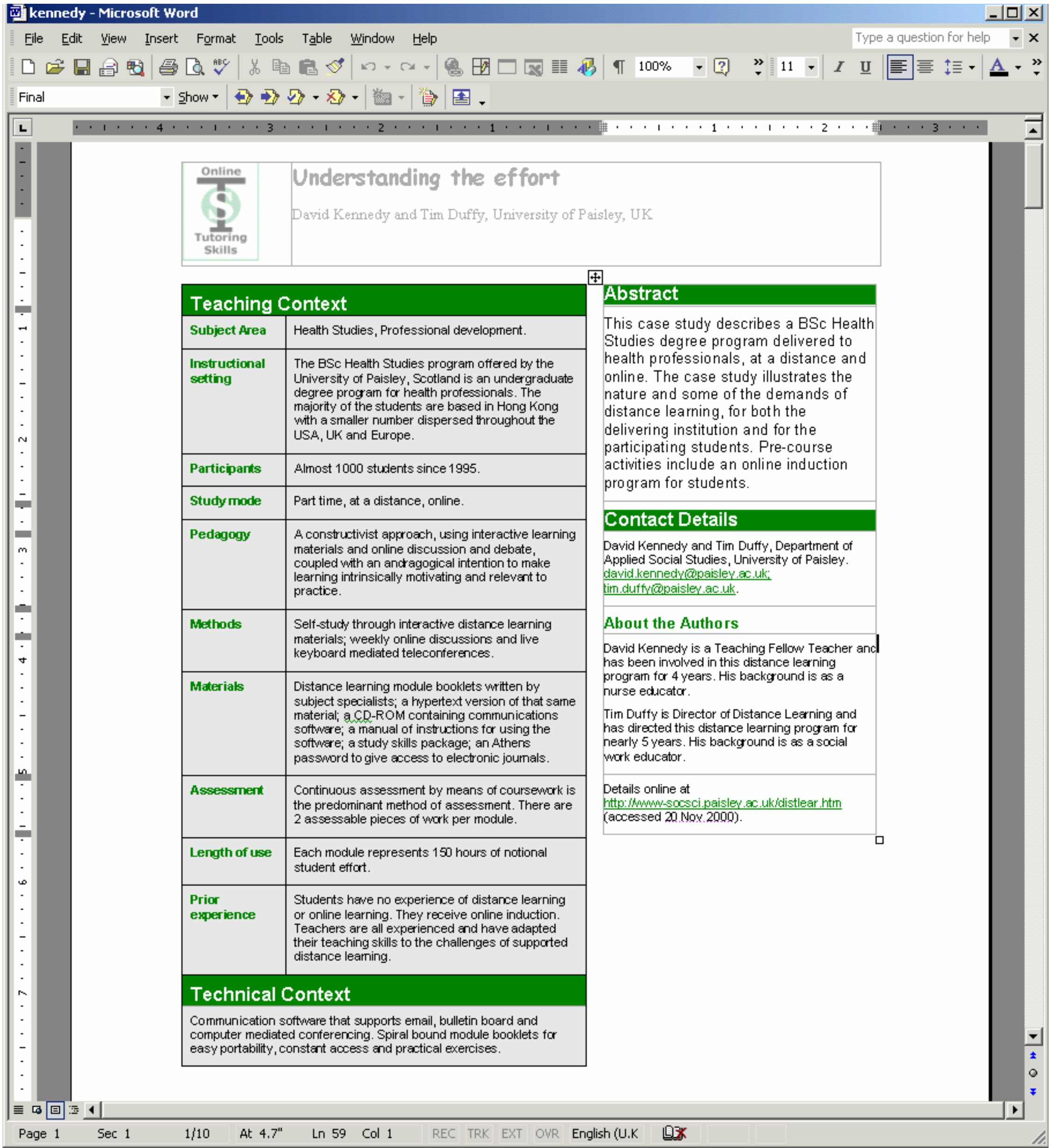
The project team gathered these case studies to prepare for an e-workshop hosted by the Virtual Learning Space, a collaboration among several higher education institutions in Scotland. Eighty case studies were submitted from 18 countries around the world and a panel of eight e-learning experts from six countries selected and posted 65 of them on the project Website.

Tasks

In OtiS, cases were gathered to encourage discussion in an e-workshop on online teaching. This purpose seems to be short term as compared to those in other projects reviewed in this chapter.

Content

A case study has a summary and the details of the case. A summary is presented at the beginning of a case study (Figure 10). The summary page includes the abstract, contact information, teaching context and technical context. The most interesting part of the summary page is the teaching context. It describes several aspects of the context: subject area, instructional setting, participants, study mode, pedagogy, methods, materials, assessment, length of use, and prior experiences. The body of the case study is composed of the following sections: rationale for using online learning in this case, execution of the class, support needed, barriers, enablers, and suggestions on how to reproduce the success of the case, evidence of success, quality assurance, as well as other recommendations and references.



Understanding the effort

David Kennedy and Tim Duffy, University of Paisley, UK

Teaching Context	
Subject Area	Health Studies, Professional development.
Instructional setting	The BSc Health Studies program offered by the University of Paisley, Scotland is an undergraduate degree program for health professionals. The majority of the students are based in Hong Kong with a smaller number dispersed throughout the USA, UK and Europe.
Participants	Almost 1000 students since 1995.
Study mode	Part time, at a distance, online.
Pedagogy	A constructivist approach, using interactive learning materials and online discussion and debate, coupled with an andragogical intention to make learning intrinsically motivating and relevant to practice.
Methods	Self-study through interactive distance learning materials; weekly online discussions and live keyboard mediated teleconferences.
Materials	Distance learning module booklets written by subject specialists; a hypertext version of that same material; a CD-ROM containing communications software; a manual of instructions for using the software; a study skills package; an Athens password to give access to electronic journals.
Assessment	Continuous assessment by means of coursework is the predominant method of assessment. There are 2 assessable pieces of work per module.
Length of use	Each module represents 150 hours of notional student effort.
Prior experience	Students have no experience of distance learning or online learning. They receive online induction. Teachers are all experienced and have adapted their teaching skills to the challenges of supported distance learning.

Technical Context

Communication software that supports email, bulletin board and computer mediated conferencing. Spiral bound module booklets for easy portability, constant access and practical exercises.

Abstract

This case study describes a BSc Health Studies degree program delivered to health professionals, at a distance and online. The case study illustrates the nature and some of the demands of distance learning, for both the delivering institution and for the participating students. Pre-course activities include an online induction program for students.

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About the Authors

David Kennedy is a Teaching Fellow Teacher and has been involved in this distance learning program for 4 years. His background is as a nurse educator.

Tim Duffy is Director of Distance Learning and has directed this distance learning program for nearly 5 years. His background is as a social work educator.

Details online at http://www-socsci.paisley.ac.uk/distlear.htm (accessed 20 Nov 2000).

Figure 10. An OTiS Case Library screen capture, developed by the Online Tutoring Skills Project Team (2000).

Features

There are several ways a user can search for case studies. S/he can browse by author surname, themes, or category. S/he can also search by keyword. However, only

browsing by author surname has been fully developed as of this writing. Cases are available in either HyperText Markup Language (HTML) or MS Word formats.

Discussion

The emphasis on the role of cases in assisting online teachers supports the current project in the following areas. First, in OTiS, case studies are one type of the resources provided to online tutors. This supports my earlier assertion that an OTCL would not replace all the current faculty development activities. It could be one component of a systemic approach to faculty development. Second, multiple search mechanisms are available for accessing OTiS case studies. They informed the design of this OTCL. Third, the summary of the case studies provides a good overview of the case. I adopted this format in this OTCL.

OTiS has several limitations. The case studies were gathered to stimulate discussion in the e-workshop, so the search mechanism is of secondary importance. The browsing methods based on themes and categories were not completely developed. Another issue with OTiS case studies is that many of the case studies do not seem to be concrete enough to provide readily applicable guidance for professors seeking help on online teaching.

Summary

The literature provides support for this study. Web technologies pose challenges to traditional teaching and require faculty change. Reflection is critical to faculty change and faculty development. The most desirable activities that support reflection are those that provide faculty with just-in-time and customized assistance, enable them to link experiential knowledge with theoretical knowledge, and encourage knowledge sharing in

a community that practices Web-based instruction. An OTCL has the potential to facilitate these activities. Cases have been used to promote learning and reflection in the communities of CBR and case methods, which are rooted in cognitive and constructivist theories as well as research that values the role of experiential knowledge.

Case libraries have already been developed to assist teachers with science instruction, technology integration, and online teaching. However, the only case library related specifically to online teaching aims to stimulate discussions in a specific workshop rather than advising faculty members on Web-based instruction. INTIME researchers (Krueger et al., 2003) suggest that one of the future research areas is to develop a case database that promotes technology integration in higher education. An OTCL can be such a case database.

The related projects informed the design of an OTCL from the perspectives of tasks, content types, features, and system development process (Table 1). The following paragraphs briefly summarize the insights gleaned from these projects. Details on how these projects informed this OTCL will be discussed in chapter 3.

Tasks. Archie-II and SCIED provide explicit and detailed reports on the types of tasks that they support, and these lists of tasks guided me in conceptualizing the task model for the current study. Archie-II follows a browsing pattern that reflects the different conceptual design phases, and SCIED focuses on a few specific types of tasks that teachers can perform. I considered both in designing this OTCL.

Content types. Similar projects informed the design of the content model in this study. First, both practical and principled knowledge is available in SCIED, Archie-II, and INTIME. This supports my decision to enrich cases with learning and instructional

theories related to online teaching. Second, large cases are broken down into snippets or vignettes in INITME and Archie-II. This setup helps the user to understand the design of a whole case as well as the specific issues. This was also considered in this OTCL.

Features. The features available in these projects guided me in developing the conceptual model of features for this OTCL. First, in KITE, SCIED, and Archie-II, users are required to fill out a search form in order to gain access to cases. Alternative means of content access such as browsing and keyword search are also available in most of the projects I reviewed. I adopted these features in this OTCL. Second, concrete experiential knowledge is linked to principled knowledge in SCIED, Archie-II, and INTIME. I provided such linkage in this OTCL. Third, in INTIME and Archie-II, individual issues are connected to the whole case. I adapted and implemented this feature in this OTCL.

System development process. The development of a case library is usually a long-term process requiring a team effort. Iterative approaches have been adopted for several related projects. This process guided the prototype development in this study and helped me understand where the current study may fit into a long term research agenda.

The literature provides justification for conducting the study and offers guidance on how to carry out the study. The next chapter presents the methodology.

Table 1

A Comparison of Related Projects

	Tasks	Content Types	Features	System Development Process
KITE	• Help teachers answer specific questions concerning technology integration	• Case summary ✓ General context ✓ Story context ✓ Goals in story ✓ Story activities ✓ Outcomes • Whole Story	• Keyword search • Super search • Browsing	• Rapid application development • Participatory design
SCIED	Help teachers to: • Identify activities to use • Implement activities, and • Use strategies for meeting objectives and managing the class	• Index objects ✓ Learning objectives ✓ Pedagogical guidelines ✓ Class context • Organizing objects ✓ Units ✓ Activities ✓ Themes ✓ Approaches • Contributing objects ✓ Stories ✓ Background ✓ Learning methods ✓ Activity context	• Query by class objectives, pedagogical issues, and the classroom context • Table of Contents links activities with themes/issues • Issues/themes are linked to stories and guidelines • User can contribute a story	• User centered design ✓ Task model ✓ User model ✓ Domain model • Iterative interface design

Table 1 (Continued)

A Comparison of Related Projects

	Tasks	Content	Features	System Development Process
Archie-II	• Orientation and issue discovery • Issue understanding and elaboration • Issue and tradeoff exploration • Proposal critique and evaluation	• Design artifacts ✓ Blue prints ✓ Specifications • Issues ✓ Problem ✓ Response ✓ Story	• A case connects design artifacts and issues • Concrete stories are linked to general problems and responses.	N/A
INTIME	• Enable teachers to choose appropriate case studies for use in classes that leverage case methods.	• Lesson ✓ Lesson summary ✓ Lesson plan ✓ Discussion area ✓ Probing questions ✓ Case studies development tool • Nine video vignettes ✓ Video clips ✓ Annotation and narration	• Browse a case by selecting a value along one dimension • Every lesson is linked to nine video vignettes • Narrations and annotations in the video helps connect concrete examples with principles • Provide other tools to support class use of the cases	N/A

Table 1 (Continued)

A Comparison of Related Projects

	Tasks	Content	Features	System Development Process
OTiS	Cases were gathered to encourage discussion in an e-workshop on online teaching.	• Case summary ✓ Abstract ✓ Contact information ✓ Teaching context ✓ Technical context • Case details	• Browse by author surname, themes, or category • Keyword search	N/A

CHAPTER 3

METHODOLOGY

Introduction

The methodology of this study consists of three components: development research, rapid prototyping, and qualitative methods. Development research (Reeves et al., 2004; Richey et al., 2003) and rapid prototyping (Dorsey et al., 1997; Tripp & Bichelmeyer, 1990) provided a framework for this study. Qualitative methods (Beyer & Holtzblatt, 1998; LeCompte & Schensul, 1999a; Mason, 2002; Miles & Huberman, 1994; Patton, 2002) guided data gathering and analysis.

This chapter starts with a discussion of the rationale for selecting the methodology, and then it presents the first two stages of the project development process: conceptualization and development. Finally, the research section of the chapter describes the procedure for conducting the study and discusses various research issues.

Choose the Methodology

This section provides justifications for selecting the research methodology in this study. It first discusses how different research goals or purposes determine research methods and why development research is appropriate for the goals of this study. It then provides an overview of development research and a rapid prototyping model to create a framework for the study. Finally, it explains why qualitative methods are most appropriate for the research questions raised in the current study.

Research Goals

Different goals or purposes of research call for different research methods (Reeves & Hedberg, 2003). Clarifying the research goals of the study helps determine the appropriate methodology.

Reeves and Hedberg (2003) identify six major types of research goals in the field of educational technology: theoretical goals, predictive goals, interpretivist goals, postmodern goals, development goals and action goals. Theory construction is the major activity for researchers with theoretical goals, whereas predictive goals aim to determine or predict the effects of technological innovations under controlled conditions. Studies with interpretivist goals portray education related phenomena, and researchers with postmodern goals are interested in examining assumptions, “revealing hidden agendas and/or empowering disenfranchised minorities” (Reeves & Hedberg, 2003, p. 267). Development goals and action goals are at the practice end of the “theory vs. practice” continuum. Development goals focus on developing creative approaches to problem solving and at the same time generating design principles. Action goals are similar to development goals, but they have less emphasis on theory and principle development. Action goals aim to solve “a particular problem in a specific place within a relatively short timeframe” (Reeves & Hedberg, 2003, p. 268).

The goals of the study are twofold: (a) to identify faculty perceptions of a case library so as to support decision making with regard as to whether to adopt it as an online teaching resource and (b) to provide design knowledge for developing this tool. These are development goals, which have the dual purposes of solving problems and constructing design principles (Reeves & Hedberg, 2003). Development goals can be achieved with

development research (Reeves et al., 2004; Richey et al., 2003). The following provides an overview of development research.

Development Research

Traditional empirical studies are inadequate in producing usable knowledge to guide the practice in the field of instructional technology (Reeves, 1995; Richey, 1998). These studies focus on comparing different instructional media or methods to identify which one(s) work better (Reigeluth, 2003). However, in practice, there usually exist multiple ways of achieving a design goal; it is rare that the same instructional methods are recommended in the same way for all situations (Reigeluth, 2003). What practitioners need are design theories or design knowledge (Kelly, 2003), which provide detailed guidance on choosing and implementing instructional methods under specific situations. Traditional empirical research has largely failed to develop such theories.

Development or developmental research is appropriate for generating design knowledge. Multiple terms have been used to refer to this type of research. For example, in addition to developmental research, Reigeluth (2003) listed several other labels, including grounded theory development method, design experiment, and formative research methods. Van den Akker (1999) suggested still more, such as design studies, design research, formative inquiry, formative experiment, formative evaluation, action research, and engineering research. There has been an increased interest in this type of studies. Leaders in the field of instructional technology have conducted a comprehensive and detailed review of this type of research (Richey et al., 2003) and provided a development research agenda for online collaborative learning (Reeves et al., 2004).

A comparison of development research with traditional empirical studies helps understand the characteristics of development research. In response to Van den Akker's (1999) argument that development research does not necessarily require methods different from other research approaches, Reeves and Hedberg (2003) contend that although this is usually true, there are significant differences in the philosophical framework and research goals between development research and other types of research. Figure 11 illustrates the distinctions between empirical and development research.

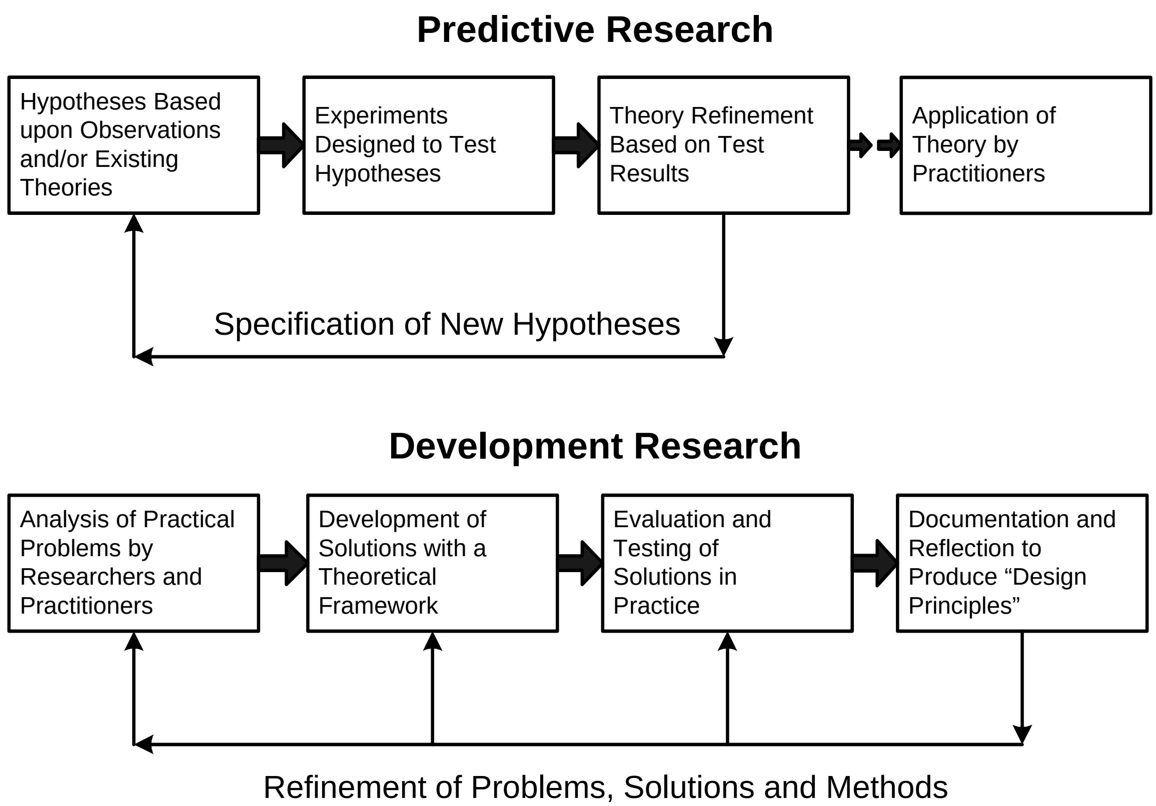


Figure 11. Empirical and development approaches to research in learning technologies, recreated from Reeves & Hedberg (2003).

The following are two major arguments made by Van den Akker (as cited in Reeves & Hedberg, 2003) with regard to the differences. First, in empirical studies, research is separate from practice, whereas development research aims to achieve both

practical and theoretical goals. Empirical research is usually conducted to test how theories work when applied in practice. In development research, however, complicated problems cannot simply be solved by applying theories. Instead, problems are clarified and solutions are generated and evaluated in practice. This is an iterative process, during which theories are synthesized and validated. Second, the divide between theory and practice in empirical research leads to the separation of researchers from practitioners. Researchers are responsible for generating and testing theories, which are applied by practitioners. A different relationship exists between the researcher and the practitioner in development research. "A basic tenet of development research is collaboration among practitioners, researchers, and technologists" (Reeves & Hedberg, 2003, p. 275). Researchers work with project team members to collaboratively solve practical problems as well as to generate and evaluate design guidelines.

Richey, Klein, and Nelson (2003) distinguish two types of development research: type I and type II. Type I studies focus on specific design, development, and/or evaluation of projects. Type II research emphasizes the study of tools, processes, or models used in design, development, and evaluation. Type I inquiries generate context-specific, lessons-learned type of knowledge, whereas type II studies produce generalized conclusions such as new procedures and/or tools used in the design, development, and evaluation process. This study can be categorized as a type I study, because it focuses on designing and researching a specific project rather than a design process, tool, or model.

Many development research projects in the field of instructional technology take the traditional instructional design approaches as represented by the generic ADDIE model (Gustafson & Branch, 1997). In this study, I followed a rapid prototyping

procedure (Dorsey et al., 1997; Tripp & Bichelmeyer, 1990), an alternative instructional design approach to guide the development and research process.

The next section first discusses the strengths of rapid prototyping and introduces two rapid prototyping models. It then presents the rationale for adopting this approach in the project. Finally, it reports how I synthesized these two models to provide a framework for the study.

Rapid Prototyping as a Development Model

A problem with the traditional instructional design approach is that stakeholders of a project generally do not really know the project requirements until they witness the project implementation (Tripp & Bichelmeyer, 1990). "A full understanding of the requirements for a product and a complete appreciation of the consequences of design decisions are generally not possible until some experience with the final product, or something like it, has been gained" (Jones, Li, & Merrill, 1992, p. 99).

This problem can be addressed with rapid prototyping, an instructional design approach that involves the early development and evaluation of prototypes to ensure that the needs of stakeholders are met. Tripp and Bichelmeyer (1990) provide a definition of rapid prototyping: "In this methodology, after a succinct statement of needs and objectives, research and development are conducted as parallel processes that create prototypes, which are then tested and which may or may not evolve into a final product." (p. 35)

Figure 12 depicts the concurrent nature of instructional design activities in Tripp and Bichelmeyer's (1990) rapid prototyping instructional design model. In this model, the process starts, as in most traditional models, with the analysis of needs and content.

Traditional models require that analysis be completed before design. In rapid prototyping, however, design and research are conducted concurrently with analysis. The overlapping boxes in Figure 12 indicate that “the analysis of needs and content depends in part upon the knowledge that is gained by actually building and using a prototype instructional system” (Tripp & Bichelmeyer, 1990, p. 36).

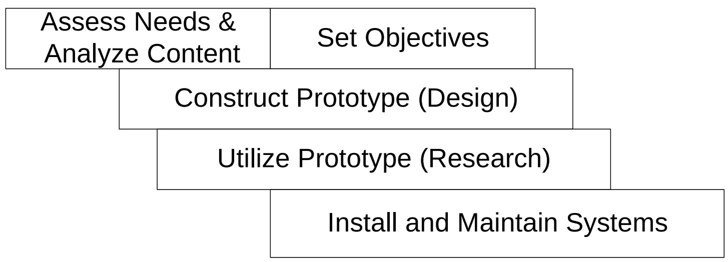


Figure 12. A rapid prototyping instructional systems design model, recreated from Tripp & Bichelmeyer (1990).

In Tripp and Bichelmeyer’s model (1990), it is unclear what process one follows to conduct analysis, design and research concurrently. Dorsey, Goodrum, and Schwen (1997) describe an iterative design process (Figure 13) in rapid collaborative prototyping. The instructional development process described in this model consists of a series of iterations, and each cycle includes tasks such as user testing, conceptualizing, and

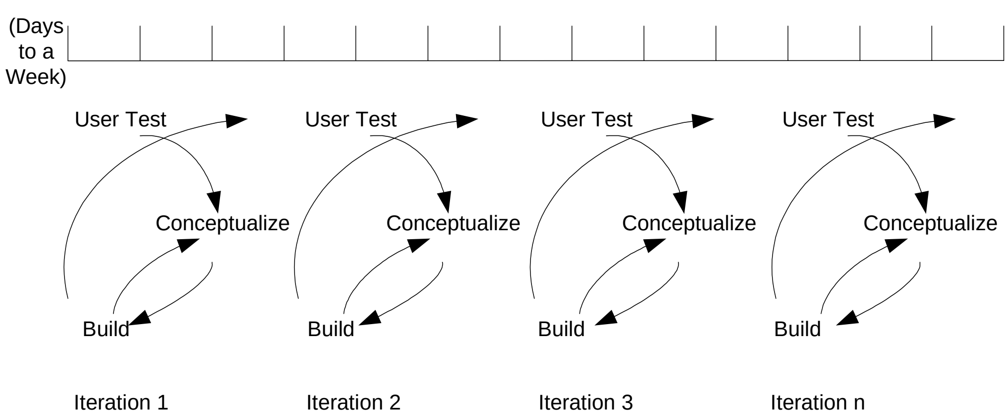


Figure 13. A rapid collaborative prototyping model, recreated from Dorsey, Goodrum, & Schwen (1997).

building. User testing is when the user operates the prototype with real tasks. Conceptualizing refers to the process of adding and refining problem definitions and solution requirements. These refinements and additions are implemented during the phase when the prototype is built.

The research questions in this study deal with the needs of faculty members with regard to an OTCL. Similar questions are usually answered in the analysis stage of traditional instructional design process (Dick & Carey, 1999). In this study, however, instead of conducting a traditional analysis, I chose a rapid prototyping approach, because this type of model “places synthesis before analysis, or uses an analysis-by-synthesis approach” (Tripp & Bichelmeyer, 1990, p.42). I speculated that without synthesizing and developing a concrete prototype based on the literature, faculty members may have difficulty conceptualizing what a case library is. This would hamper the effort to gather any meaningful data to answer the research questions. To further justifies the selection of this approach, the following paragraphs present an analysis of the match between rapid prototyping and the characteristics of the current study.

First, rapid prototyping is appropriate for situations where complex factors make it difficult to predict the project outcome (Tripp & Bichelmeyer, 1990). Many complex issues are related to developing case libraries. For example, in the case library projects reviewed in chapter 2, some of the major factors include stakeholder needs and requirements, user-interface design, system technical design, as well as the diffusion and adoption of these systems. These considerations interact to create many different variations, which require a design model that allows for these variations to emerge and to

be addressed in each new situation of use. Compared to traditional instructional design models, rapid prototyping can better handle such complexity.

Second, rapid prototyping is especially applicable in situations where there is limited experience to inform the design process (Tripp & Bichelmeyer, 1990). The development of an OTCL is such a situation. It is an innovative approach to supporting faculty online teaching. There is no exact roadmap to follow. A traditional approach to this type of project usually requires extensive formal research before the development process can start. Instead of making such a commitment to the project without knowing how it would be received by the stakeholders, rapid prototyping provides an efficient approach that researchers and developers can follow to involve stakeholders from the beginning of the project (Van den Akker, 1999).

Third, rapid prototyping is an appropriate instructional design approach when the development tools offer modularity and plasticity (Tripp & Bichelmeyer, 1990). Modularity allows components of a product to be added, removed, or modified without much impact on the other components. Modularity enables plasticity, which refers to the ability to make changes without extensive cost of time or money. Modularity and plasticity can be achieved with current software development tools (Tripp & Bichelmeyer, 1990). Because the proposed case library is computer-based, rapid prototyping should be appropriate for its development.

Fourth, several case library development projects (Chandler, 1994; F. Wang, Means et al., 2003; F. Wang, Moore et al., 2003) reviewed in chapter 2 took the iterative prototyping approach. This also supports the decision to adopt rapid prototyping for developing this case library.

Rapid prototyping plays two roles in this study. First, it describes how this study fits into a long-term research agenda to develop an OTCL (Figure 14). This dissertation project focuses on the first rapid prototyping development cycle to examine faculty members' perceptions of a case library. Second, rapid prototyping provided a framework for the current study. I developed an "analysis-by-synthesis" development and research procedure to guide the study (Figure 1). The first step is conceptualization. I identified the research questions and synthesized the related literature to conceptualize a solution. The second step is development. This was when I developed a prototype to represent the solution. The last step is research. I conducted a pilot study to examine, refine and improve the research procedure, and then carried out the formal study to examine the solution and to identify issues and possible improvements to guide future research and development.

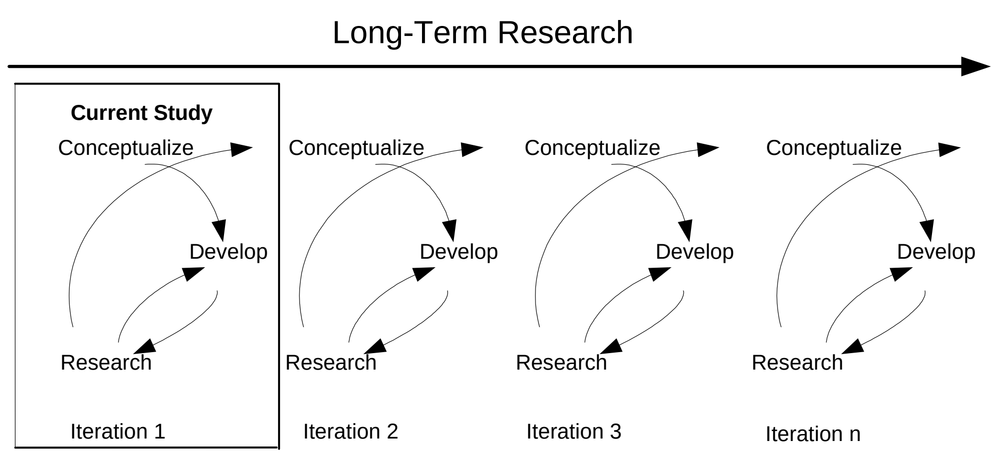


Figure 14. Dissertation study from the long term perspective, adapted from Dorsey, Goodrum, & Schwen (1997).

Rationale for Choosing Qualitative Methods

I selected qualitative research methods for this study. The following argues that the phenomenological nature of this research requires the use of qualitative methods in addressing the research questions in this study.

This research is phenomenological in nature, because it examines faculty perceptions of an OTCL. A common challenge to software development is that systems developed from the worldview of the developers sometimes fail to meet the needs of the intended users, who have different perspectives from the developers (Schuler & Namioka, 1993). A discussion of the *emic* and *etic* perspectives (Pike, as cited in Patton, 2002) helps make sense of this issue. The emic perspective is the insider's view of reality, whereas the etic perspective is the external, social scientific view. This study intends to examine how an etic perspective synthesized from the literature matches that of the insiders, in this case, the faculty. The four research questions are all related to faculty perceptions. The phenomenology tradition focuses on perceptions. From this tradition, an understanding of perceptions cannot be achieved without an appreciation of experiences (Creswell, 1998; Patton, 2002). "What is important to know is what people experience and how they interpret the world. This is the subject matter, the focus, of phenomenological inquiry" (Patton, 2002, p. 106).

Phenomenological studies usually employ qualitative methods such as participant observation and in-depth interviews (Bogdan & Taylor, 1975; Creswell, 1998; Patton, 2002). These are also common methods used in type I development research (Richey et al., 2003). This study falls into Type I development research. Therefore, qualitative methods seem to be appropriate in gathering and analyzing data.

Figure 1 shows that this study consists of three phases: conceptualization, development, and research. I identified the research questions and generated conceptual models of the problem solution at the conceptualization phase, developed a prototype to represent the conceptual models at the development phase, and conducted research to examine the solution at the research phase. The following sections report the development and research procedures in these three phases.

Conceptualization

The conceptualization phase is the first step of this study (Figure 1). It started when I identified online teaching problems and generated the idea of using an OTCL to address the problems. This was described in chapter 1. This process continued when I reviewed the literature to find support for the solution and to explore design ideas from related projects. This was reported in chapter 2. In the following, I present how I synthesized these ideas and developed them into conceptual models.

The early iterations of the development of a prototype should focus on high-level conceptual models and design ideas rather than the detailed "look" and "feel" (Beyer & Holtzblatt, 1998). These models usually focus on tasks, objects or the user interface (Chandler, 1994; Ludolph, 1998; Stary, 2000). These models were developed for this OTCL. They were task model, content model, and the conceptual model of features.

The task model describes the types of tasks the user may accomplish in this OTCL, and the content model depicts what resources should be available in this OTCL to support these tasks. The model of features connects tasks, content and the user by prescribing how the user can access the content in order to complete the tasks. The following sections describe how I developed these models for this OTCL.

Task Model

Two related projects discussed in chapter two, Archie-II (Domeshek & Kolodner, 1997) and SCIED (Chandler, 1994; Kolodner, 1991), provided guidance on designing the task model. Domeshek and Kolodner (1997) identified a browsing sequence reflecting different phases of the conceptual design. The details of these phases were described in Chapter two. They included: (a) orientation and issue discovery, (b) issue understanding and elaboration, (c) issue and tradeoff exploration, and (d) proposal critique and evaluation.

Existing case-based design aids only support the first three phases. In addition, the second and the third phases can be combined, because they both deal with exploring specific issues to identify possible solutions. As a result, I decided that an OTCL would support two tasks: (a) orientation and issue discovery as well as (b) issue exploration and solution generation. During the first task, instructors may explore online courses similar to the ones they are teaching or expect to teach. This would help them get oriented and discover the potential problems. Once the instructors obtain a general idea of the situation, they may need to develop solutions to these problems. This is the second task. They may explore how other instructors addressed similar issues, what worked and what lessons they have learned. Other instructors’ experiences would serve as templates to help them with their issues.

A review of SCIED provides support for these two tasks. SCIED was designed to help teachers achieve the following goals: (a) identifying appropriate activities to use, (b) implementing the activities, and (c) using strategies for meeting objectives and managing the class. The first goal can be achieved when faculty members are engaged in the first

task of exploring how other professors teach similar classes. The second and the third goals can be completed when the instructor focuses on the second task of resolving specific issues related to activity implementation and management.

There is more support for these two tasks when comparing them to the two stages that instructional designers go through while designing courses: problem understanding and solution generation (Rowland, 1992). The problem understanding stage is comparable to orientation and issue discovery, and the solution generation stage is similar to issue exploration and solution generation.

Content Model

Once I identified the task model, the next step was to determine the types of content faculty would need in order to accomplish the tasks. I achieved this goal by conducting an analysis based on the following two assumptions. First, the content model should be able to help the user accomplish the tasks that the case library supports. Second, the types of content available in related projects may offer suggestions on the composition of this content model. I followed a top down procedure to develop the model.

Step 1: Determined the top level content types. From the literature reviewed in the second chapter, I decided that cases in the current project should be enriched by learning and instructional theories. I found two types of support for this decision. The literature related to faculty change and faculty development emphasizes the need to link theoretical knowledge with practical or experiential knowledge (McAlpine & Weston, 2000; Orrill, 2001; Weimer, 2001). Moreover, this practice is evident in the experience of related projects (Chandler, 1994; Domeshek & Kolodner, 1997; Krueger et al., 2003). Therefore,

at the high level, an OTCL should have two types of content: cases and theoretical knowledge. This served as my starting point to determine the content model.

Step 2: Defined a case and determined the components of a case. The two tasks identified in the task model require that both courses and the specific issues that professors have encountered in teaching the courses be available in an OTCL. Should a case be defined as a course or a specific issue? INITME and Archie-II provided relevant experiences on breaking down cases into snippets or vignettes. In INTIME, a case is a whole lesson, which consists of a lesson summary, lesson plan, tools professors can use to support their teaching with the cases, and nine video vignettes. In Archie-II, a case is the design of a whole library, which is composed of design artifacts and specific stories. Experiences of these two projects suggested that in an OTCL a case be defined as an online course, which could be broken down into smaller components.

An analysis of the projects reviewed in chapter 2 indicates that a case in an OTCL could include the following components: a case description, case materials and lessons learned. The case description is similar to the case summary or the lesson plan found in KITE, INTIME, and OTiS. It provides an overview of an online teaching course. The case description consists of the following fields: college/school, instructor online teaching experience, student level, case background, types of learning, class activities, and course outcome. These are the most common items in the case summary or the lesson plan in the related projects. Case materials are similar to design artifacts in Archie-II and activities in SCIED. They offer a more detailed description of how a course is taught and what materials are used in the course. For online courses, case materials are usually available on the course websites. Lessons learned in an OTCL are equivalent to the

stories in Archie-II or the video vignettes in INTIME. They describe the issues professors have encountered while teaching a course and the lessons they have learned from the experience. Each lesson has a problem, a solution and an outcome, all of which are important components in Kolodner's (1993) definition of a case.

Step 3: Determined the composition of theoretical knowledge. In SCIED, Archie-II, and INTIME, theoretical knowledge is represented as themes, issues, guidelines, or narration and annotation in video cases. These projects suggest that theoretical knowledge in an OTCL be embedded in a list of common topics that professors are interested in online teaching. Each topic includes some guidelines that represent the theoretical knowledge, and lessons learned from teaching online courses are presented as stories that illustrate the guidelines.

To summarize, the original content model of this an OTCL consists of cases and common topics (Figure 15). A case includes a case description, case materials, and lessons learned. A common topic consists of guidelines and stories. Lessons learned are categorized and presented as stories to illustrate guidelines.

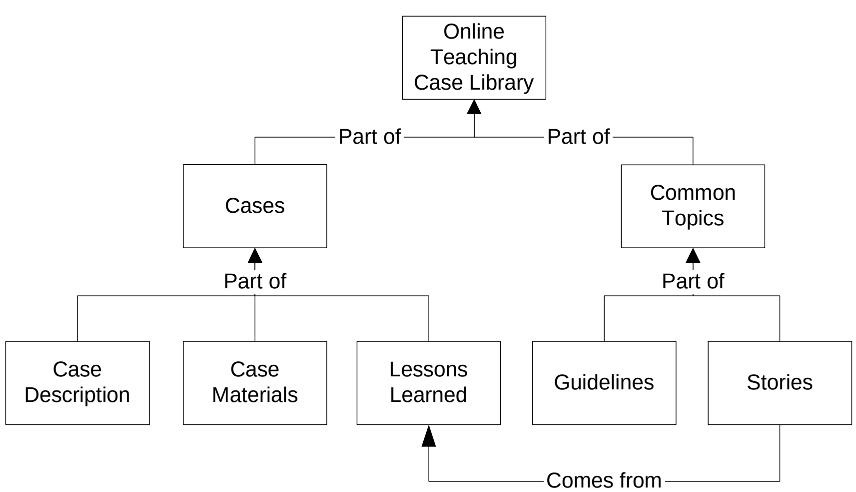


Figure 15. Original content model.

An OTCL was designed to provide on-demand knowledge to support faculty online teaching. The content model of this OTCL offers four types of knowledge deemed as crucial for successful teaching: content knowledge, content specific pedagogical knowledge, general pedagogical knowledge, and experiential knowledge (McAlpine & Weston, 2000). In this OTCL, cases primarily represent content knowledge and content specific pedagogical knowledge, whereas common topics embody general pedagogical knowledge. Experiential knowledge is included in both cases and common topics.

Conceptual Model of Features

How does the user access the content in order to complete the tasks? A model of features helped me answer this question. To develop a conceptual model of features, the task and content models were examined to guide the procedure. Features in related projects also shed light on this issue.

While performing the first task in the task model, the user may examine cases and the related content. A common way to access cases is to fill out a form to search cases on multiple criteria. Several related projects, including KITE, SCIED, and Archie-II, adopted this approach. After a user fills out and submits a search form, a list of similar cases is presented. The user can select a case to review. Case browsing and keyword search are two alternative means to accessing cases in this OTCL. These two features were included because of the findings and practices in related projects. It was found in the usability testing of KITE that users were not comfortable with the case search form, so keyword search and case browsing were added. In addition, these two features are also available in INTIME and OTiS.

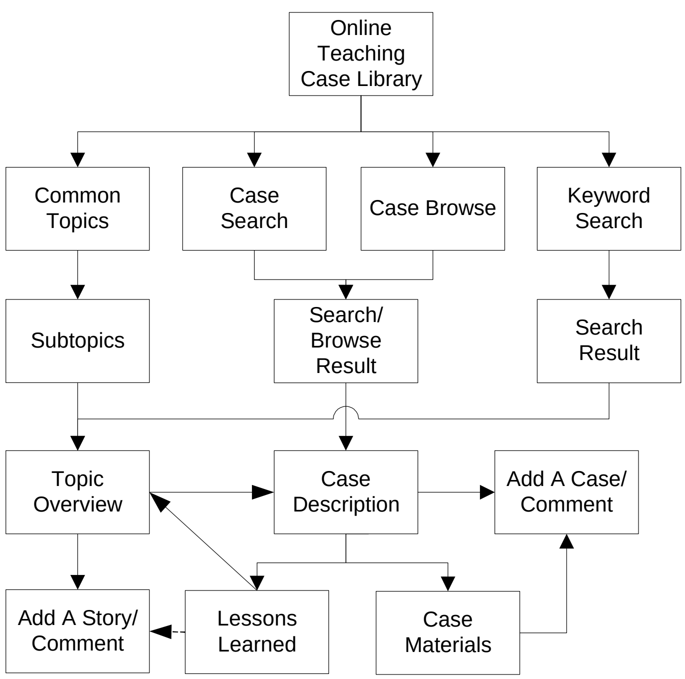
When completing the second task, the user may explore the common topics in order to generate solutions to specific problems. SCIED, Archie-II, and INTIME were helpful in conceptualizing features to support this task. Two primary types of features are available in these case libraries: searching and browsing. SCIED and INTIME allow the user to browse a specific topic, whereas in Archie-II, the user can search for specific lessons by filling out a structured form to specify multiple dimensions of interests in the conceptual design of buildings. I modified these features and identified keyword search and topic browse as two methods a user could use to access the topics in this OTCL. Searching with the use of a structured form was changed to keyword search, because I speculated that the domain of online teaching was complex and the types of issues that users may have would be difficult to capture with a structured search form; keyword search would probably be more appropriate in this case.

Some other features in related projects were also important in conceptualizing the features in this OTCL. First, in SCIED, the user has the option to connect specific activities with generalized knowledge such as approaches, themes and issues. Similarly, connections between different pieces of theoretical and practical knowledge are also found in Archie-II and INTIME. Similar links are important in the current project to help faculty members make connections between different pieces of content. One link is between stories and cases. A user who is browsing a common topic and the stories related to the common topic may be interested in finding out more about the case related to the story. Another link is between lessons learned and common topics. While reading a lesson learned in a case, the user may need to explore the guidelines and read more stories related to the topic.

Second, in INTIME and Archie-II, individual vignettes or stories are connected to the case. This helps the user see both the overall design and the specific issues. Similarly, in this OTCL, the case description, case materials and lessons learned are linked to each other so that the user could explore all the resources related to a case.

Third, a couple of related projects, SCIED and INTIME, allow the user to submit his or her own experiences or to make comments in the case libraries. This feature was added to the conceptual model for this OTCL, because it would support the knowledge sharing spirit of this OTCL, and the participants in the pilot study were positive about this feature.

Figure 16 summarizes the main features in this OTCL. There are three paths that a user can follow to access content related to cases: case search, case browse, and keyword search. Once the user selects a specific case from a list of search results, the case



* The arrow indicates that a type of features includes sub-types of features.

Figure 16. Original conceptual model of features.

description, case materials, and lessons learned are available for review. From lessons learned, the user can access the topic related to the lesson. In addition, s/he can also contribute cases, lessons learned, or comments. Two paths are available for accessing common topics: topic browse and keyword search. The user can either navigate to a topic by selecting it from a list or by conducting a keyword search. A topic is primarily presented in a topic overview, which consists of both guidelines and stories. From the topic overview, the user can view the course descriptions associated with the stories. S/he can also contribute stories or comments to the topic.

Development

The goal of the development phase of this study is to create a vision prototype (Erickson, 1995) to represent and communicate the high-level design of an OTCL. The following two sections report the issues addressed in the prototype development and describe the prototype in operation.

Issues in Prototype Development

This section reports the following issues addressed in the prototype development process of an OTCL: (a) What was the scope of this prototype? (b) What tool did I use to develop the prototype? (c) What procedures did I follow to develop the prototype? (d) Where did the content come from? (e) How did I index the content?

Scope of Prototype

Nielsen (1994) identified two dimensions of prototyping: vertical prototyping and horizontal prototyping (Figure 17). Vertical prototyping provides full functionality for a few features, and horizontal prototyping keeps all the features but reduces the level of

functionality. Scenarios are the minimalist type of prototype. Both the number of features and the level of functionality are reduced. Although scenarios do not allow the user to interact with the real data or to move freely through the system, they are easy to build and good for obtaining quick and frequent feedback. This study aims to develop a vision prototype, which can be best represented with scenarios (Erickson, 1995).

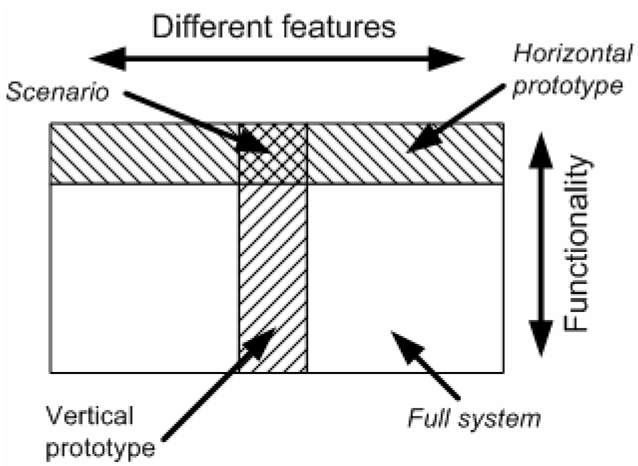


Figure 17. Two dimensions of prototyping: horizontal and vertical, recreated from Nielsen (1994).

Prototype Development Tool

Paper prototypes (Snyder, 2003) are usually developed to communicate the initial design ideas. Web-based medium-fidelity (Leone, Gillihan, & Rauch, 2000; Snyder, 2003) prototyping adopts HTML to rapidly build prototypes. It is an alternative to paper prototyping. I selected this approach because of the following reasons.

First, it is easier to facilitate a user evaluation session with the HTML prototype as compared to the paper prototype (Leone et al., 2000; Snyder, 2003). More than one facilitator is required to evaluate paper prototypes and activity overload is a problem for the facilitator. Second, the HTML prototype is more interactive and easier to use than the

paper prototype (Leone et al., 2000). Third, I am familiar with HTML editors such Macromedia Dreamweaver (Macromedia Inc., 2004). It would be quicker and easier for me to develop the HTML prototype than the paper prototype.

However, one may argue that the user may refrain from criticizing the HTML prototype because it provides more polished look than the paper prototype. HTML editors have made it easy for anyone to publish anything on the Web. One would expect that the user of the prototype has learned to use judgment and criticism while browsing the Web. I found in the pilot study that the HTML format did not seem to restrict the subjects from criticizing the prototype. Participants in the pilot study provided constructive feedback concerning the types of content and features available in the prototype.

Prototype Development Procedures

To develop the prototype, I followed four steps synthesized from several interface development procedures (Ludolph, 1998; Mayhew, 1999; Weinschenk, Jamar, & Yeo, 1997). First, I chose the basic interaction paradigm. The interface can be procedural or object-oriented. The procedural approach guides the user through every step of the task and gives them little flexibility to do anything else. It is great for procedural tasks and for inexperienced users. The object-oriented design provides a variety of options. It is up to the user to determine what the next step should be. This type of design is appropriate for environments where there are many different types of tasks and the experienced user needs the freedom to move from task to task. The object-oriented design is a good fit for this OTCL. Users may have different needs and may prefer different paths to access the content.

Second, I developed primary user scenarios. A scenario can be used in designing the user interface and obtaining user feedback (Nielsen, 1994). Nielsen (1990, as cited in Nielsen, 1994) defines a scenario as a self contained description of a user interacting with a set of computer facilities to achieve an outcome under certain circumstances over a specified time interval. A scenario can be developed based on the information about the tasks that the prototype will support (Bradford, 1994). It should also reflect real world situations or episodes. I followed these two guidelines in creating two scenarios (see Appendix A) to represent the two tasks in the task models. In order to develop scenarios that can reflect real world situations, I reviewed the existing literature on online teaching related issues and case studies.

Third, I identified the objects and user actions in the scenarios. I used an object-action table (Weinschenk et al., 1997) to guide this procedure. This table captures the major user objects, their attributes, and how the user manipulates the objects. User objects are those that users can manipulate on the user interface. They are related to but can be different from software objects or objects in object-oriented analysis and design (Larman, 1998). Graphical user interface (GUI) objects are another type of objects important to the interface design. GUI objects usually refer to user interface components such as drop-down menus, submit buttons, scroll bars, and etc. In this project, I added GUI objects to the table to help me identify the interface items for the user objects. I created an object-action table for each scenario (see Appendix B).

Fourth, I developed the individual screens and major navigational pathways. I created the screens by following the object-action tables and Web design principles (Lynch & Horton, 2002). Once the individual screens were created, I developed the

navigation between screens by reviewing the scenario flow. Because the features are at the user interface level and the prototype only needs to appear to work, I created hard links between screens, which would be generated by data and algorithm in the final product.

Content Selection

To build a prototype that can communicate the conceptual models to the faculty participants of the study, a primary consideration involves choosing content that can meaningfully represent the two scenarios in the prototype. In the first scenario, I identified an individual course and gathered content knowledge as well as content specific pedagogical knowledge associated with this course. The second scenario involves selecting an online teaching issue and collecting course independent pedagogical knowledge related to this issue. The following paragraphs report the challenges I encountered in selecting the content and describe how I addressed the challenges.

The biggest challenge I had was selecting the content for scenario one. No matter what cases and how many cases I build into the prototype, the subject matter would not be completely relevant to some faculty participants. In addition, the advantage of rapid prototyping as a process to quickly mock up design concepts to answer research questions would be compromised if I spend extensive amounts of time gathering and inputting cases into the case library. It occurred to me that in this OTCL, what is important is not the subject matter; it is the *type* of content that I want to convey to faculty participants to obtain their feedback. One case is sufficient for scenario one. It can serve as a concrete example to prompt user discussions. The key is to engage the participants in reflecting on their own experiences and determining whether the types of

tasks, content, and features represented in the case would meet their needs. Now that the subject matter is not a concern, the major consideration for case selection is choosing a case that has enough and meaningful content to represent the case description, case materials, and lessons learned. In addition, it would be helpful if the lessons learned in the case are discipline independent and of common interest. Much of the literature on Web-based instruction is centered on the notions of collaboration (Comeaux, 2002; Eijl & Pilot, 2003; Steeples & Jones, 2002) and learning communities (Rovai, 2001). One can argue that case studies that focus on online communication and collaboration in a course can be interesting to faculty with different backgrounds. Thus, I selected a case study on collaborative problem solving in an online instructional design course (Moallem, 2002). It has enough details to represent the conceptual models and many of the lessons learned from the course could be of common interest. The course Website is also available on the Internet. During the pilot, it proved that the content was adequate to communicate the project concepts to the participants.

Selecting content for the second scenario was less of a challenge. Because faculty members may have varying levels of knowledge on pedagogy and online teaching, it is important to choose a topic that is so common and typical that it is relevant to most faculty members. Again, I narrowed my search of content to online communication and collaboration. I decided to focus on the issue about the lack of meaningful participation on the discussion board. I selected this issue, because it is a common concern in online teaching and there is plenty of content on this topic in the literature.

In the related projects, cases were acquired through interviews (Kolodner, 1991; Krueger et al., 2003; F. Wang, Means et al., 2003), existing literature or documents

(Domeshek & Kolodner, 1997; Kolodner, 1991), or case study submission from faculty members (The Online Tutoring Skills Project Team, 2000). In this project, because the scope of the project is limited to only two scenarios, I decided to gather most of the content from the existing literature for expediency and convenience. In addition, I also talked to two content experts to add to the content knowledge. One expert is an online instructor who had four years of online teaching experience. Another expert is an instructional designer who provides instructional support to online instructors.

Content Indexing

One of the core issues in CBR is the development of indexing vocabulary (Kolodner, 1993), which is used to describe and retrieve cases in case libraries. It usually involves identifying the dimensions of a domain and a set of possible values for each dimension. It is a complex process, which warrants a study of its own.

My intention in this study is to develop a rapid prototype that can serve as a tool to communicate the design concepts to faculty, so content indexing is not a major concern. However, although I do not need a fully functioning indexing vocabulary, I should identify the indexing dimensions and associated values for cases so that they could be used in content access features such as case search and case browse. In related case libraries, researchers identified these dimensions either by consulting a panel of content experts (F. Wang, Means et al., 2003), using the factors described in a theoretical model (Krueger et al., 2003), or modeling the knowledge domain related to the case libraries (Chandler, 1994; Domeshek & Kolodner, 1992; Domeshek & Kolodner, 1997). To quickly identify the indexing dimensions, I synthesized the indexing vocabulary of a related case library (F. Wang, Means et al., 2003) and the theoretical work of several

leaders in the field of instructional design (Gagne, 1985; Jonassen, 2000; Reigeluth, 1999). Appendix N lists these dimensions and associated values. I identified four indexing dimensions, including subject areas, learning outcomes, instructional strategies, and student types. The values for subject areas include the colleges in the university where I recruited the participants. The values for the learning outcomes are from the learning outcomes used in KITE (F. Wang, Means et al., 2003), Gagne's taxonomy (1985), and Jonassen's typology of problem solving (2000). I borrowed part of Molenda's (as cited in Reigeluth, 1999) list of instructional methods as the values for instructional strategies. I used "graduate" and "undergraduate" as two values for student types.

Although I identified the indexing dimensions and values for cases, the first type of content, I decided not to do that for topics, the second type of content; instead, I identified a common set of topics from the literature and presented them in this OTCL. I thought this design could better present the major issues related to online teaching. This is also the practice in SCIED (Chandler, 1994).

An OTCL in Action

The previous sections in this chapter described the various task, content, and feature components in an OTCL as well as the issues encountered in developing this OTCL. The best way to describe the prototype is to describe it in action. This section presents the two scenarios supported by this OTCL together with three major screen captures. Readers interested in more screen captures may refer to Appendixes N to Y. Scenario one represents the first task in the task model. In this scenario, suppose the user is teaching or expect to teach a course online. S/he wants to find out how other professors

in the field are teaching similar online courses. To do that, s/he can search for cases on multiple criteria, browse cases, or conduct a keyword search. If the user chooses to search for cases on multiple criteria, s/he can select one or multiple values along the dimensions of subject area, learning outcomes, student types, and instructional strategies. S/he also has the options of browsing cases along one of these dimensions or searching cases by using her or his own keywords. Once the user identifies a case to review, this OTCL presents the case description (Figure 18). It provides the following information: college/school, instructor online teaching experience, student level, case background, types of learning, class activities, and class outcome. After reviewing the case description, the user could explore the course Website related to this case or the lessons the instructor has learned from teaching the course. A lesson learned page (Figure 19) presents a problem the instructor encountered, the solution attempted, and the outcome experienced. The user could get more information about this issue if s/he wants.

Scenario two represents the second task in the task model. In this scenario, suppose the user is already teaching a course online. Her or his students are posting superficial messages on the discussion board. S/he wants to find out how other professors address this issue. To achieve this goal, s/he needs to identify the topics related to this issue. To do that, s/he can either browse common topics or conduct a search using her or his own keywords. This OTCL presents a list of 12 online teaching common topics. Examples of these topics include “teacher’s role in online teaching,” “analyzing student’s needs,” “transferring traditional class to online teaching,” “collaboration and interaction,” as well as “time management.” If the user selects the topic “collaboration and interaction,” s/he can navigate to a subtopic “facilitating student online discussion” to

examine how other professors address this issue. Figure 20 shows that the topic page presents the theoretical perspectives and the stories associated with this topic. When the user is reading a story, s/he can review the description of the case from which the story is drawn; s/he can also add a story or add a comment.

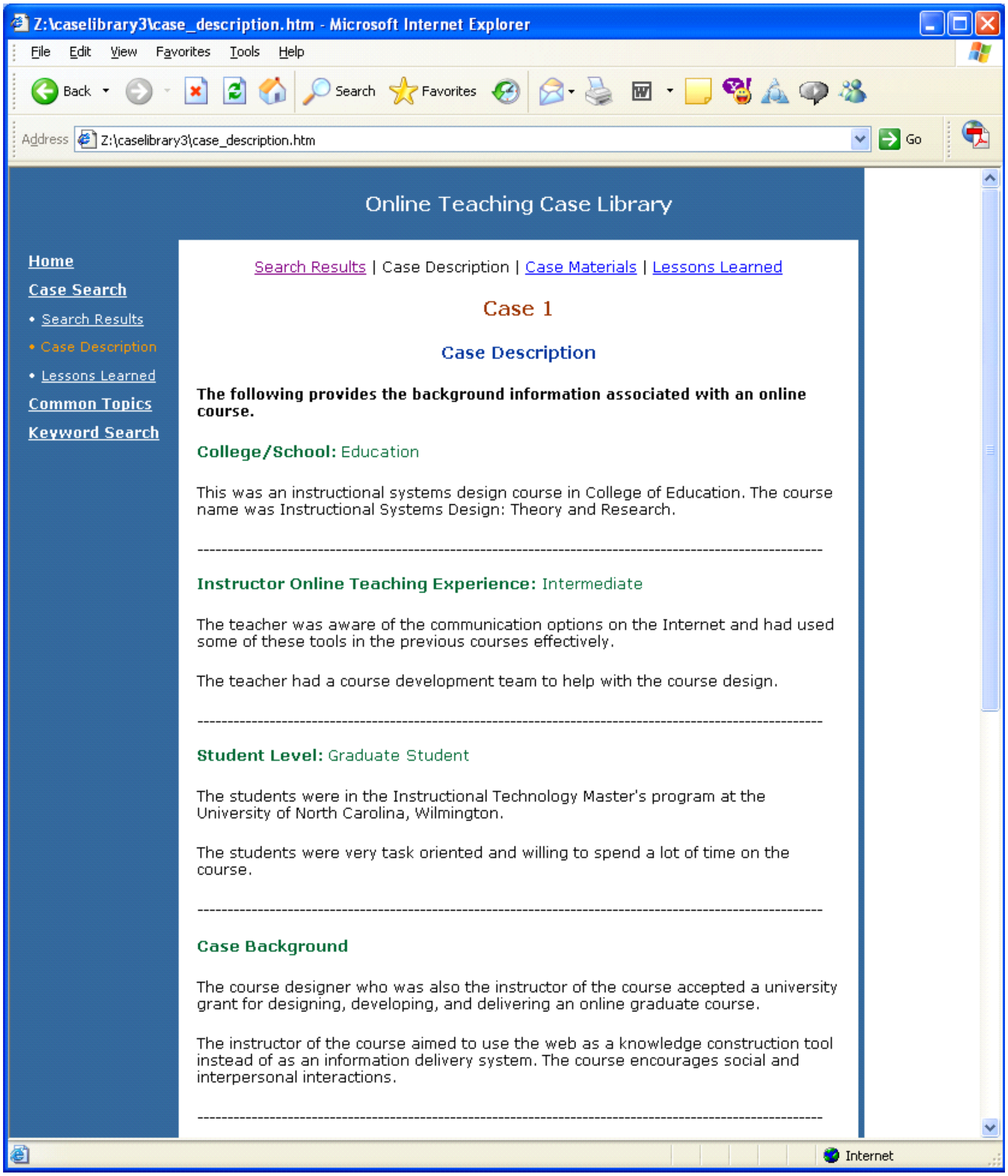


Figure 18. Screen capture of an OTCL: A Case Description.

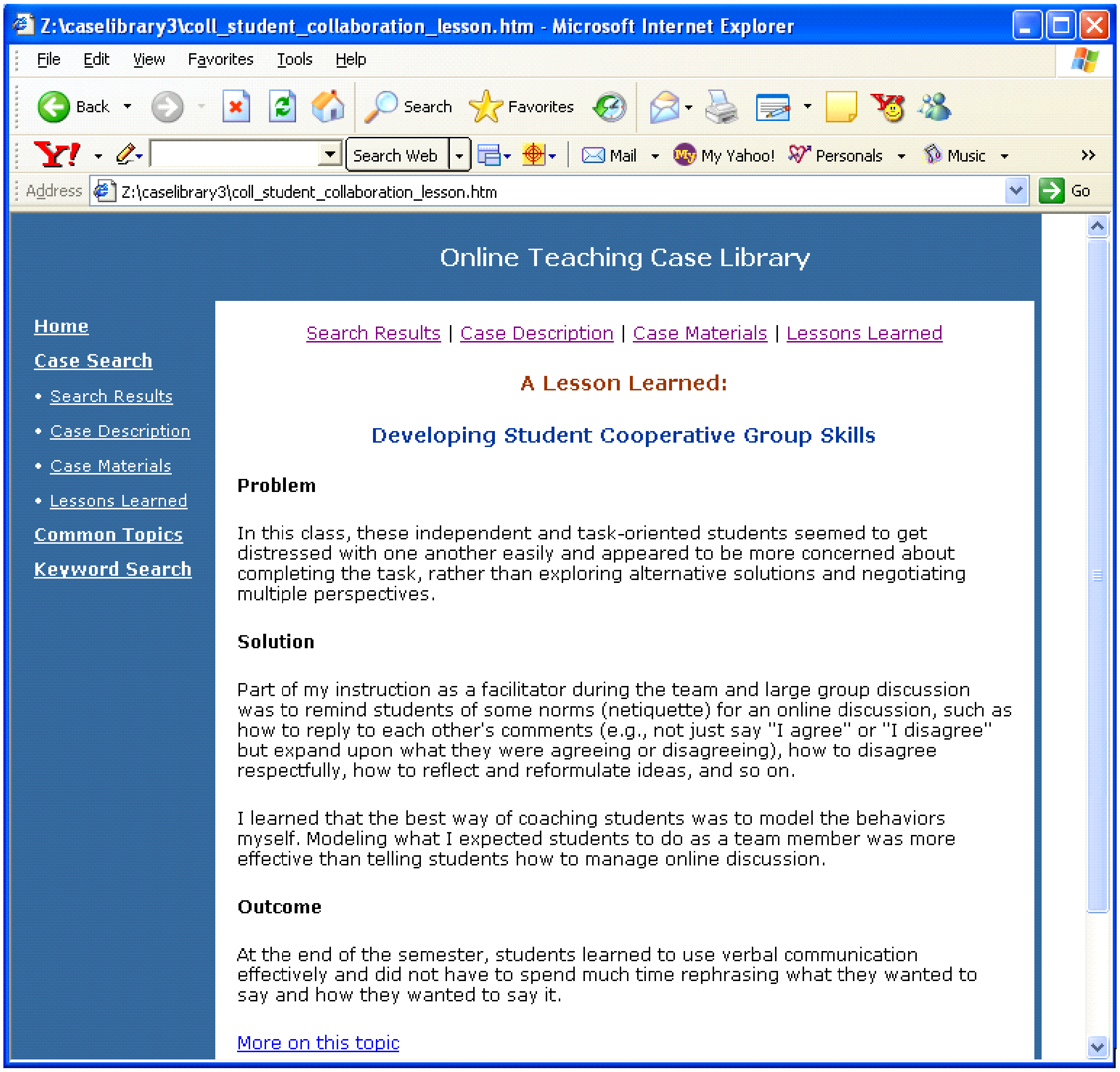


Figure 19. Screen capture of an OTCL: A Lesson Learned.

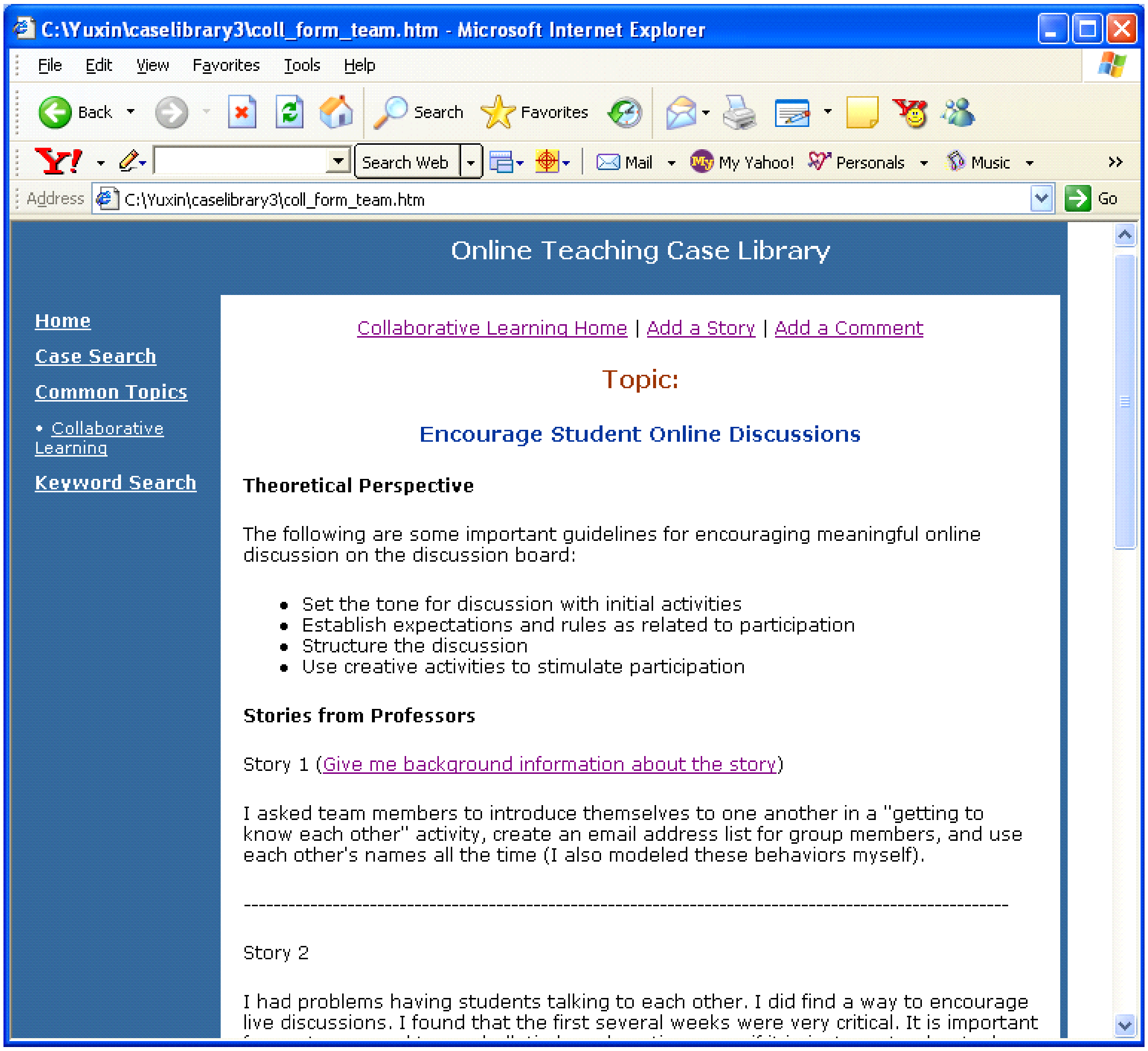


Figure 20. Screen capture of an OTCL: A Topic on Encouraging Student Online Discussions.

Research

Based on the development and research procedure identified for this study (Figure 1), once a prototype is developed, the next step is to conduct research to examine the solution represented by the prototype. I addressed the research questions by interviewing faculty participants and asking them to evaluate the conceptual models and the prototype of an OTCL.

This section first describes the research setting and presents the procedures for selecting the participants as well as collecting and analyzing data. It then discusses the methods I used to ensure rigor and trustworthiness of the study and to address my biases. The section concludes with a report of the pilot study.

The Setting

I evaluated an OTCL in a large Southeastern metropolitan urban research university. There are six colleges within the university that provide about 50 degree programs in more than 200 fields of study. It has an enrollment of more than 27,000 undergraduate and graduate students. The university adopted WebCT (2004) in spring 1998, and it has become the primary online course delivery application for the university. In spring 2003, about 957 faculty members used WebCT to teach over 20,000 students in 2191 courses (Gard, 2003). Consultations and workshops are the primary means of instructional support available to faculty members who are teaching online at the time of this writing.

Select the Participants

Small sample size in qualitative studies usually prohibits the use of quantitative sampling strategies such as random sampling. Since the purpose of qualitative research focuses on in-depth exploration rather than statistical generalization to a population, purposeful sampling strategies should be used to select information-rich cases (Mason, 2002; Patton, 2002).

Purposeful sampling usually involves identifying the critical characteristics that may have an impact on the subject being investigated. These characteristics are used to design a sample matrix to systematically guide the sampling procedure (Mason, 2002;

Miles & Huberman, 1994; Patton, 2002). In this study, I speculated that amount of online teaching experience and the level of familiarity with case use in teaching may be two major characteristics that would influence faculty perceptions. First, instructors with different amounts of online teaching experience may have different perceptions of an OTCL. This assumption is based on the findings that experienced online instructors have broader and deeper personal knowledge repertories related to teaching than novice online instructors (Dunkin, 2002). I predicted that professors new to online teaching may have a stronger need for an OTCL than experienced online instructors, because with limited experience and knowledge related to online teaching, novice online instructors may depend more on external resources than experienced online instructors. Furthermore, faculty with different amounts of online teaching experience may differ with regard to the types of tasks they would want to perform in an OTCL and the types of content and features that they would need. Novice online instructors may want to explore similar courses to obtain a general understanding of how to teach a course online, whereas more experienced online professors may be more interested in searching for answers to specific questions or sharing their expert knowledge by contributing stories and comments. Second, the level of familiarity with case use in teaching may also have an impact on faculty perceptions of an OTCL. Roger's theory on Diffusion of Innovation (DOI) (Rogers, 2003) states that the compatibility of an innovation with the potential adopters' past experiences would impact the rate of diffusion of this innovation. Therefore, one would expect that faculty who are familiar with the use of cases in teaching may have a more positive view of an OTCL than those who are not familiar with case use in teaching, because an OTCL is based, in part, on case methods.

I devised a participant selection matrix (Table 2) based on two sampling criteria: online teaching experience and familiarity with case use. There are two categories for classifying faculty based on the amounts of online teaching experience: novice and experienced online instructors. There is no guidance in the literature in terms of how to identify these instructors, so I generated a formula to help accomplish this task. The following presents this formula and the rationale behind this formula.

Table 2

Participant Selection Matrix

Participant	Online Teaching Experience	Familiarity with Case Use
Participant 1	Experienced	Familiar
Participant 2	Novice	Familiar
Participant 3	Novice	Unfamiliar
Participant 4	Experienced	Unfamiliar

A faculty member's amount of online teaching experience is determined by E = (1 x Y) + (2 x C) + (1 x (S-C)) where E is the amounts of online teaching experience; Y is the number of years teaching online; C is the number of different courses taught online; and S is the number of sessions taught online. Years of online teaching and the number of repeated sessions taught are given a weight of 1 and the number of courses taught is given a weight of 2. The following is the thought process behind the weight allocation. First, a course is given twice as much weight as a repeated session because more work is involved in teaching a course for the first time. Second, the number of years teaching online is only given a weight of one, because it is already reflected in the number of courses or sessions taught online. However, it still needs to be added to the formula, because the longer one has taught online, more reflections and learning may have

occurred. This may make a difference in one's online teaching experience. When calculating the number of sessions taught online, I subtract C from S. This is because C, which represents the number of different online courses, has already been calculated once in the formula.

I sent three screening questions to potential participants to determine their amounts of online teaching experience (see Appendix C). If a faculty member has an E greater than or equal to 16, I would categorize him/her as an experienced online instructor; If a professor has an E less than 16, I would classify him/her as a novice online instructor. I derived this cut-off score by consulting a university department responsible for working with faculty on online teaching. I asked them to define expert and novice online instructors in terms of years of online teaching experience, numbers of online course sessions and numbers of different online courses taught. With the help of a manager in that department, I obtained the responses from five staff members. The average years of online teaching experience, numbers of online course sessions and numbers of different online courses taught were used to calculate an E score for experienced online instructors. This resulted in a cut-off score of 16 for experienced online instructors. However, those who responded had reservations in their responses. They were uncomfortable using the amount of experience as an indicator of online teaching expertise and they differed in terms of the definitions of online teaching. This could be a limitation of my participant selection strategy. With an awareness of this potential limitation, I recruited participants who clearly fell into two categories: those who had much online teaching experience and those who never taught or just started to teach online (Table 6). This is a comparative measure developed for the purpose of

identifying participants for this study. Future studies may be needed to create independent a measure for defining novice vs. experienced online instructors.

I developed two screening questions to define faculty members' level of familiarity with case use (see Appendix C). One question asks the faculty to report their level of familiarity with the use of case studies in teaching, and the other question asks them to report the frequency that they used case studies in their teaching. A faculty member is considered as familiar with case use if s/he chooses "familiar" or "very familiar" as her or his level of familiarity or if s/he selects "occasionally," "sometimes" or "all the time" as her or his frequency of case use in teaching. Otherwise, s/he is categorized as unfamiliar with case use.

The participant selection matrix indicates that I should recruit at least four faculty members to participate in the study. In qualitative research, there are no magic numbers for sample size. The primary consideration is redundancy, which occurs when new data no longer bring new information. As a general rule, sampling should terminate when redundancy is reached (Lincoln & Guba, 1985). In the current study, I had data saturation when my sample size reached seven. At that point, the interviews were no longer providing me with much new information. Instead, they confirmed the themes that have already emerged from previous interviews. A review of the codes that have come out of the data analysis also indicates that I have reached data saturation. Each code has been assigned to the interview transcripts of at least two participants.

Data Collection

A data collection matrix (LeCompte & Schensul, 1999b) can help researchers to match research questions with data collection procedures. Table 3 is a matrix created for

the current study. Data gathering tools selected for this study include interviews (initial and final interviews) and contextual interviews. I used a portable usability lab to record the interviews and the audit trails, which track user interactions with the prototype.

Table 3

Data Collection Matrix

Research Questions	Types of Data	Data Gathering Tools
1. How do faculty members perceive a case library as a tool that supports online teaching?	Self-reports	Initial Interviews Contextual Interviews Final Interviews
2. What tasks do faculty members perceive that they would accomplish with a case library that supports online teaching?	Self-reports Audit trails	Initial Interviews Contextual Interviews Final Interviews
3. What types of content do faculty members perceive that they would need in a case library that supports online teaching?	Self-reports Audit trails	Initial Interviews Contextual Interviews Final Interviews
4. What major system features do faculty members perceive that they would need in a case library that supports online teaching?	Self-reports Audit trails	Contextual Interviews Final Interviews

I designed the research procedure in such a manner that the participants could follow my development process and evaluate the following design artifacts: overall concept of an OTCL as a faculty development solution, conceptual models, and the prototype. I followed a three-step procedure in gathering the data: an initial interview, a

contextual interview and a final interview. At the initial interviews, participants talked about their teaching and online teaching experiences and their initial perceptions of a case library as an online teaching resource. During the contextual interviews, the participants provided feedback to my conceptual models. Then, they evaluated the prototype while completing tasks in two scenarios. In the final interviews, the participants stepped back from the details and talked about their overall perceptions of this OTCL.

This research design gives me multiple opportunities to gather data. I examined faculty perceptions of an OTCL prior to and after faculty participants evaluated the conceptual models and the prototype. Their perceptions of these design artifacts provided me with rich and in-depth data to answer the research questions. For example, I found that participants liked the case library concept, but sometimes they were frustrated with some of the features. Without such a research design, if a user was not satisfied with the prototype, I would not be able to find out whether the problem lies in the overall case library concept, the conceptual models, or the specific interface design issues in the prototype.

Qualitative researchers usually develop an interview guide to help establish focus in gathering interview data (Patton, 2002; Seidman, 1998). The research procedure for this study is more complicated than regular interviews. It involves multiple steps and requires that I not only ask questions, but also observe the participants' interactions with the conceptual models and the prototype. At the same time, I need to work with the participants to generate design ideas. To ensure that I follow consistent data gathering procedure, I developed a protocol (see Appendix D) and a checklist (see Appendix E) for data gathering. The protocol includes interview guides, step-by-step instructions on how

to conduct the contextual interviews, as well as some of the design artifacts such as conceptual models and scenarios.

The following paragraphs provide an overview of the three-step interview process. The interviews took place in the video studio of the College of Education building. A usability lab was set up to capture the conversations and the participants' behaviors on the screen. Prior to the interviews, I presented a brief introduction to the study and asked the participants to read and sign a consent form (see Appendix F). The three-step interviews occurred in one session, which ranged from an hour and forty minutes to two hours and ten minutes. The initial interviews usually took about twenty to thirty minutes; the contextual interviews typically lasted for about eighty minutes; the final interviews generally required five to ten minutes.

Initial Interviews

The purposes of the initial interviews are twofold. First, I intended to conduct the interviews to elicit the participants' past experiences to ground the prototype evaluation in real situations. After the participants "relived" some of their past experiences, their opinions would be more grounded and meaningful (Patton, 2002; Seidman, 1998). This mentally prepared the participants to use their experiences to evaluate the concept and the prototype. Information about the participants' experiences also provided a context for understanding their behaviors and opinions. The emphasis on the relationship between perceptions and experiences is part of the phenomenological tradition (Schram, 2003). Second, the initial interviews provided me with an opportunity to explore the participants' initial perceptions of the case library concept, which were compared to their perceptions of the conceptual models and the prototype.

Contextual Interviews

The contextual interview (Beyer & Holtzblatt, 1998; Holtzblatt & Jones, 1993; Kensing & Blomberg, 1998) is an ethnographic field method in systems design. It involves observing and interviewing potential users of the system while they are engaged in real work. It provides a means to engage the user in the iterative system design process. Contextual interviews can be used in conjunction with prototypes for the user to confirm or alter the design based on their work practice. In this study, I adopted contextual interviews to examine the participants' perceptions of the conceptual models and the prototype. I followed the steps below to conduct the contextual interview.

Step 1: Concept introduction and initial feedbacks. I began the contextual interviews with an introduction to the conceptual models. I asked the participant for his/her reactions to the models. This step was included for the following two considerations. First, the user needs to understand the conceptual models in order to explore the prototype. Ideally, the final product of the system should communicate the conceptual models to the user through the user interface. Because this project is still at the initial stage of development, such a user interface is not available. Therefore, an introduction of the conceptual models is warranted. Second, introducing the conceptual models to the participant provided me with an opportunity to obtain his or her reaction to the conceptual models.

Step 2: Scenario review. I modified the two scenarios developed for building the prototype and used them to guide the user in exploring the prototype. These scenarios are included in the Data Gathering Protocol (see Appendix D). The participant reviewed the two scenarios and I asked about his/her thoughts of the scenarios. Specifically, I was

interested in learning how realistic and how typical the scenarios were. I also asked the participant to think of a similar experience s/he had. The participants' personal experiences provided authentic situations for her/him to interact with the prototype.

Step 3: Prototype exploration. The participant explored the prototype using the scenarios. During the procedure, I asked the participant questions in order to understand his/her thought process, expectations, as well as likes and dislikes.

Step 4: Prototype walkthrough. If the participant failed to explore all the features or used different features from what I expected during the prototype exploration, I walked him/her through the unexplored features and asked for feedback.

I videotaped the contextual interviews to generate audit trails, which recorded the actions taken by the user and the responses of the system. In previous studies, audit trails have provided data in tracking the user navigation path in computer-based environments (Ferry, Hedberg, & Harper, 1999; Hill & Hannafin, 1997). In this study, interview transcripts and the audit trails corroborated to help examine how the participant interacted with the prototype and what their thought process was during the interactions.

Final Interviews

The final interviews allow the participants to step back from the details and to summarize their overall perceptions of the prototype. Patton (2002) recommends that we space some demographic questions unobtrusively throughout the whole interview and save the rest of them for the end. I asked demographic questions when opportunities arose during the initial interviews and contextual interviews. Toward the conclusion of the final interviews, I gathered the background and demographic information that I had not yet collected.

Data Analysis

In this study, I consulted multiple sources to guide my data analysis. Two primary sources came from the works of Miles and Huberman (1994) as well as LeCompte and Schensul (1999a). The following provides an overview of these two data analysis approaches.

Based on Miles and Huberman (1994), data analysis consists of three major activities: data reduction, data display, as well as conclusion drawing and verification. Data reduction involves condensing the data through “selecting, focusing, simplifying, abstracting, and transforming” (Miles & Huberman, 1994, p. 10). Some of the common tasks in data reduction include summarizing and coding. Qualitative data analysis should start while data collection is in process (Miles & Huberman, 1994; Patton, 2002). Analyzing the data collected during earlier phases of field work generates patterns, themes, and hypotheses, all of which help inform later data collection that tries to confirm and disconfirm emerging themes and patterns. Data display refers to activities that organize and assemble information into matrices, graphs, charts, and networks. The third type of activities, conclusion drawing and verification, occurred when the representations developed during the data reduction and data display stages were reviewed and synthesized.

According to LeCompte and Schensul (1999a), there are three levels of data analysis. It starts from the item level. This is when researchers read through the interviews to isolate and operationally define individual concepts and items. After the individual concepts are identified, researchers start to operate at the pattern level of analysis. This is when they compare and contrast the concepts and fit them together into

patterns. After patterns emerge, researchers examine the relationships among the patterns and put them together to construct higher-order structures. This is the constitutive/structural level of analysis. In summary, the item level aims to identify the concepts; theory/model building occurs at the structural level; the pattern level is the interim stage between the two. I synthesized these two data analysis approaches (LeCompte & Schensul, 1999a; Miles & Huberman, 1994) into a 11-step procedure to guide my data analysis (Table 4).

Prior to the three major types of activities summarized by Miles and Huberman (1994), some initial data organization activities (Patton, 2002) should take place. During the first three steps of analysis, I aggregated and organized original data so that they were ready for analysis. I transcribed the audio tapes verbatim to create transcriptions and create the audit trails. Then, I combined these two sources of data into one set of transcripts. An example of a transcript is provided in Appendix G.

Steps four to seven involve reducing data by identifying the items (LeCompte & Schensul, 1999a) or conceptual chunks (Strauss & Corbin, 1998) in the data. During this phase, I filled out a contact summary sheet (Miles & Huberman, 1994) (see Appendix H) to summarize the main points of contact with each participant. Then, I developed a "start list" of codes (see Appendix I) from the research questions and the key concepts in the prototype. These codes were put into a codebook. I took this deductive approach to code development (Miles & Huberman, 1994) to ensure that I focus on the research questions in analyzing the data. The "start list" of codes was applied to the transcripts to reduce the data into conceptual chunks. During this process, I found that these codes were inadequate in coding the scripts, so I added more codes to the codebook. Once I coded all

the transcripts, I entered the codes and the associated transcripts into a database. Appendix J shows the structure of the database.

Table 4

Data Analysis Procedure

Task Category	Steps
Data Organization	1. Transcribed audio tape 2. Generated audit trails from the video tape 3. Combined audio and video transcription to generate transcripts that matched participants' action with articulation.
Data Reduction at the Item Level	4. Filled out a Contact Summary Sheet 5. Generated a "start list" of codes based on research questions and related literature 6. Read the scripts and coded the scripts into conceptual chunks. Revised the codes as necessary 7. Entered the codes and scripts into a database
Data Reduction at the Pattern and Structural Levels	8. Ran reports from the database and read the scripts organized by codes 9. Recoded as necessary and grouped codes into categories and associated them with research questions
Data Display for Interpretation	10. Drew flow charts to display and make sense of the relationship among the categories
Conclusion Drawing and Verification	11. Wrote up and verify conclusions

Steps eight and nine were associated with data reduction at the pattern and structural levels. I ran reports from the database and read the scripts organized by each code. This reading gave me an opportunity to recode the snippets of transcripts when it was necessary and grouped the codes into categories and associated them with research

questions. Appendix K displays the final codes and categories as well as their relationship with the research questions.

The last two steps consist of displaying data and drawing conclusions. During these two steps, I drew flow charts to make sense of relationships among the categories and to generate answers to research questions. Figures 23 to 34 in chapters 5 to 9were created during this phase of the analysis. Finally, I wrote up and verified the conclusions of the study.

Describing these steps in a linear fashion may help the reader understand my analysis process. However, the actual data analysis was nothing but linear. For example, data reduction to identify patterns and categories happened almost concurrently with data display and conclusion drawing. Drawing flowcharts and writing up findings helped me see the gaps in my codes and called for modifications to them. On the other hand, coding and reading the transcripts revealed the relationships among codes and categories and led to the conclusions of the study.

Rigor or Trustworthiness

There has been increased popularity of qualitative research in the field of instructional technology. Reeves and Hedberg (2003) warned us of the backlash against qualitative research because of its lack of generalizability and its failure to produce useful knowledge. To enhance the trustworthiness and rigor of this study, I addressed the following issues: credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985).

Credibility

The credibility of a qualitative study is concerned with the “truth value” of a study (Miles & Huberman, 1994, p. 278). It addresses questions such as “Do the findings of the study make sense? Are they credible to the people we study and to our readers? Do we have an authentic portrait of what we were looking at?” (Miles & Huberman, 1994, p. 278)

Credibility can be established with the following techniques: triangulation, peer debriefing, discrepant evidence or negative case analysis, and member checking (Lincoln & Guba, 1985). I followed these four methods to ensure the credibility of this study.

Triangulation is a technique used in qualitative research to cross check or confirm findings using multiple sources of data gathered in different ways and at different times. In this study, I explored participants’ perceptions of an OTCL prior to, during, and after they reviewed the conceptual models and the prototype. This helped me compare and contrast the data gathered with the use of different design artifacts. Collection of data from participants with different amounts of experience and backgrounds also helped satisfy the need for triangulation.

The technique of peer debriefing involves presenting the research data, the analysis procedure, and research conclusions to peers who do not have a stake in the study in order to identify researcher bias or explore aspects of the research ignored by the researcher. The peer debriefer for the study has extensive experience working with faculty members on online teaching and her own dissertation is qualitative in nature.

Studying discrepant evidence or negative cases can also contribute to the credibility of a study. This technique refers to examining the data that does not support

the researcher's current theory. In this study, conscious efforts were made to analyze the discrepant evidence and challenge the emerging patterns. Patton (2002) argued that perfect patterns and explanations are usually unlikely to find. Openly dealing with complexities and dilemmas can enhance the credibility of the study.

Member checking is the process of presenting research findings to the participants to ensure that their perspectives are accurately represented in the study. To conduct member checking, I emailed the transcripts to the participants for review and verification. This provided me with an opportunity to ask follow-up questions and to clarify issues.

Dependability and Confirmability

Dependability is similar to the concept "reliability" in quantitative research, whereas confirmability is equivalent to "external reliability" (Miles & Huberman, 1994). The former is concerned with the consistency and the stability of the study over time and across researchers and methods, and the latter emphasizes the replicability of the study by others. A good documentation of the process and the product of a study can establish both dependability and confirmability. I kept a detailed description of the steps of the study, copies of the data gathering protocol, raw data in the format of audio and video tapes, transcriptions, contact summaries, a reflective journal (see Appendix L), as well as the database developed for data coding, reporting and management.

Transferability

A more familiar term for transferability is "external validity" used in quantitative studies. It deals with the generalizability of a study (Miles & Huberman, 1994). Support for the transferability of a study can be provided by a "thick description" (Geertz, 1973; Lincoln & Guba, 1985), a detailed, in-depth description of the research process and how

researchers arrive at the conclusions. It helps other researchers to monitor the validity of the research and make decision with regard to the generalizability of the results. In this study, I tried to bring out the experiences of the participants so that the readers could interpret the participants' perceptions and to determine whether the findings were applicable in their own environments.

The Researcher and Researcher Biases

In qualitative studies, the researcher is the instrument. "The credibility of qualitative methods, therefore, hinges to a great extent on the skill, competence, and rigor of the person doing fieldwork – as well as things going on in a person's life that might prove a distraction" (Patton, 2002, p. 14). My experience and education related to online teaching provided me with the knowledge and skills needed for me to carry out the study. At the same time, however, they were also sources of biases that I had to address. In the following paragraphs, I first describe how my background adds credibility to my study. Then, I present two biases brought about by my experiences related to online teaching and case libraries. Finally, I discuss how I addressed the biases in this study.

My background and experiences with online teaching prepared me with the knowledge to develop an OTCL and to investigate faculty perceptions of this tool. I have had much experience with online teaching from the perspectives of a student, an instructor, and a graduate assistant providing faculty with online teaching support. As a student, I have taken more than ten courses at different levels of the online teaching continuum (Harmon & Jones, 1999), ranging from courses that simply used the Web to post course content to courses that completely depended on the Internet for information presentation and class interactions. As an instructor, I have taught an undergraduate level

introductory computer course in which I used the Web to post course information and to facilitate student discussions. As a graduate assistant, I had one-year experience providing technical support to faculty members who were teaching online. These experiences familiarized me with the various issues in online teaching, enabled me to empathize with the needs of faculty participants, and allowed me to interpret the interview data with a rich background of knowledge.

My background and experiences with online teaching helped me acquire the technical skills necessary to conduct this study. Online teaching has been one of the main areas that I focused on in my doctoral study in instructional technology. My interest in this area motivated me to acquire technical skills related to Web development. I took many courses to obtain these skills and had four years' experience developing Web sites in both higher education and business settings. These experiences made it possible for me to develop the prototype.

My background and experiences not only gave me the competence to complete the study, they also shaped the perspectives and biases that I brought into the study. First, I have a strong belief that an OTCL is a beneficial tool to faculty and it will be well received by professors. My idea to develop this OTCL originated from my own need in a professional experience of mine. As a novice instructional designer, I wished that I had an online case library that could provide me with case-based advices related to instructional design. I even started to conceptualize such a system. My aspiration for such a tool and my experience as an instructor convinced me that other professors would have positive perceptions of an OTCL. This belief might have drawn my attention to the data compatible to my conviction. Second, I developed the conceptual models and the

prototype based on my experiences with online teaching and a review of the related case libraries. These design artifacts contain my perceptions of what are important components in an OTCL. In summary, the following are the primary principles that impacted the design of this OTCL: (a) An OTCL should enable faculty to explore online courses or to examine specific issues related to online teaching; (b) Online teaching knowledge can be organized into both cases and topics; (c) There should be multiple features to allow the user access cases and topics; (d) There should be links between cases and topics. These principles may bias the participants when they were sharing their perceptions of this OTCL. They may provide comments consistent with these principles just to be agreeable.

To offset my tendency to look for the data that confirms my belief about an OTCL, I followed techniques such as seeking discrepant evidence or negative cases, keeping a reflective journal, peer debriefing, and member checking. To reduce the influence of my bias on the perceptions of the participants, I took the following procedures.

First, triangulation of multiple data sources helps diminish the impact of biases (Patton, 2002). As discussed in a previous section on the credibility of the study, interviewing the participant about their perceptions of an OTCL at different times and with different stimuli helped me confirm the findings.

The second way to decrease the influence of my biases on the data was to inform the participants of my intention in this study. During the pilot study, a participant apologized for "messing up" my study because he criticized the prototype. He was much relieved and was willing to give me more feedback after I explained to him that the

prototype was intended to serve as a communication tool for me to understand his perceptions, so any thoughts or criticisms on the prototype would be most welcome.

Third, asking the participants to recall their own experiences reduced the influence of my biases on participants' perceptions. To answer the interview questions and complete the tasks, the participants would need to make some mental efforts. It may be easier for them to be agreeable and simply provide positive feedback. To address this potential issue, I started the interviews by asking the participants about their experiences related to teaching and online teaching. This established a context for them to evaluate the prototype. This strategy seemed to work well in this study. When the participants made comments on this OTCL, they usually brought up their experiences to back up their observations.

Pilot Study

The pilot study was conducted with the following objectives in mind: (a) to refine the data collection process, (b) to test and modify some of the data analysis procedures, (c) to evaluate the feasibility of using a portable usability lab to gather data, and (d) to practice and improve my interview skills. Four participants were recruited in the pilot study: one adjunct faculty member, one former Graduate Teaching Assistant (GTA), and two current GTAs. These four participants came from different disciplines, and they had a range of knowledge and experience related to teaching and online teaching.

The objectives of the pilot study were achieved. First, problems and issues with the prototype and the data collection procedure emerged during the pilot study. Changes were made accordingly to address these issues. Details of the changes will be described in the next several paragraphs. Second, I tested and modified the beginning steps of the

data analysis process during the pilot study. I carried out the data organization procedures, developed a contact summary sheet, generated some initial codes and applied them to the pilot data. I also developed a database to store, manage, code, and report the data. Third, after using the portable usability lab to collect the data for a couple of times, I identified the lab components that I would need for my study. Fourth, I transcribed some pilot interview data and identified problems in my interview techniques. This helped me improve my interview skills. The following were two major changes I made to the prototype.

First, I modified the prototype so that it served as a more effective communication tool to help me gather data. There was a lot text in the early iterations of the prototype, and it required that the participants spend a lot of time reading. This was a barrier for me to achieve my goal because the purpose of the prototype was to communicate the design concepts to the subjects rather than obtaining feedback on specific content. The participants were frustrated with extensive reading and were distracted by the details of the content. To solve this problem, I simplified the text and added more headings to enable browsing.

Second, I added some components to the conceptual models and the prototype. The participants in the pilot study brought up the ideas of adding “case materials,” as well as some knowledge sharing features such as “add a comment” and “add a story” to the prototype. I went back to the literature and found support for these features in the related case libraries. Thus, I integrated these components into the conceptual models and the prototype.

My initial data collection procedure was heavily influenced by usability testing methods (Nielsen & Mack, 1994). It soon occurred to me that these methods were not appropriate for my study. I was at an early stage of the development process. What I really needed was to find out about the subjects' experiences with online teaching and their perception of the design artifacts in light of their experiences. Structured usability testing would not provide the data I would need at this stage. As a result, I made some changes to the data collection procedure. Figure 21 shows the procedure that I followed when interviewing the first participant in the pilot study, and Figure 22 illustrates the interview process for the formal study. The following presents the three changes that I made to the data collection procedure.

First, I added an overview of the conceptual models to the beginning of the contextual interviews. As I mentioned earlier, the interface was inadequate to provide the user with an understanding of the conceptual models within a short period of time. I found in the first pilot that the participant spent a lot of time trying to construe the structure of the Website from the interface. This interfered with the data gathering

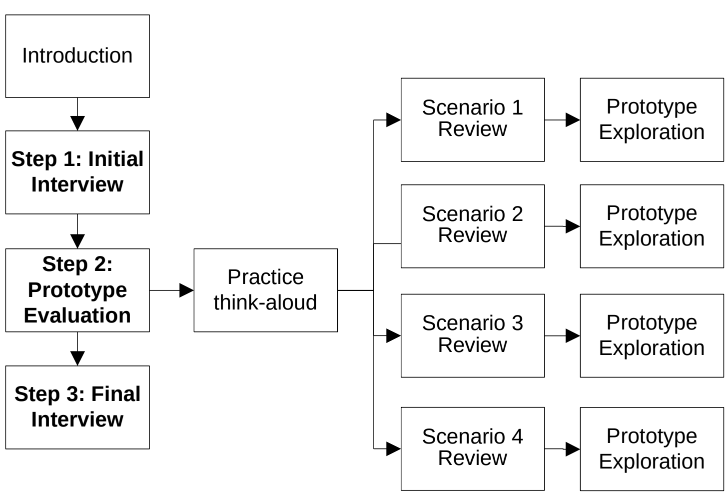


Figure 21. Data gathering procedure for the first participant in the pilot study.

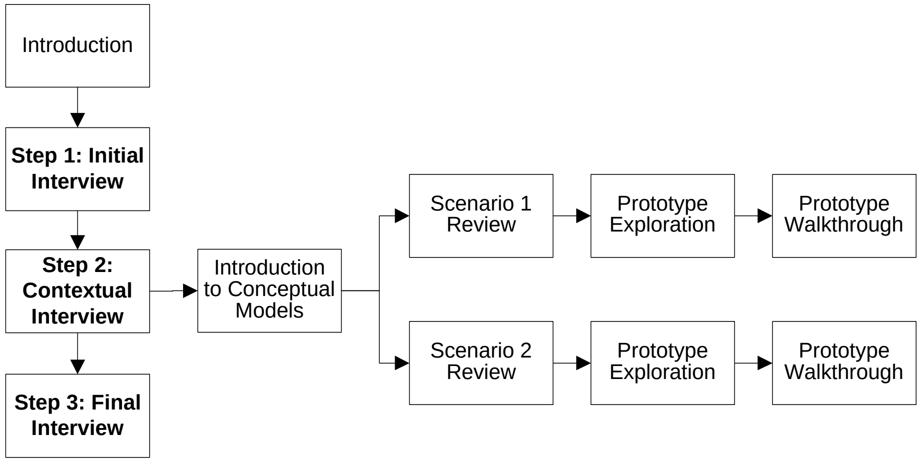


Figure 22. Data gathering procedure for the formal study.

process. An overview of the conceptual models was added to the contextual interviews so that the participants could focus on the questions and tasks important to the study. Moreover, asking the participant for feedback right after the overview provided me with another data gathering opportunity. This helped me distinguish the perception of the conceptual models from that of the prototype.

Second, I modified the scenarios used in the data collection procedure. In the first pilot, I gathered the data by using the scenarios created to develop the prototype (see Appendix A). These scenarios include all the specific steps that one should follow to complete the tasks. It turned out that this procedure was boring for the first participant because he did not have the freedom to explore the content in which he was interested. In addition, this approach failed to draw out his experiences to help make sense of his opinions. To address this issue, I modified the scenarios so that they provided general problem situations for the participants to reflect on their own experiences and to explore the prototype.

Third, I replaced think-aloud protocols with contextual interviews. The think-aloud procedure is usually used in conventional prototype evaluation (Barnum, 2002). It involves requiring the participants to verbalize their thought process. This procedure was adopted for the first pilot. However, I soon realized that contextual interviews would be better than think-aloud protocols for the following two reasons. First, talking to the participants while they were working with the prototypes was more natural than asking them to think aloud (Nielsen, 1994; Snyder, 2003). Second, my research questions required that I work with the user collaboratively on evaluating and suggesting design ideas. This goal cannot be achieved with the think-aloud procedure, which usually discourages the interactions between the facilitator and the participant (Ericsson & Simon, 1993).

The pilot study was instrumental to the research process. Valuable lessons learned from the pilot study improved my methodology, and built up my skills and confidence in carrying out the study. I not only achieved those goals that I expected to obtain in the pilot study, I also identified gaps in my conceptual models and the prototype. Changes were made to the models and the prototype to reflect the findings from the pilot study. This demonstrates the iterative nature of the development process.

Limitations

This study has several limitations. The following paragraphs describe these limitations and the efforts that I made to address them.

First, “qualitative findings are highly context and case dependent” (Patton, 2002, p. 563). The results of this study were not meant to be statistically generalized to other

situations or contexts. Instead, the study was conducted to guide decision making with regard to adopting an OTCL in similar contexts and to inform future development and research efforts related to an OTCL. A thick description (Geertz, 1973) of the participants' perceptions of this OTCL allows the readers to determine the generalizability of the findings in their own contexts.

Second, in this study, I played multiple roles: the designer, the developer, and the researcher. I developed the conceptual models and created the prototype. My roles as the designer and the developer might have brought some biases when I collected and analyzed the data. I made the following efforts to address this issue: triangulating multiple data sources, encouraging the participants to provide constructive feedback and to make sense of this OTCL based on their own experiences, keeping a reflective journal, asking the participants to clarify issues after data collection, and involving a peer debriefer in validating research findings. The details of these techniques will be elaborated when I discuss the researcher biases in chapter 3.

Third, the reader may argue that the contextual interview procedure adopted in the study might have changed the thought process of the participants when they interacted with the conceptual models or the prototype. Contextual interviewing has some similarities with level 3 verbalization (Ericsson & Simon, 1993) in that they both direct the participant to attend to and verbalize particular aspects of a situation. Unlike level 1 or level 2 verbalization, which usually simply requires the participants to vocalize any verbal or nonverbal information that comes into one's mind, level 3 verbalization requires the participants to explain their thoughts or thought processes. To achieve the third level verbalization, intermediate mental processes are needed to scan and filter

relevant information as well as to make inferences. Whereas the first two levels of verbalization do not change the course or structure of the cognitive processes, level 3 verbalization does induce change and alter performance (Ericsson & Simon, 1993). In addition, contextual interviews require that the researcher frequently interrupt the participants to seek understanding of the thought process behind their behaviors. Therefore, it can be argued that the contextual interview procedure itself might have changed the way that the participants used and perceived the prototype. To address this issue, I tried to make my questioning as unobtrusive as possible. At times when I had to interrupt the participants, I usually tried to bring them back to where they were right before I asked the questions.

Fourth, the characteristics of the participants in the study might have influenced the results of the study. Participants were volunteers. Most of them were interested in online teaching and the case library. Therefore, they might have more positive perceptions of the case library than those who are not interested in the study. Readers should keep this in mind when generalizing the results of the study to their situations.

Summary

The development research methodology was followed to carry out this study because I intended to solve a real world problem while at the same time generating design knowledge. This was a developmental goal, which could be achieved with development research.

A rapid prototyping development model was used because of the nature of this project and the research questions. This model suggested a three-phase process to carry out this study: conceptualization, development, and research.

At the conceptualization phase, conceptual models of tasks, content, and features were developed. These models describe (a) the types of tasks faculty would accomplish in this OTCL (b) the types of content should be provided, and (c) the types of features should be available. These three models correspond to the last three research questions.

In the development phase, a prototype of an OTCL was built to represent the conceptual models. This prototype primarily includes a case study on collaborative problem solving in an online instructional design course and it supports two scenarios. A four-step development procedure and HTML were adopted to develop the prototype.

In the research phase, qualitative methods guided data gathering and analysis. With a purposeful sampling technique, I recruited seven faculty participants. The data collection procedure I used includes three stages: initial interviews, contextual interviews, and final interviews. The initial interviews examined faculty experiences with online teaching and case methods, which provided a context for the contextual interviews. Faculty participants reviewed the conceptual models and performed the tasks in the prototype during the contextual interviews. The final interviews investigated faculty overall perceptions of an OTCL after their interactions with it. To guide my data analysis, I followed the analysis procedures described in Miles and Huberman (1994) as well as LeCompte and Schensul (1999a). Rigor or Trustworthiness has been an issue in qualitative research. To address this issue, I followed many established techniques, including triangulation, reflective journal, peer debriefing, discrepant evidence or negative case analysis, member checking, as well as documentation and thick description of the research process and the product of the study.

This chapter offers a roadmap for conducting the study. The following chapter describes the participants as well as their backgrounds and experience.

CHAPTER 4

PARTICIPANTS

Introduction

This chapter presents information about the participants, including their demographic information, their backgrounds and experience related to teaching and online teaching. Their names have been changed to maintain anonymity. This presentation provides "thick descriptions" of the research participants so that readers can determine whether research results can be generalized to their own situations.

Demographic Information

Table 5 shows that a diverse group of faculty members participated in this study. They represent four colleges of the university: Education, Business, Health and Human Sciences, as well as Arts and Sciences. Among the seven participants, two of them are males and five are females. They fall into four age groups. One is in the 20-29 age group, two are in the 30-39 age group, three are in the 50-59 age group, and one is in the 60-69 age group. Six of the participants hold an earned doctorate degree, whereas one possesses a Master's degree. Three participants are assistant professors, two are associate professors, and two are lecturers/instructors.

Backgrounds and Experience

The participants in this study had a range of experience with online teaching and case methods. The following provides a brief overview of the participants, including a

brief introduction of their backgrounds, teaching and online teaching experience, how they learned to teach online, and their experience with case methods.

Table 5

Participant Demographic Data

	Randal	Campbell	Robinson	Smith	Nelson	Davis	Walker
Academic Unit	CHHS	COE	COE	COB	A&S	COB	COE
Gender	F	F	F	F	F	M	M
Age	50-59	30-39	30-39	20-29	50-59	50-59	60-69
Rank	Assoc	Asst	Asst	Asst	Lect	Inst	Assoc
Highest Degree Earned	Doc	Doc	Doc	Doc	Master	Doc	Doc

Note. Asst = Assistant Professor; Assoc = Associate Professor; Inst = Instructor; Lect = Lecturer. CHHS = College of Health & Human Sciences; COE = College of Education; COB = College of Business; A&S = College of Arts and Sciences; Doc = Doctoral Degree; Master = Master's Degree

Dr. Randal

Dr. Randal is a female associate professor in the College of Health and Human Sciences. She is in her fifties. She is an advocate of technology use in teaching. She has been involved in a lot of committee work related to the use of technology in teaching and learning in the university. This has given her perspectives different from those reported by most of the other participants. She seemed to enjoy sharing her online teaching experiences and her perceptions of this OTCL. The interview with her lasted about two hours. If time permitted, it could have lasted longer.

Teaching and Online Teaching Experience

Dr. Randal was selected as an experienced online instructor to participate in this study. Her online teaching experience score, E, is 57. She has about 30 years of teaching experience and she has taught both graduate and undergraduate students. She is among the early adopters of online teaching in this university.

She has taught five different courses online in a total of 44 sessions. These courses range from completely online courses where the class never meets face to face to courses in which some components are delivered online, but students still come to the physical classroom. Dr. Randal has used Web tools for a variety of purposes: posting course content, organizing problem solving activities, facilitating student collaborations and communications, as well as providing drill and practice exercises for students to repetitively practice certain skills to prepare for exams.

Dr. Randal has a positive attitude toward online teaching. Prior to the use of WebCT, she taught distance education courses using the interactive television. Teaching courses online helped her bypass some of the problems she had with the interactive television, including unreliable television transmission and material distribution. Another advantage Dr. Randal mentioned about online teaching was that with a large online test bank, she could give students enough practice on some repetitive tasks in areas such as math. Moreover, she turned one of the challenges of online teaching into an advantage. Without face-to-face interactions in traditional classrooms, she had to make her instructions explicit and intuitive in the online environment. This required her to spend time thinking through her courses and to improve the class each time she taught it. She had more control of her class this way. Students no longer crowded around her asking

questions after the class because they could post questions and review answers online. If one person asked a question, the answer would be available to everyone. At the end of the semester, she was able to review the log of these questions and improve the course assignments for future semesters.

Learning to Teach Online

Dr. Randal used a variety of resources to help her with online teaching. She sought help from a campus technology group to address technical issues so that she could focus on the pedagogical aspects of her courses.

To deal with issues on teaching and learning, she read books on pedagogy and talked to people at meetings and conferences. From these people she learned about ideas of teaching that she could not come up with on her own. She believed that nothing could replace her reading, because she was not a “trained teacher,” and reading the literature on pedagogy gave her an understanding of how different people learn. This helped her adapt to the needs of different students. She stated, “In many cases, I have two or three ways you can learn something. So people don’t have to all try to do it the same way.”

When asked about the types of resources she wished to have when she first started to teach online, Dr. Randal said that there were no models she could follow in her online teaching. She used the word “model” to refer to specific examples or tools that she could use to teach certain subject matter. A vocabulary flashcard was a simple example of a model. It would have been easier for her if such flashcards had been available when she first taught those courses. At the time of the interview, she already had many years of online teaching experience, but she was still looking for models. One example she gave

was that she was looking for models on teaching writing-intensive courses in the online setting.

Experience with Case Methods

Dr. Randal reported that she was familiar with the use of cases in teaching, although she never used this instructional method in her own courses. She learned about case methods from her friends in the College of Business who used case studies in teaching. In addition, there are many case studies in the field of medicine and she is familiar with the literature in this field.

Dr. Campbell

Dr. Campbell is a female assistant professor in the College of Education. She is in her thirties. She recently received a Ph.D. and has taught at the current university for about one year.

Teaching and Online Teaching Experience

Dr. Campbell was identified as an experienced online instructor (E = 21) in this study. She has five years of online teaching experience, during most of which she worked as a teaching assistant. She has been involved in the teaching of six courses with a total of 15 sessions. Among them, she was the sole instructor for five sessions and served as the teaching assistant for the other ten. Dr. Campbell's experience with online instruction was not limited to her own teaching; she worked as a graduate assistant who provided faculty with online teaching support.

Most of the courses Dr. Campbell taught or assisted with teaching were "hybrid" courses, in which about 30% to 40% of the course content was delivered online and the rest was taught in the traditional classroom. She stated that she took a "self-directed"

approach to teaching and she played more of a moderator role rather than the role of a teacher in the traditional sense. Her primary responsibilities included facilitating class collaboration in both the face-to-face and online learning environments. She had experience in organizing groups and online forums. In a course she just started to teach at the time of the interview, she planned to use online tools to post course information and to facilitate class discussions.

When asked about the challenges she encountered in online teaching, Dr. Campbell mentioned both technical and non-technical issues. Examples of technical issues included situations when documents were missing or when programs failed to run online. These issues were frustrating for her and her students. Non-technical issues were usually related to course organization, course management and time conflict. These issues were caused by a lack of physical presence in the online environment. Without her being in the same room with students, she sometimes did not know whether things went wrong and what problems students really had.

Learning to Teach Online

Dr. Campbell learned to teach online by “trial and error” and with the help of an array of resources. For technical issues, she tried to resolve them herself or looked for help from people who had expertise in the specific technical area. For non-technical issues, she consulted people who had more experience in online teaching than herself, went to presentations, and read related literature. From these resources, she looked for “how-tos and what work for others,” so that she did not have to “reinvent the wheel.”

Dr. Campbell not only gathered online teaching related resources for her own use, but also collected and compiled information to help other faculty with online teaching.

When she was a research assistant, she and her colleagues surveyed professors to find out the issues they had with online teaching as well as the solutions they tried. The survey results were then disseminated among faculty.

Experience with Case Methods

Dr. Campbell reported that she was familiar with the use of case studies in teaching and she sometimes incorporated this strategy in her instruction. She learned about this strategy from her experience as a student in the fields of both business and education. She sometimes used scenarios in the courses she taught. In those courses, she selected case studies related to the topics she would discuss in the class and required students to work in small groups to answer questions about the cases. She brought in readings and asked students to share personal experiences to enrich the discussions.

Dr. Robinson

Dr. Robinson is a female assistant professor in The College of Education. She is in the 30-39 age group. She received her Ph.D. three years ago and at the time of the interview, she just started to work in the current position.

Teaching and Online Teaching Experience

Dr. Robinson was selected as an experienced online instructor (E = 17) in this study. She has a total of 17 years of teaching experience consisting of 13 years in public schools, two years as a teaching assistant and three years as an assistant professor in higher education.

Dr. Robinson has taught online for three years, including four courses and a total of ten sessions. Her online teaching experiences included one course delivered totally online and the other courses with some online components. She used a variety of Web

tools. Her students communicated online using chat rooms and discussions boards. They critiqued each others' presentations online and retrieved course materials and assignments online. Dr. Robinson was selected as an experienced online instructor to participate in this study.

The types of issues that Dr. Robinson came across included both technical and non-technical ones. She was concerned about the level of interactivity that online teaching allows. She taught only one course completely online. She stopped teaching in this format because she could not create an online learning environment as interactive as those in the traditional classroom. One problem was that online discussions were not as "free flowing" as those in the classroom. The other problem was that she could not figure out how to invite guest speakers in the online classroom. Without the interactivity she desired, she thought the class "lost the dialog" and the "give and take."

Learning to Teach Online

Dr. Robinson learned to teach online by resorting to her expertise in education, her experiences as a student in the online classroom, and online teaching related workshops. With a background in the field of education, Dr. Robinson was able to depend on her prior knowledge to help her deal with some issues in online teaching. Her exposure to an online course as a student gave her an idea of what would work and what would not work in the virtual learning environment. She also attended workshops. However, she complaint that "the workshop happens so infrequently that you don't always have a workshop available when you need someone to really assist you." Therefore, most of the time, she had to come up with ideas on online teaching by herself.

Experience with Case Methods

Dr. Robinson stated that she heard about the use of case studies in teaching but she never adopted this method in her own teaching.

Dr. Smith

Dr. Smith is a female faculty member in the College of Business. She is in her late twenties. She recently obtained her Ph.D. and joined the faculty at the current university.

Teaching and Online Teaching Experience

Dr. Smith was identified as a novice online instructor (E = 0) to participate in this study. She has about three years of teaching experience, including two years as a teaching assistant and one year as a corporate trainer. She reported that she had no experience teaching online although she always made the discussion board available to students.

Learning to Teach

Trial and error, readings, and discussions with colleagues helped Dr. Smith with her teaching. After teaching a class for a semester, she would get an idea of the knowledge level of the students and of the expectations she should set for students in subsequent semesters. Such trial and error helped her improve her teaching. In addition, she also learned about teaching by reading and talking to faculty who taught the same courses in the past.

Experience with Case Methods

Dr. Smith reported that she was very familiar with case studies, and she sometimes used cases to facilitate class discussions. In these classes, she usually required students to read the case before the class. During the class, they discussed the problems

described in the case, the lessons that they could learn from the case, and how the case was related to the concepts they were learning.

Ms. Nelson

Ms. Nelson was a female lecturer teaching a foreign language in the College of Arts and Sciences. At the time of this writing, she already retired from this position. She is in her late fifties. She is the only participant who does not have a Ph.D. in this study. During the interview she was a little disconcerted. A series of events might have contributed to her disposition at the time of the interview. She mentioned that she knocked her head on a truck during the weekend, so she thought she was not very competent that day. She taught a class right before the interview. She came to the interview about ten minutes late because she talked to students after class. When she rushed into the video studio where the interview was conducted, she ran into a camcorder that I set up for the study. During the prototype exploration, she failed to find any courses in her subject area. All these events were frustrating for her, and this might explain some of her agitated comments.

Teaching and Online Teaching Experience

Ms. Nelson was selected as a novice online instructor (E = 0) to participate in this study. She has a total of 19 years of teaching experience with 16 years in public schools and three years in higher education. At the time of the interview it was her third year of teaching at the current institution. Unlike other participants who have experience teaching both graduate and undergraduate students, Ms. Nelson has only taught undergraduate students.

This was the first semester that Ms. Nelson incorporated any online tools into her teaching. The only online components she was using were writing and listening comprehension exercises in WebCT. These exercises came with the textbook from the publisher. Ms. Nelson was frustrated with the technical issues associated with these exercises. Throughout the interview, Ms. Nelson commented that she had little experience teaching online, so she had a hard time understanding this OTCL and she was a good participant in this study. Contrary to what she expected, she contributed some valuable data showing how a novice online instructor perceived such a tool.

Ms. Nelson has an interesting attitude toward online teaching. She said that she was not very good at technology and she thought the idea of designing a course online was “frightening” and “intimidating.” When I asked her to imagine a situation where she would be asked to teach a course online the next semester, she jokingly said that if that were the case, she would retire a semester earlier than she planned. Her attitude toward technology can be described using the following sentences from the transcript of her interview: “See, I’m 58. I got dragged into the computer age, kicking and screaming all the way… I’m resigned to the fact that the world is going to be run by computer pretty soon. We just have to learn how to talk to them, using them gently…”

Learning to Teach

While teaching in public schools, Ms. Nelson sought advices from other teachers and guidance counselors to help her with her teaching. In higher education, however, she did not have many resources and she learned from trial and error. If one thing did not work, she would try something else. She did not believe that she really needed a lot of resources for teaching as long as there were not technical issues.

> I guess really I have everything I need. I have a textbook. They have a textbook. I have the ability to present to them. And they have the ability to learn. So I don't really believe a person needs a lot of things… need a lot of stuff to be able to teach.

Experience with Case Methods

Ms. Nelson said that she never heard about the use of case studies in teaching and she never used this method either. She was the only participant in this study who reported to have never heard about the use of cases in teaching.

Dr. Davis

Dr. Davis is a male instructor in the College of Business. He is in the 50-60 age range. In addition to teaching, he is also practicing in business and working in professional organizations.

Teaching and Online Teaching Experience

Dr. Davis was selected as a novice online instructor (E = 0) to participate in this study. He has been teaching at the current institution for three years. At the time of the interview, he was also teaching at two other organizations. He has a total of 15 years of teaching experience.

Dr. Davis has been using WebCT and other similar online teaching tools in universities and professional organizations for five years, during which he posted PowerPoint presentations and assignments on the Web with these tools. He included online components in five different courses and a total of 47 sessions. However, I categorized him as a novice online instructor because he did not use online tools to facilitate class interactions in these courses and online interaction is a core criterion for defining online courses in this study. He represents the perspectives of faculty members

who have incorporated online components into limited aspects of their teaching, but who are willing to explore new ways of teaching with the use of technology.

A major issue that Dr. Davis has been struggling with was how to use the online course materials. On one hand, he wanted to post the course materials to give students an opportunity to review the materials and complete some related assignments before coming to class; on the other hand, he was concerned that students would skip class meetings because they might think that they could get everything online.

Learning to Teach

Dr. Davis reported that his training in a professional organization helped him learn to teach. This organization requires that their faculty be well trained.

Trial and error was also important in contributing to his teaching improvement. Many of his students were practitioners in the field rather than traditional students. They were not shy about asking questions if they did not understand something. Dr. Davis was able to improve his teaching based on student feedback. His use of online tools in teaching was also a trial and error process. To incorporate online components into a course, he created a “prototype” of the course and taught it based on the initial design. After the course was over, he made changes to it. He then repeated the cycle a couple of times. After he taught the same course for the third or the fourth time, he would just follow the outline established in the past.

Experience with Case Methods

Dr. Davis stated that he was familiar with the use of case studies in teaching. With a background in the fields of both law and business, he was exposed to two different definitions of cases. Chapter 8 will discuss his definitions. Cases were essential to his law

classes. They were in the textbook. Every semester, he assigned each student a case brief and asked them to find resources related to this case either on the Web or in the library. Students then presented their findings to the class.

Dr. Walker

Dr. Walker is an associate professor in the College of Education. In the last five years, he has focused on improving faculty teaching excellence on campus. His role in coordinating teaching improvement efforts in the university has given him unique perspectives and makes him a key informant in this study. He provided some great insights and thought provoking ideas that helped me interpret my data.

Dr. Walker has been working with faculty to "shift from focusing on their teaching to emphasizing student learning." In the last couple of years, his work has been centered on documenting student learning as a driver for teaching improvement. He stated that by assisting faculty to sort out different ways of assessing student learning, he could go back and help them think about alternative ways of teaching.

A lot of the work that Dr. Walker has accomplished focuses on coordinating teaching improvement efforts already existing in the university. Many departments in the university have been preparing graduate students for teaching in higher education, but they failed to communicate to each other. Dr. Walker helped these programs share resources and ideas using technologies such as CDs and the Web.

Teaching and Online Teaching Experience

Dr. Walker has extensive experience with teaching and online teaching. He was identified as an experienced online instructor (E = 33) to participate in this study. He has taught for 30 years in the institution where he is currently working. As an early adopter of

online teaching in this university, he taught online for nine years with four different courses and a total of 20 sessions. Six to eight of these sessions were delivered almost totally online. These classes usually started with an initial face-to-face meeting followed by synchronous or asynchronous discussions. A library of reading materials was available online to support discussions. In these classes, Dr. Walker invited authors of the research articles that students were reading to log into the chat sessions, so that students could ask the authors questions about their articles. The other type of online courses he taught involved putting short clips of streaming videos online which showed teaching practice and students' work. Graduate students in his classes were required to watch the video clips and to make decisions with regard to how they might intervene if their students produced the type of work depicted in the video.

The issues that Dr. Walker had while teaching online included technical issues and problems with students' comfort level with online courses. He told a story to show that in the early days of his online teaching, students were not comfortable using online communication tools. On a rainy day when students could really appreciate the advantage of online teaching by taking the course at home or at work, they still came to the university computer lab to participate in a chat session in order to seek the comfort of technological stability and the company of other students.

Learning to Teach Online

Dr. Walker depended on technology experts to handle the technical issues for him. As for the pedagogical problems in the online learning environment, his interest in student learning and his background in education helped him deal with many of those

issues. Moreover, he benefited from readings, conferences, courses offered by the Board of Regents on online teaching, as well as colleagues who had expertise in this area.

Experience with Case Methods

Dr. Walker stated that he was familiar with the use of case studies in teaching and he occasionally incorporated them in his courses. His use of video clips of teaching practices was an example of how he employed case methods in teaching.

Summary

The purposeful sampling technique used in this study resulted in a sample of participants from a variety of backgrounds and disciplines, with different experience related to online teaching and case methods. They offered insights on an OTCL from diverse perspectives.

Table 6 shows that the seven participants in this study have varying amounts of teaching and online teaching experience. Their years of teaching range from three years to 30 years, and years of online teaching vary between zero to nine years. Four of the participants are identified as experienced online instructors and three are classified as novice online instructors.

These instructors used the online tools for different purposes (Table 7). Most of them used these tools to post course materials and facilitate student collaboration and discussions. Some also employed the Web to provide students with drill and practice opportunities or to organize problem solving activities.

Table 6

Participant Teaching and Online Teaching Experience

	Randal	Campbell	Robinson	Smith	Nelson	Davis	Walker
Years of Teaching	30	4	15	3	20	15	30
Years at Current University	18	1	0	0	2	3	30
Years of Online Teaching	8	5	3	0	0	0	9
Sessions	44	10	10	0	0	0	20
Courses	5	6	4	0	0	0	4
Online Teaching Experience Score (E)	57	21	17	0	0	0	33
Online Teaching Experience Category	E	E	E	N	N	N	E

Note. E = Experienced online instructor; N = Novice online instructor

Participants reported different challenges that they came across in online teaching. Although I asked them to focus on issues related to teaching and learning, many of them mentioned technical issues. They might not be able to separate their online teaching problems into technical and non-technical ones. The major teaching and learning related issues that they reported were usually problems caused by a lack of physical presence in the online environment. These issues included lack of interactivity, requirement for clear instructions, optimal use of online course materials, as well as students' frustration and lack of comfort with the online learning environment.

Table 7

Purposes of Using Online Teaching Tools

	Randal	Campbell	Robinson	Smith	Nelson	Davis	Walker
Collaboration Communication	x	x	x	x			x
Posting Course Content	x	x	x		x	x	
Drill and Practice	x				x		
Organizing Problem Solving Activities	x						x

Table 8 summarizes a list of resources that participants used to help them with their issues in teaching or online teaching. For technical issues, they usually sought assistance from technical personnel or sometimes attempted to address the issues themselves. As for teaching and learning related issues, they primarily took an apprenticeship approach by learning from trial and error, their own experiences as students in the online environment, and other professors' experiences obtained from personal interactions, conferences or meetings, and readings. Their previous pedagogical knowledge, workshops and other types of formal training also played a role.

Table 8

Resources Participants Used to Improve Online Teaching

	Randal	Campbell	Robinson	Smith	Nelson	Davis	Walker
Technical Personnel	x	x	x				x
Trial and Error		x		x	x	x	
Experience as a Student			x				
Previous Pedagogical Knowledge			x				x
Colleagues		x	x	x	x		x
Conferences/meetings	x	x					x
Reading	x	x		x			x
Workshop/Formal Training			x			x	x

Participants had varying amounts of experience with case methods (Table 9). Among the seven participants, one of them claimed to be very familiar with case methods; four were familiar; one has heard about them but was not familiar; and one has never heard of them.

An analysis of faculty teaching and online teaching experiences indicates that participants took an apprenticeship approach to improving their online teaching. They talked to colleagues on campus, went to conferences and meetings, and read how other people dealt with issues in online teaching. This may explain, in part, their perceptions of an OTCL. The next chapter describes faculty overall perceptions of this OTCL.

Table 9

Participants' Familiarity with and Frequency of Case Use

	Familiarity with Case Use				Frequency of Case Use			
Participant	Very Familiar	Familiar	Heard of but not familiar	Never heard of it	Very Often	Sometimes	Occasionally	Never
Randal		x						x
Campbell		x				x		
Robinson			x					x
Smith	x					x		
Nelson				x				x
Davis		x				x		
Walker		x					x	

CHAPTER 5

FACULTY OVERALL PERCEPTIONS OF AN OTCL

Introduction

This chapter presents the data that addresses the first research question. It describes faculty overall perceptions of an Online Teaching Case Library (OTCL). The chapter starts with a description of three factors that may impact faculty overall perceptions of an OTCL, which is their perceived decision to use this tool: (a) perceptions on how an OTCL would support the way faculty learn to teach, (b) perceived usefulness, and (c) perceived usability of an OTCL. It then discusses whether faculty members with varying amounts of online teaching experience and different levels of familiarity with case methods differed in their overall perceptions of an OTCL.

Factor 1: An OTCL and the Way Participants Learn to Teach

The first factor that contributes to participants' overall perception of an OTCL is the belief that an OTCL could support participants' apprenticeship approach toward learning to teach. It could serve as an alternative to human mentors by supporting dialog and sharing among professors, offering multiple perspectives on online teaching, and providing timely support. The following presents several themes related to this perception.

Apprenticeship

As discussed in the previous chapter, many participants took an apprenticeship approach to learning online teaching. This may explain why they generally reported positive perceptions of an OTCL. A couple of participants confirmed this speculation. Dr. Robinson stated that an OTCL could support her way of learning how to teach.

> This is something that is more similar to the way that I learn. I'm not so good with going some place, reading directions on how to set something up, and doing all of that, and not being really sure about what issues may arise, how you handle certain things. I think just from the more personable type of view point, that would be helpful for me because it would give you that idea that here is another person who's been in a similar situation, and these are the things that they chose to do. I think this will save a lot of time.

As an expert who has worked with faculty to improve their teaching, Dr. Walker was in a good position to judge how an OTCL matches the way faculty members usually learn to teach.

> The strength is that it's based on evidence from the real world, that one of the real ways that I think faculty members learn well is … that craftsman approach to have someone sit and work with them as if they are apprentices. But we can't do that 24 hours a day. This (tool) provides an alternative where a faculty member in their own office can learn from others.

Sharing Experiential Knowledge

How could an OTCL help faculty learn from each other? Participants in the study conceptualized this OTCL as a tool that could promote the sharing of experiential knowledge among faculty. Dr. Robinson wished that she had the tool "ready to go right now" so that she could look at some examples and determine what to put in her course. Without such a tool, she would have to ask her colleagues to share with her what they were doing in their classes.

Some participants had a general view of using an OTCL as a tool to facilitate sharing among faculty, and but some others had specific ideas about what this tool could help them achieve. Ms. Nelson stated that the strength of the tool is that it could provide a framework for instructors to communicate with each other. Similarly, Dr. Campbell thought that an OTCL could "become a collaboration area" where the users could all share their experiences. Dr. Randal had a more detailed picture of how sharing can improve teaching in a community of instructors. She envisioned that the tool has the potential of "building a cohort of people" who could develop teaching models that faculty might modify to meet their own needs.

> You have a small class you might modify it this way. You have a large class you may modify it this way. If it's tied to a writing intensive course you may want to add this to it. If it is tied to a math-focused course, you may want to add this to it. But I think you begin to get more of a dialog and to have a scholarly teaching dialog on campus.

Dr. Walker's expertise in teaching improvement allowed him to make insightful comments that summarized the importance of experience sharing among faculty.

> I think that this is an area we have omitted… sharing about our courses. One of the missions that I see that's important to help faculty is the idea of making teaching, the term is making teaching community property. It's Lee Shulman, Head of Carnegie Foundation, (who) talks in those terms….When we learn something by our teaching, it stays with us. A colleague that I worked with a few years ago, when he retired he said "the saddest (thing) about my retirement is I leave no legacy and whoever takes my job is going to have to learn the same lessons that I have learned".

Dr. Walker believed such sharing could be made possible with Internet technologies. In the online courses he taught, he put video clips of teaching practice online so that student teachers could view how someone taught a class. He stated that similar ideas could be applied to faculty teaching in higher education.

Multiple Perspectives

Some participants perceived that an OTCL could allow faculty to share multiple perspectives on teaching. Dr. Walker emphasized that one of the strengths of an OTCL is that from this tool, a professor “was not learning from one person, (he) was learning from multiple persons.” This is important because some participants believed that there are many different approaches to teaching, and instructors need a variety of examples so that they could choose the ones that match their situations. Dr. Randal used a story to point out that a teaching style that worked for one person might not work for another. Dr. Campbell and Dr. Robinson stated that they would need to have multiple stories or cases so that they could choose the ones that would work best for them.

Timely Support

Another strength participants reported that an OTCL has is that it could support sharing the information relevant to their needs in a timely manner. Dr. Walker stated that unlike a human mentor, an OTCL could enable dialogue and sharing 24 hours a day. Dr. Robinson pointed out that, compared to traditional workshops, an OTCL could provide the resources related to her needs whenever she needed it.

> Instead of attending a workshop which takes several hours, you may or may not want to hear (what) you need to hear or want to hear, here you can search and look for those things that pertain specifically to you.

Dr. Robinson would need such timely and relevant resources, because she envisioned that if she were to use an OTCL, it would probably be “a panic situation” where she encounters a problem and needs to find out what other people have done to solve the problem. Dr. Campbell, Dr. Smith, and Ms. Nelson talked about similar needs.

Although an OTCL may support the way that participants learn to teach, their decision to use an OTCL would be determined by how useful and usable this OTCL is. The following sections present these two factors.

Factor 2: Usefulness of an OTCL

For an OTCL to be useful, it needs to be applicable and relevant to the user. These are the two dimensions related to the usefulness factor. This section discusses these two dimensions.

Applicability

Applicability refers to the need for an OTCL to support the tasks that faculty would be engaged in while using this tool. Participants commented that they would not use an OTCL unless it is applicable to support their needs in teaching. Dr. Smith stated that she typically would not use resources unless she absolutely needs to look for specific information. Similarly, Dr. Campbell wanted information to be provided at the time it could help her. Participants' need for applicability requires that an OTCL be applicable to professors with various needs in multiple situations. The following sections present faculty perceptions of the audience and situations that an OTCL should support.

Audience of an OTCL

Participants in the study believed that an OTCL could be useful for faculty with different needs. Dr. Davis stated that the tool could be helpful for two types of faculty. It could help someone get started on online teaching or improve the effectiveness of instructors who were already teaching online. Ms. Nelson emphasized the use of the tool for the first type of faculty. She said that, if the instructors are "forced" to teach online and are "terrified by the whole situation," it would be good for them to have the tool so

that they could see what potential pitfalls may exist, what others have tried and what techniques have worked. Dr. Davis belongs to the second type. He only used Web technologies to post course materials. He believed that this tool could help him expand his teaching from lectures and presentations to group projects and discussions. Similarly, Dr. Randal stated that the tool would be most useful for someone who has some experience in teaching and who is willing to try new things to improve their teaching.

An OTCL should be applicable to both novice and experienced online instructors. Moreover, it should meet the needs of professors who take a proactive or reactive approach to using resources. For example, as a more reactive type of person, Ms. Nelson stated that she would not use an OTCL unless she runs into a problem. Then, she would be "forced" to use it. When the need for an OTCL does emerge, she would review the relevant information in the tool and then work on her own issue. She would go back and forth many times until she resolves her problems. Dr. Robinson seems to be a more proactive person. Although she stated that she would probably use an OTCL when she bumps into a problem, she tended to browse all the related information thoroughly once she was in the tool. Chapter 6 will provide more details of these two approaches.

Situations for Using an OTCL

Participants identified two major situations in which they would use an OTCL. One is during course design and another is during course delivery. For example, Dr. Robinson said she would use this tool to identify the possibilities for course design, and when she runs into problems during course delivery, the tool would help her "brainstorm solutions," just like "a person next door." Likewise, Dr. Smith mentioned that she would use an OTCL at the beginning of the semester while she is putting together her syllabus

and lesson plans. She would also use it when she is modifying lesson plans throughout the semester. Ms. Nelson provided a more detailed description of the two situations. She would review the courses in the tool and design her own course. Then, she would come back to the tool to see the potential pitfalls and revise her course in order to avoid the problems. She would repeat the cycle a couple of times during her course development. During course delivery, if problems come up or things fail to work, she would come back to the tool to see whether she has missed anything.

Relevance

Relevance, a dimension closely related to applicability, means having resources that can be readily adapted and implemented in fulfilling faculty tasks. Dr. Randal said that “usefulness means that I will be able to adapt it to my need,” and “if I start reading something and I don’t see how it can be applied, I really lose interest pretty quickly.” Other professors concurred. Dr. Smith and Dr. Davis emphasized the importance of accessing information on how to implement something in their situations. Dr. Smith stated, “it is one thing to hear what other people have been doing, and some of the things they face, but how you actually transfer that into your course may be something that is beneficial.” Professors’ need for relevant resources requires that an OTCL provide access to multiple types of content. The next section presents faculty perceptions of the relevant resources that they would need in an OTCL.

Relevant Resources in an OTCL

An OTCL was intended to assist professors with pedagogical issues in online teaching. However, many participants liked this tool because they thought it has the potential to serve as a gateway to all the resources relevant to their online teaching. Dr.

Campbell envisioned that the strength of the an OTCL is that it is a “one-stop shop,” where all the information related to online teaching is at one location, which could eliminate the need for faculty to search different tools. Faculty would need resources related to not only pedagogical issues, but also content and technological issues. For example, Dr. Campbell wanted to find out from an OTCL the topics other schools covered in similar courses, the text books they used, and the expectations they had for students so that she could “make sure the students who go through our programs get the same out of the course.” Similarly, Dr. Robinson loved the idea that the tool could support content sharing. She mentioned that she was always sharing syllabi with colleagues throughout the country. In addition, many participants wanted the tool to provide technological assistance to them. This theme will be elaborated in chapters 6 and 7.

Factor 3: Usability of an OTCL

Usability is another factor that has impacted the participants’ perceptions of an OTCL. Based on the ISO standard (ISO 9241-11 as cited in Frojkaer, Hertzum, & Hornbaek, 2000), usability has three dimensions: effectiveness, efficiency, and satisfaction. Effectiveness refers to the accuracy and completeness with which users complete certain tasks. Efficiency is usually measured by the amount of time it takes to learn to use a tool and complete the tasks. Satisfaction is defined as the users’ comfort with and attitude toward the use of a system. In this study, only the first two dimensions are apparent. This may be explained by the fact that this OTCL is an initial prototype, and participants were probably more concerned with how to make it work for them, rather than indicating their level of satisfaction toward this tool.

Effectiveness and efficiency in accessing the relevant information and completing the tasks would be critical in participants' decision to use an OTCL. Dr. Randal believed that an OTCL might be a useful tool as long as professors know how to access the relevant information. Similarly, Dr. Smith was concerned about how easy and fast one could retrieve the pertinent content. She stated that if it takes a long time for her to get the information she needed, she would not use it. However, if it is "easy and quick to use," it would be a helpful tool for her. Ms. Nelson and Dr. Davis expressed similar thoughts. Chapter 8 presents more details on faculty perceptions related to effectiveness and efficiency of an OTCL.

Participant Types and Their Perceptions

Although all faculty participants expressed positive perceptions of an OTCL, experienced online instructors seemed to have different perceptions as compared to novice online instructors. First, experienced online instructors better perceived the match between an OTCL and professors' apprenticeship approach to learning to teach. Dr. Robinson and Dr. Walker, two professors who clearly pointed out this connection, are both experienced online instructors. Second, experienced instructors had a more detailed and complete perception of how an OTCL could help them teach. They thought of an OTCL as a tool that provides timely support to faculty by enabling them to share online teaching experiences and multiple perspectives on online teaching. Novice online instructors such as Ms. Nelson and Dr. Davis only had a vague view of an OTCL as an experience sharing tool. Third, novice online instructors were more explicit than experienced online instructors in stating that the usefulness and usability of an OTCL would influence their decision to use an OTCL. For example, Dr. Smith and Ms. Nelson,

two novice online instructors, expressed concern of whether an OTCL would be actually useful to them and whether it would be "easy and quick to use." In several instances, Dr. Smith stated that she would not use an OTCL if it could not quickly address her needs. In spite of their concerns, novice online instructors may become more positive as they gain more experience with online teaching and start to use this tool. At the beginning of the interview, Ms. Nelson, a novice online instructor, seemed to be overwhelmed by the thought that an OTCL is another piece of software that she had to learn in order to teach online. As she started to explore this tool, her approval for it increased and she seemed to think that it would be a helpful tool if it was easy to use.

Faculty members with different levels of familiarity with case methods did not seem to have different overall perceptions of an OTCL. Dr. Smith and Dr. Davis, two instructors most familiar with case methods, did not express the greatest appreciation for an OTCL. Dr. Robinson, however, who only heard of case methods but who never used them, stated that she wished she had an OTCL "ready to go right now," because she was in a situation in which she wanted to look at examples of other professors' online teaching.

Summary

This chapter describes the three factors that contribute to the participants' overall perceptions of an OTCL. The first factor is the perception that an OTCL could support the way that professors learn to teach online. Participants believed that an OTCL could facilitate the sharing of teaching experiences among faculty, afford the dissemination of multiple perspectives on online teaching, and provide support in a just-in-time manner. However, participants' decision to use an OTCL would be impacted by another two

factors, their perceptions of the usefulness and usability of an OTCL. Some participants stated that they would use an OTCL only when it could provide directly applicable content to support their teaching and when the resources are easy and quick to retrieve.

Experienced online instructors differed from novice online instructors in their overall perceptions of an OTCL, whereas professors with different levels of familiarity with case methods did not seem to have different overall perceptions of an OTCL. The next chapter presents the tasks that participants perceived as important in an OTCL.

CHAPTER 6

TASKS FACULTY WOULD ACCOMPLISH

Introduction

This chapter presents the data that addresses the second research question. It presents faculty perceptions of the tasks that they would perform while using an OTCL. The chapter first describes the three primary tasks and two secondary tasks that faculty participants would want to accomplish in an OTCL. It then explains how applicability has driven faculty perceptions of the tasks. Finally, it discusses whether faculty members with varying amounts of online teaching experience and different levels of familiarity with case methods differed in their perceptions of the tasks that an OTCL should support.

Primary Tasks

Participants reported that they would be engaged in three primary tasks while using an OTCL: exploring different ways of teaching, discovering potential issues, and identifying problem solutions. These are the primary goals they would want to achieve with the use of an OTCL.

Explore Possibilities

Participants reported that they might use an OTCL to help them explore the different possibilities of online teaching while designing a new course. Dr. Robinson mentioned that at the beginning of the school year, she might need resources to help her set things up for a new course. She would explore all the possibilities to find out what

other faculty were doing in their class and what instructional components worked for them. At the time of the interview, she was in this situation. She just assumed a new job and was switching from Blackboard to WebCT. She wanted to review examples of online courses delivered in WebCT to see what the possibilities were. Dr. Walker also mentioned that he would explore case examples if he was beginning to teach online.

This task could also be appropriate for someone who is contemplating alternative ways of online teaching. Dr. Davis is such an example. His use of online tools has been limited to document sharing and storage. At the time of the interview, he was interested in exploring ways to incorporate group projects and discussions in his online courses.

Dr. Smith talked about the third type of situation where one might be interested in this task. Someone might explore the possibilities presented in an OTCL when s/he simply needs ideas for new and different approaches to teaching.

Discover Potential Issues

A couple of participants pointed out the need for identifying potential issues when teaching online. Dr. Smith believed that for those who just start to teach a course online, it would be important for them to understand the types of challenges they might face. Dr. Nelson provided the reason for performing this task early in teaching. She stated that instructors would need to look at potential issues so that they could avoid problems that others have encountered. Dr. Robinson shared a similar view. She talked about looking at the problems other people had so that she could include related information in her courses.

Identify Solutions to Specific Problems

Solution identification is another important task that participants discussed. They would want solutions to both discipline independent and discipline dependent problems. For example, Dr. Randal would like to know how other professors embedded critical thinking related writing assignments in online courses, and Dr. Campbell was interested in finding out how to communicate more efficiently with students in the online environment. Ms. Nelson, however, needed information about how other professors taught discipline specific topics such as indirect object pronouns in a certain foreign language.

Secondary Tasks

The data suggests that professors would need to accomplish two secondary tasks while using an OTCL: identifying technical solutions and contributing to the knowledge base. The three primary tasks can be thought of as the purposes that motivate faculty to use an OTCL, and the secondary tasks are the natural extension of the primary tasks (Figure 23). For example, Dr. Robinson mentioned that if she reviews how a professor organizes a chat session, she would want to know the details on how to implement it in WebCT; when she looks at other people’s cases or stories, she might contribute her own.

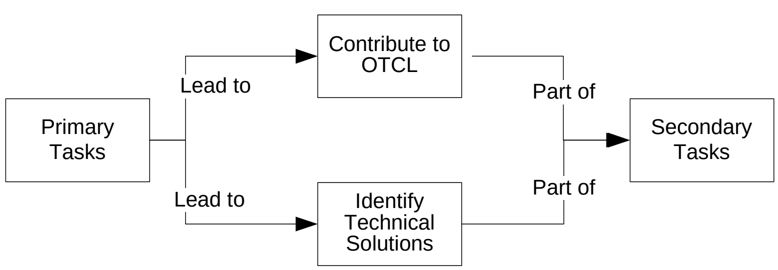


Figure 23. Relationship between primary tasks and secondary tasks.

Identify Technical Solutions

Identifying technical solutions seems to be a task significant for both new and experienced online instructors. Ms. Nelson said that the technical aspect of online teaching would be especially important for people like her, who never taught a course online before. Dr. Smith would agree. While reviewing the task model, she commented that implementation should be added as another task, because it is one thing to hear about someone's experience, and it is another thing to actually set up an online course. Experienced online instructors like Drs. Campbell, Randal, and Robinson also mentioned the significance of this task. Dr. Campbell stated that technical issues were "a point of frustration" that she had to resolve, and Dr. Randal wanted to have specific and easy-to-follow technical advices. Dr. Robinson used an example to demonstrate this requirement. She said that if she is reviewing the information on how to facilitate a chat session, she would want to know "How do I do that on my computer?"

Contribute to an OTCL

Another secondary task participants identified is making contributions to an OTCL. This task is not in the original conceptual model. Dr. Randal explicitly stated that this should be added. She identified two reasons for including this task. First, contributing to an OTCL may increase faculty reflection. Second, user contributions would make this tool a "living document" that supports sharing of multiple perspectives among faculty. She used her knowledge of medical journals to support this suggestion.

> …in medicine right now, a lot of online journals are now having sections where people can add to the article their own experience and one of the ways that helps is if you reported big success using something and I tried and doesn't work for me, then my experience probably needs to be added to that. And it would also give you a chance to develop a group of people

> who may begin working on something. So if I report back, this didn't work for me but your class is a small class, my class is a very big class, and that may be one of the reasons.

Dr. Walker agreed. With user contributions, he believed that an OTCL would have "a living growing library of information." Dr. Campbell provided an internal motivation for user contributions. She stated that adding to the knowledge base would make her feel that she could contribute to the community and her opinion counts.

However, there might be some issues with this task. Ms. Nelson stated that she probably would not contribute anything to an OTCL, because as a newcomer to online teaching, she would not have much to contribute. Time and motivation are another two issues related to user contributions. Dr. Smith mentioned that she would not post a story or comment because of the requirement of time. Dr. Robinson raised the related issue of motivation. She stated that adding a whole story requires time, so a faculty member might need incentives for making contributions. On the other hand, if they had benefited from this tool before, they might have the intrinsic motivation for doing that.

Applicability and Task Types

The previous chapter argued that applicability is a key user requirement for an OTCL. For this tool to be applicable, it should support two types of users in two situations. This section discusses how this requirement has driven professors' perceptions of the tasks they would carry out in an OTCL.

It was discussed in the last chapter that faculty participants would use an OTCL in two situations – course design and course delivery. Figure 24 shows that these two situations require professors to accomplish the tasks identified in this chapter. At the course design stage, participants might be more interested in the first two primary tasks,

whereas at the course delivery stage, they would focus more on the third primary task. Dr. Robinson commented on the first and the third tasks. She stated that she would explore the different possibilities for online teaching when she set up the course, whereas solution identification would be an interest while the course is running. Dr. Smith associated the second task with course design. She believed that it would be important for someone to understand the potential issues one might face during the course design stage.

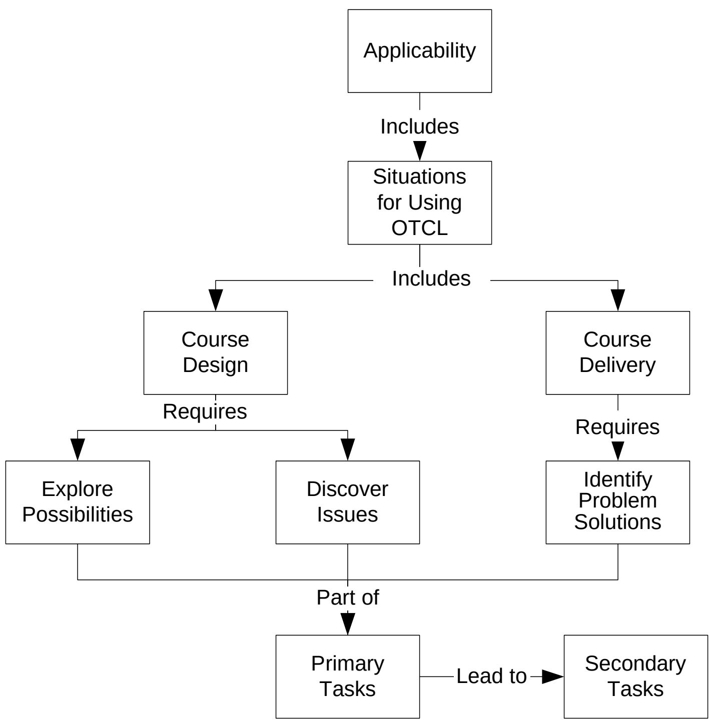


Figure 24. Tasks associated with course design and delivery.

The previous chapter suggested that an OTCL would be useful for two types of users: those who are starting to teach online and those who have already been teaching online. Figure 25 indicates that to meet the needs of these two audiences, an OTCL should support the tasks identified in this chapter. These two audiences might have different preferences for different tasks. Novice online instructors might have the

propensity to explore an OTCL with the first two tasks in mind, whereas professors who have already been teaching online might tend to perform the third task. For example, Dr. Campbell stated that the first two tasks would be appropriate for those who never taught online, whereas the third task would be for those at the "intermediate or advanced level." Similarly, Dr. Walker believed that at the beginning of online teaching, he would be more interested in looking at example cases. As he gains more confidence and becomes more comfortable with online teaching, he would look at specific issues such as how to increase participation on the discussion board and how to conduct online assessment.

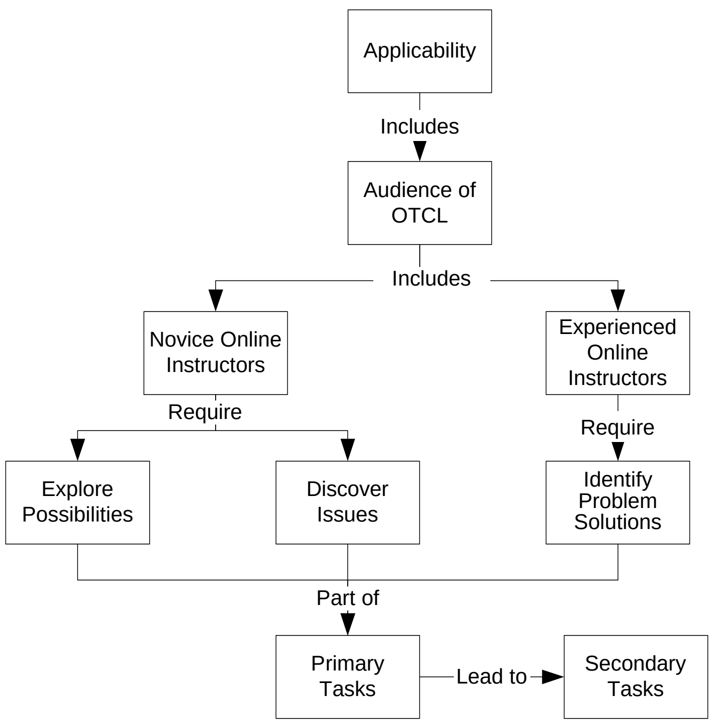


Figure 25. Tasks associated with novice online instructors and experienced online instructors.

The last chapter discussed that an OTCL should be applicable to faculty who are either proactive or reactive when using resources. Figure 26 illustrates that an OTCL should support these tasks to satisfy the needs of faculty with different preferences. When

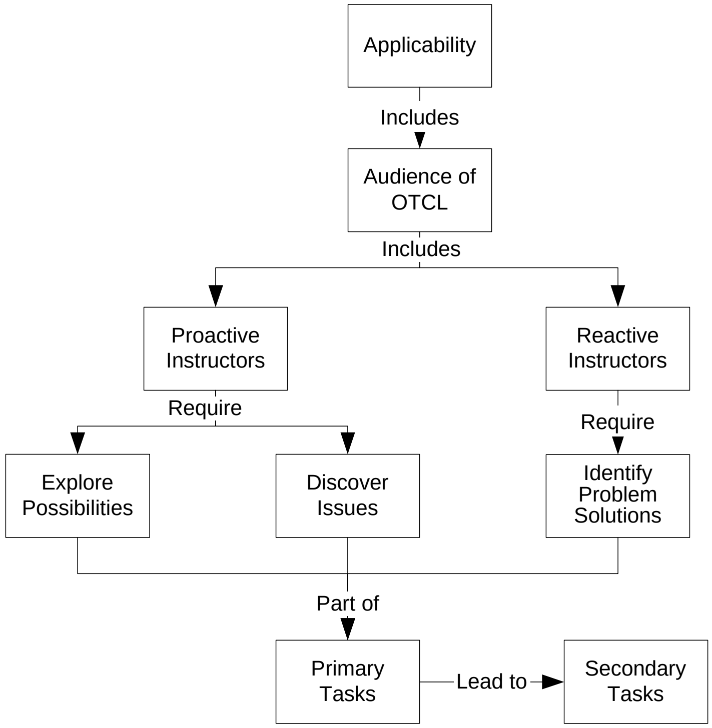


Figure 26. Tasks associated with proactive instructors and reactive instructors.

designing an online course, professors who are proactive might start with task one and two to explore the possibilities and problems, whereas some more reactive faculty might jump into designing their own course and they would not use an OTCL until they come across a problem. Dr. Nelson is this type of person. Even though she is new to online teaching, she thought she was prone to the third type of tasks. She claimed that she tends to look for help only when she has problems. She described herself as “the person who tends to just cheerily go along down my little path until I hit a problem and then I want to look around for some help.” Dr. Robinson seems to be a more proactive person. Although she has a lot of experience teaching online and she did mentioned that she might look for solutions to address specific issues while teaching a course, most of her comments focused on the first two tasks, exploring possibilities and discovering issues. She

preferred using case browse or topic browse to access the content, partly because she wanted to be open to “the different possibilities that are out there.” Dr. Walker summarized these two different preferences.

> I think about …how different people approach problems, for example, putting together a bicycle. There are some people who kind of glance over the information, and kind of jump into doing it, and will refer to the manuals …whenever they need help; there are other people (who) read through it, and go pretty much step and step, based on the suggestions of the experts. So it’s dealt with in some cases as an introduction and as a reference. And in other cases, (it is) dealt more as a manual to follow, a step-by-step thing.

Participant Types and Their Perceptions

Participants with different amounts of online teaching experience had different perceptions of the tasks. The previous section discussed that novice online instructors might focus on exploring possibilities and identifying issues in online teaching, whereas more experienced online instructors would tend to use an OTCL to identify solutions to specific problems. However, this difference may not always be true. Another factor, professors’ proactive or reactive approaches to using resources, might also have an impact on the types of tasks that they would complete. Moreover, experienced online instructors might be more interested in adding stories and comments than novice online instructors. For example, Ms. Nelson stated that she would not contribute to an OTCL, because with limited online teaching experience, she would not have much to share. Participants with different levels of familiarity with case methods did not seem to have different perceptions of the tasks.

Summary

This chapter presents the tasks that professors would perform with the use of an OTCL. They would carry out three primary tasks in an OTCL, including exploring possibilities, discovering issues, and identifying problem solutions. While professors are performing the three primary tasks, they might also want to contribute to an OTCL and identify the technical solutions associated with their tasks. These are the secondary tasks that professors may want to accomplish in an OTCL.

Applicability is a faculty requirement that has driven professors' perceptions of the tasks that an OTCL should support. Participants perceived that an OTCL should be applicable to both proactive and reactive instructors with varying amounts of online teaching experience, and it should support both the course design and delivery stages of online teaching. This requirement is reflected in the types of tasks deemed as important in an OTCL.

Novice online instructors differed from experienced online instructors in their perceptions of the tasks that they would complete in an OTCL, whereas professors with different levels of familiarity with case methods did not seem to have different perceptions of the tasks. The next chapter presents faculty perceptions of the types of content they would need from an OTCL.

CHAPTER 7

TYPES OF CONTENT FACULTY WOULD REQUIRE

Introduction

This chapter presents the data that addresses the third research question. It describes faculty perceptions of the types of content that they would need in an OTCL. The chapter first describes the two primary and secondary types of content that faculty participants would require to carry out the tasks. The primary types of content consist of cases and topics, and the secondary types of content include technical resources as well as user stories and comments. It then explains how relevance has driven faculty perceptions of the types of content that they would require. Finally, it discusses whether faculty members with varying amounts of online teaching experience and different levels of familiarity with case methods differed in their perceptions of the content that an OTCL should provide.

Primary Content Types

Participants perceived that they would need two primary types of content from an OTCL: cases and topics. The following sections describe the components of these two content types.

Cases

Participants would require three main components from a case: case background, case details, and the lessons that the instructor has learned from teaching this case.

Case Background

In this OTCL, case background is presented as part of the case description. It includes information such as the college and school where the course is taught, instructor's online teaching experience, student level, and background information such as the developers of the course. Participants perceived that a case background could give them a sense of how their own situations match up with the case described in the prototype. Dr. Campbell discussed how she would use the background information.

> …it tells me oh, I am novice, this person is a novice, they might have something that I am encountering, let me see how they solved it and see what the result is. At the same time, I might be a novice, and I might see an expert here, oh, this person has been doing this for a long time, let's see what advice they have to offer. So I like the fact that is stated right there.

Dr. Walker even suggested that an OTCL include the instructor's teaching philosophy because it could give him an idea about how this professor's approach to teaching is similar to or different from his.

However, several faculty participants stated that some background information could be secondary or even irrelevant as compared to the description of how a professor actually taught a course. For example, Dr. Randal was concerned that certain background information might discourage faculty from reusing some strategies, when in fact these strategies could be applied to their situation.

> I've been teaching online for a long time, so if you said my online teaching experience would likely be advanced, many of the things that I use, you could do the first time you ever taught an online course. So if I were going through this and I were new instructor and it said advanced or intermediate, I would skip right over, I would say oh, this is not for me, this is for someone who has already done this.

Case Details

In this OTCL, case details are provided in the case description, including a brief overview of the type of learning outcomes, class activities, and the course outcome. A link to the course Website is also available. The data suggests that case details be organized into learning outcomes, teaching strategies, and class effectiveness.

Participants perceived that case details constitute a very important content component. Dr. Nelson stated that “how you go about doing this course and what you do in the course” is the “meat of what’s going on here”, and she was “interested in what they are going to cover and how they are going to cover it” in relevant courses. Other faculty participants expressed similar interests. The following paragraphs presents the three components deemed as important by faculty participants.

Learning outcomes. A theme that is consistent throughout Dr. Walker’s interview is the emphasis on learning outcomes. In several instances during the prototype exploration, he stated that he wanted to see specific learning outcomes that indicate exactly what students did in the class. For example, if the goal of a course is for students to learn about class design, then learning outcomes should have active verbs stating what students are expected to do, such as evaluating courses or designing courses. Dr. Walker’s background in education and his work on faculty teaching improvement may explain his detailed comments on learning outcomes. All other participants believed that the learning outcome is an important component in an OTCL, but their comments are not as specific as Dr. Walker’s.

Teaching strategies. The teaching strategy is another component emphasized by all participants. They wanted to have detailed and specific information related to the teaching strategies employed by the instructor described in an OTCL. They provided three reasons for including this component. First, teaching strategies, as well as the related assignments and activities students are engaged in during the class, are part of what Dr. Nelson called the "nuts and bolts" of teaching and what Dr. Walker has been trying to help faculty to focus on. Second, participants wanted to see how other professors designed assignments and activities to carry out their teaching strategies because these are not easy tasks. Dr. Randal stated that designing "an effective assignment" is "one of the hardest things to do." She gave an example to show the importance of designing unambiguous assignments.

> If you work really hard at it and if you have a good fit, students would do 120% because they would do more than what the assignment actually requires. But they still need to know what the assignment is. Because if you have, if you stress this, set the tone for discussion with the initial activities and you send out eight emails the first week, telling students, watch for this, go do this, the books are around, all kinds of things. And then you say, your discussions need to focus on issues and not on personality, all these things, but you never tell them how many postings you expect or give them real guidelines for what a good posting is and how they will be evaluated. You may have someone who puts in 500 postings that don't mean anything but they think quantity is important because you send out eight emails the first week.

Another difficult aspect related to designing assignments and activities is to assess the amount of time it would take to set up and complete them. Dr. Robinson and Dr. Randal wanted to see time estimates in other professors' courses, because they sometimes overloaded their students without realizing it. Third, faculty participants needed the details and specifics about teaching strategies in order to understand how they were implemented. While reviewing the synopsis of a problem solving activity in this OTCL,

Dr. Robinson stated that she wanted to see what problems the instructor used, what documents and questions s/he posted, how the activity was set up, and what the discussion forum looked like. She said, “I’m such a visual learner. I need to see it in order to really understand it ... Only reading it would be really difficult for me to have an accurate picture of what’s going on.”

In addition to assignments and activities, student assessment is another component critical in understanding someone’s teaching strategies. Several participants talked about it. For example, Dr. Randal wanted the student evaluation component to be included in assignment descriptions. Dr. Walker had more explicit suggestions on this issue. He recommended that an OTCL show the types of assessments and evaluation rubrics used by professors.

Course effectiveness. Dr. Campbell provided the reason for including this component. She believed that the purpose of cases studies is to share what other professors learned from teaching certain courses. She wanted to know what worked and what did not work for them. Information on course effectiveness could provide this information.

A couple of participants emphasized that they wanted specific and measurable descriptions of class effectiveness. For example, Dr. Randal was interested in finding out the percentage of students who achieved certain goals, the products they delivered, and the national criteria the course met. She held that it was not useful to present information that was not measurable. Dr. Campbell concurred. She said,

> ‘It was impressive’ (She read the text on the screen), but what part of it was impressive, you don’t know. Here, ‘the class had quality products’ (She read the text on the screen), we do not know what quality is, and what was used to gauge the quality and that kind of thing.

Lessons Learned

In this OTCL, the lessons that the course instructors have learned from teaching the course are presented in the format of a problem, a solution, and outcomes. Participants were very interested in the lessons. They suggested several reasons for including this component in an OTCL. First, the lessons that professors learned from teaching online courses would provide other faculty with certainty in online teaching. Dr. Campbell stated that an OTCL would give the user support and awareness that s/he is "not the only one encountering this issue." Similarly, Dr. Smith maintained that "learning what others have gone through definitely mitigates the uncertainty surrounding the course." Second, Dr. Campbell and Dr. Nelson mentioned that the lessons learned section would be one of the most useful components in an OTCL, because it could help the instructors "take advantage of somebody else's experience" instead of "reinventing the wheel." Third, sharing lessons learned among faculty is an area that has been ignored. Dr. Robinson stated that she thought it would be really helpful to have this component, because "many times part of what you never hear about is what happens if you ran into this certain difficulty." Dr. Walker would agree. He believed that this issue could be addressed, especially with the help of technology.

> A colleague that I worked with a few years ago, when he retired he said "the saddest about my retirement is I leave no legacy and whoever takes my job is going to have to learn the same lessons that I have learned."… that's not necessary, especially with the technology we have today.

Participants conceptualized the lessons learned component as professors' reflections of their experiences. Dr. Campbell considered it as "a kind of a journal, where people document their experiences." Dr. Smith said that this component reminded her of

a course portfolio where instructors “were assessing what went right, what went wrong with the course.” This perception contributes to the following requirements of what should be included in this component.

Participants generally liked the organization of this component in this OTCL, which includes the problem, the solution, and the outcome. Dr. Robinson stated the structure of lessons learned is “very to the point.” However, participants made several suggestions to improve this component in the prototype. First, more details about the solution should be provided. Dr. Campbell explained that she would need more details to understand how the solution led to the outcome.

> It says here “I learned that the best way of coaching students was to model the behaviors myself” (She read the text on the screen)… but we don’t know how that information was translated to the students. Like if I say “I model it”, does it mean that I said “everybody look at me, this is how it is done.” Or does it mean I have to go in and tell them individually… “please avoid using ‘I agree,’ ‘I disagree.’” So it doesn’t give me the exact (of how the professor has modeled the behavior)… We are introduced to the solution, but we are not told how that solution is really transitioning into the outcome.

Second, outcomes should be measurable. Both Dr. Randal and Dr. Campbell talked about the importance of including measurable outcomes. Dr. Randal held that it is not useful to “have things that you can’t measure, or assess, or work with.” This comment is consistent with their observation that the description of course effectiveness should be measurable. Third, it would be important to discuss both the positive and negative aspects of the outcomes and what the instructor planned to do in the future. Dr. Randal pointed out that a solution usually has both positive and negative outcomes. It is important to know what both outcomes were and what the instructor would want to do in the future.

> I think it would also help to have what you plan to try next, because I think the person who’s had the experience may also have an idea for the

> next thing to try. And it could also make it more interactive because then other people could get their feedback on what they will try next and whether they had the same problem.

Dr. Davis concurred. He stated, “I would like a sentence from the instructor, ‘yes I would use this again,’ ‘no I would not’ and ‘if I will, what changes I might make.’ Fourth, Dr. Walker stated that the lessons learned section only has the instructors’ perspectives, and it would be interesting for him to see students’ perspectives of the issue too.

Topics

In the original content model, a topic has two components: theoretical perspectives and stories. These components have been confirmed in the data. Dr. Randal and Dr. Smith stated that it would be important to include both sections in presenting a topic. Dr. Randal explained that the theoretical aspect would assist her to determine how to help people learn, whereas the practical examples would “put things into practice.”

Theoretical Perspectives

Several participants mentioned the importance of including theoretical perspectives in the topics. Dr. Robinson commented that viewing the theoretical perspective at the beginning of a topic page could “get your mind set.” Both Dr. Smith and Dr. Campbell asked for more theoretical background about the stories. Dr. Campbell stated that the theoretical perspectives should be elaborated because someone who is not familiar with these perspectives would need to have more details in order to understand them.

Stories

Most participants maintained that stories are more relevant to them than the theoretical perspectives. Dr. Robinson stated that “the stories are more what I would be

looking for immediately.” Dr. Nelson commented that “theories just go over my head some days.” Dr. Davis could not agree more.

> …it is where (the) rubber meets the road… Theory is wonderful in lots of instances, but these are the people who stand in front of the classes and who are addressing a problem in a current, real-time environment. And I like to know how they handle it. I think that’s something we all share together.

Dr. Walker provided an explanation for faculty preference for stories. He suggested that authenticity in the stories is what makes the stories special.

> It makes it personal, and gives it a ring of authenticity. What I think a lot of us are used to seeing is a list of helpful hints, do this, do this, do this, do this. And that may be ok but having someone personalize it – I was facing that problem, here is what I did with it – Oh, Ok, and now I can take from it, that sounds like … something that will work for my students, or it doesn’t. But I know that it is a real suggestion that someone really used, as opposed to the authors storming out ideas. So the authenticity of it is what strikes me.

Dr. Robinson especially appreciated the multiple stories associated with each topic. She thought that the topic would be presented in the question and answer format, but it turned out that each topic has a series of different answers embedded in stories. This was a nice surprise to her. She stated that providing multiple perspectives would be “incredibly helpful,” because if the user has already tried some answers that did not work, s/he could try something else.

Secondary Content Types

The content model developed during the conceptualization stage consists of only the two primary types of content: cases and topics. The data suggests that two secondary types of content, technical resources as well as user stories and comments, be added to the content model. This section presents the secondary types of content.

Technical Resources

The first secondary content type faculty would need is technical resources. This finding is unexpected. As noted in the last chapter, this project was intended to provide pedagogy related resources, whereas participants wanted this tool to be a "one-stop shop" where they could access all the resources on online teaching, including technical support. Dr. Robinson discussed the linkage between technical and pedagogical issues, which helps explain why professors may need technical resources in an OTCL.

> But the technical aspects are so often linked to pedagogical types of issues such as how I bring a guest speaker into the room, what would you do? What's the scenario if someone brought in a guest speaker? How do they handle it? How do they set it up? What do they do with the students? What were the expectations? So it's both technological and pedagogical, because you have to think about what's the purpose, and how do they handle that, as well as, like for me, I need to even know, is it a possibility, because could I have that type of learning taking place in my classroom or not.

For technical resources, participants would need explicit instructions on how to implement something online. Dr. Randal stated that the usefulness of an OTCL would depend on whether she could easily adapt something to meet her needs.

> It will have to have the components that tell me exactly what to do. It wouldn't do me any good just to see it. I would need to know that, you know, this is the form you fill out to make this happen, you know. These are the limits to what you can do. That kind of thing. It wouldn't help me just to see what someone has done and then have to try to figure out what technology can make it happen.

User Stories and Comments

User stories and comments are another type of secondary content as a result of the user contributing to an OTCL. Participants described the types of stories or comments they would contribute. When she was reading the "getting to know you" activity in this

OTCL, Dr. Randal stated that she might have another activity that she would want to add as a story, or she might add a comment stating that the activity posted would work better for her if it was modified in a certain way. Similarly, Dr. Robinson talked about the types of comments she might add. When she was reading a case about requiring students to post their writings on the Web, she wanted to contribute a comment on this.

> But what I found out is, so the students post it, big deal, they might just as well give me a hard copy and put in my office because what's the purpose of posting if no one is going to look at it or no one is going to make sense of it. So I would make the comment that you might consider after posting, you might want to require your students to read two people's postings and to respond or something like that.

Dr. Davis mentioned another type of comments he may contribute. If he is unclear about the story or needs more information about what the storyteller has learned, he might post a comment.

Relevance, Tasks, and Content Types

Chapter 5 discussed that relevance is a key user requirement for an OTCL. For this tool to be relevant, it should be a "one-stop shop" to provide the users with all the resources that could be readily adapted in completing their tasks. This section discusses how this requirement has driven professors' perceptions of the types of content that an OTCL should offer (Figure 27).

As a "one-stop shop" of online teaching resources, an OTCL should offer both primary and secondary types of content to help professors accomplish the primary and secondary tasks. The following paragraphs describe the connections between the tasks and the types of content.

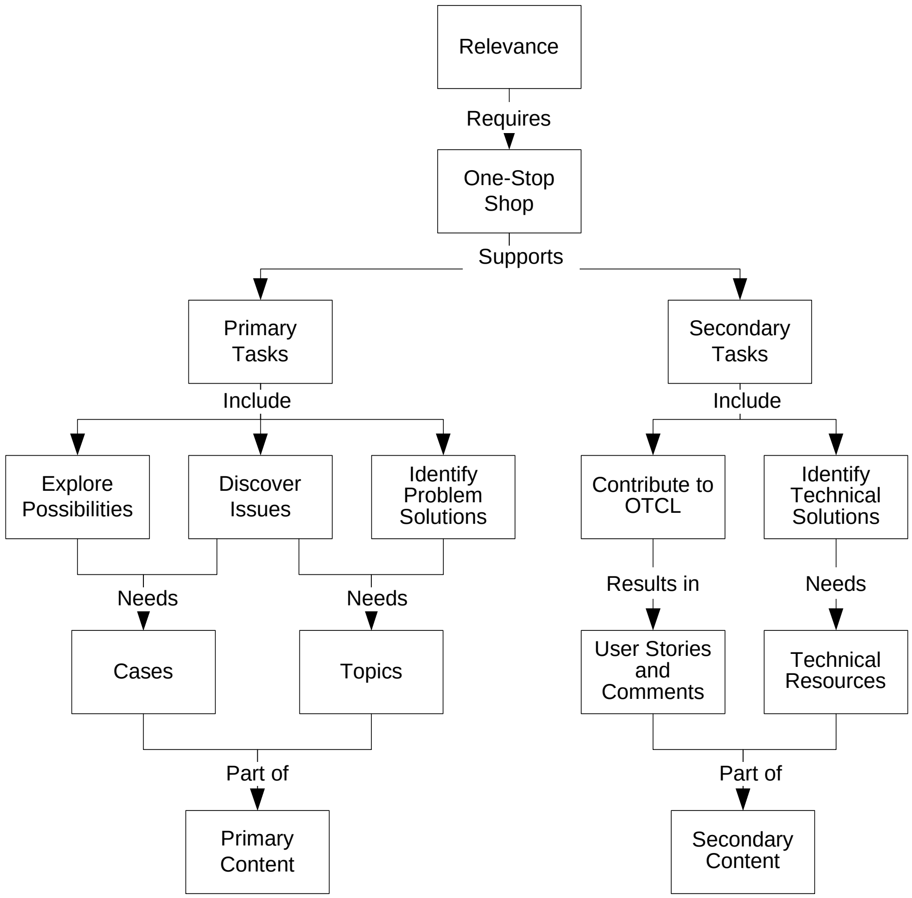


Figure 27. Relevance determines content types.

Professors associated the first primary task, exploring possibilities, with the first type of primary content, cases. Dr. Robinson commented that cases would be most useful for her when she explores the possibilities in setting up her courses. Likewise, Dr. Walker stated that he would look at case examples at the beginning of teaching a course online.

Dr. Robinson seemed to think that topics would be useful for her during both issue discovery and solution identification. She viewed the topics mainly as a component that could help her trouble shoot. However, she stated that while exploring potential issues, she would also browse topics to see what problems she might have so that she

could include related information in her course. Dr. Nelson would agree. She believed that taking a proactive approach to problem solving would help faculty avoid some problems although personally she tends to look for resources only when she encounters a problem.

> So you know what to give to students for criteria. And the more you can put there for them to see, the less you have to do over and over. The less remediation you have to do later if you have the warning there at the beginning for them. Do this, and I'm going to do this. You do this, and I'll be evaluating you this way, or I'll be reacting to you this way.

Two secondary content types, technical resources and user contributions, are needed to help professors implement courses or solutions online or contribute to an OTCL.

Participant Types and Their Perceptions

Participants with different amounts of online teaching experience perceived the content types a little differently. Most participants did not specifically comment on this. The only evidence is a statement that Dr. Walker made. He said that at the beginning of online teaching, he would tend to look at examples of cases, and as he becomes "more comfortable and more competent," he would be more prone to examining topics. Participants with different levels of familiarity with case methods did not seem to have different perceptions of the content types.

Summary

This chapter presents the types of content that an OTCL should provide. Professors would need two primary types of content in an OTCL, including cases and topics. While they are reviewing these two types of content, they might also want to examine the secondary types of content: user contributions and technical resources.

Relevance is a faculty requirement that has driven professors' perceptions of the types of content that an OTCL should offer. To be relevant to users, an OTCL should provide access to all types of content needed to support the tasks that professors would accomplish in an OTCL. They would need the primary types of content to carry out the primary tasks, and the secondary types of content to complete the secondary tasks.

Novice online instructors differed from experienced online instructors in their perceptions of the types of content they would need, whereas professors with different levels of familiarity with case methods did not seem to have different perceptions of the types of content. The next chapter presents faculty perceptions of the features that an OTCL should provide.

CHAPTER 8

FEATURES FACULTY WOULD NEED

Introduction

This chapter presents the data that addresses the fourth research question. It describes professors' perceptions of the features that they would need in an OTCL. The chapter starts with a report of the functional and non-functional features that an OTCL should offer. It then discusses the factors that have influenced faculty perceptions of what features an OTCL should provide. The chapter ends with a discussion of whether faculty members with varying amounts of online teaching experience and different levels of familiarity with case methods differed in their perceptions of the features that an OTCL should provide.

Functional Features

Chapter 1 discussed that system features can be categorized into functional and non-functional features (Kang et al., 1998). Functional features enable the users to accomplish their tasks. In this study, professors' discussions of functional features focus on content access features and user contribution features. Content access features are those that provide professors with access to the content in an OTCL. User contributions features allow faculty to add stories or comments to the tool.

Content Access Features

This section describes faculty perceptions of the content access features. First, it presents multiple features required to retrieve the primary types of content. Then, it discusses two features that allow access to the secondary types of content. Finally, it describes the internal and external links that enable flexible navigation.

Access to Primary Content Types

There are three reasons for providing multiple tools for faculty to access the primary types of content. First, participants had preferences for different features. For example, Dr. Robinson claimed that browsing is her favorite tool to access both cases and topics, whereas Dr. Nelson and Dr. Campbell liked to search cases on multiple criteria.

Second, participants tended to follow a pattern of navigation, which starts with a preferred feature and then changes to other tools if necessary. For example, Dr. Nelson stated that when she searches for a case, she would start with case search. If her results need to be broader, she might change to case browse; if she wants to be more specific, she would use keyword search. Participants reported similar patterns for accessing topics. Dr. Smith and Dr. Robinson stated that they would prefer to begin with topic browse. If they could not find the information they needed, they would conduct a keyword search.

Dr. Smith provided the third reason for offering multiple features to access the primary content. She anticipated that the features she might need would be driven by her objectives at the time when she uses an OTCL. Dr. Robinson seemed to agree. She stated that if she wants to explore all the different possibilities, she would browse cases; if she already knows exactly what she wants her students to do, she would search for cases. Dr. Walker used an analogy to summarize the need for multiple content access tools.

> I tend not to pick up a dictionary and start looking at the A's and the B's and the C's. When I grab a dictionary, I look for something very specific. On the other hand, when I am learning something new, I pick up the textbook, I might browse through the book to see what strikes me as being important... So… different tool(s) (are required) for different tasks. And I need the multiple tools.

Table 10 shows that the following factors may impact faculty choice of content access features: number of cases or topics in an OTCL, users' prior experiences with keyword search, whether users have specific/cases or topics that they want to examine, whether users have appropriate keywords in mind, openness to possibilities, and specific vantage point to look at content. The following paragraphs present how these factors would influence faculty choice of the content access features.

Table 10

Factors Impacting Faculty Choice of Content Access Features

	Case Browse	Topic Browse	Case Search	Topic Search	Keyword Search for Cases	Keyword Search for Topics
Number of cases or topics	x	x	x			x
Prior experiences with keyword search	x	x			x	x
Specific cases/topics in mind	x	x	x	x		x
Appropriate keywords in mind		x	x	x		x
Openness to possibilities	x					
Specific vantage point to look at content	x					

Case browse. In this OTCL, case browse allows users to look for a case based on criteria in one of the following dimensions: subject matter, learning outcomes, instructional strategies, or student type (graduate or undergraduate) (see Appendix M). Multiple values are available for them to choose for each aspect. For example, users can select "business" as the subject matter to browse cases in this content area. The values for each of these dimensions are provided in Appendix N.

Participants perceived that they would use case browse in the following situations. First, browsing would be appropriate when there are limited number of cases in the content area taught by the user. Dr. Randal was teaching interdisciplinary courses. She was concerned that there might not be many courses exactly similar to the ones she was teaching. In that case, she would use case browse to look at cases in related disciplines. Second, faculty members' prior experiences with keyword search might encourage them to browse cases. Dr. Robinson reported that she liked to browse cases because of her frustration with keyword search. Keywords could be set up in so many different ways that a person might search for something that did not exist in the tool. Third, case browse would be useful for instructors who do not have a specific type of courses in mind. Dr. Smith would like to browse cases because she thought "sometimes you don't know what exactly you are looking for." Fourth, case browse would provide flexibility and allow participants to see all the possibilities. Dr. Robinson wanted to be open minded when exploring different ways of teaching a course. Case browse would help her "see the spectrum of what other possibilities are here."

> I have a new course, what might I do with it? I personally don't want to close my mind to the different possibilities that are out there. If I only select three things, then I may not find these other five great things I could have done with my students.

Likewise, Dr. Nelson mentioned that sometimes she wanted to browse cases to see all the options. Fifth, browsing would allow participants to review cases from a certain standpoint. For example, Dr. Smith stated that if she had specific learning objectives in mind, she would browse cases to find out what other professors did to accomplish these objectives.

Keyword search for cases. In this OTCL, keyword search for cases (see Appendix O) resembles the keyword search feature commonly found in search engines where the user types in one or multiple keywords of their own choice and the system returns a list of results. For example, a user interested in graduate level management courses that focus on group work may type in keywords such as “graduate level management course group work.”

Participants had a few comments on keyword search for cases. These comments were all negative. The concern was based on their previous unsuccessful experiences with keyword search. They were worried that the mismatch between the keywords that they would use and the ones available in the tool would lead to poor search results. For example, Dr. Robinson expressed concern that with keyword search she could only search for the few keywords that someone determined for the cases rather than searching the whole body of the case. Dr. Randal pointed out that the issue with keyword search is that the user would not know what keywords were available. She said that in her discipline, this issue has been addressed by providing vocabulary lists for the user to use in keyword search. If this feature is incorporated into an OTCL, keyword search may be replaced by case browse or case search, because when keywords are available for

keyword search, this feature will be equivalent to case browse and case search, which is described below.

Case search. In this OTCL, case search enables users to search for a case based on criteria in several of the following aspects: subject matter, learning outcomes, instructional strategies, and student type (graduate or undergraduate) (see Appendix P). A list of values is available for them to choose for each aspect. It differs from case browse in that it allows the user to search for a case on multiple rather than a single criterion. For example, a user can search for undergraduate cases in the area of social sciences that use simulation as an instructional strategy.

Participants described several scenarios in which they would use case search. First, this feature would be useful if there are a large number of cases in an OTCL. Dr. Randal stated that if there are many cases in an OTCL, browsing would be overwhelming and it would not help the user identify the relevant cases; instead, case search should be more appropriate. Similarly, Dr. Campbell believed that case search would be the most useful feature for her because if there are "10 thousand resources out there," this feature could help her find the ones pertinent to her. Second, case search would be useful for instructors who know exactly what types of cases they are seeking. In that situation, they could use case search to retrieve cases most relevant to them. For example, Dr. Campbell stated that if she already knows the requirements and the context of her course, she would conduct a case search to access the most relevant ones. Dr. Randal and Dr. Davis shared similar views. Third, instructors who did not know the correct keywords that they could use to conduct a search might find case search useful. Dr. Robinson said that she likes to

have the choices available in case search, because with keyword search, she might find nothing relevant because she might choose keywords that do not exist in the tool.

A feature closely related to these three content access tools is case search results (see Appendix Q). After the user conducts case browse, keyword search, or case search, this OTCL take them to case search results. The next paragraph presents faculty perceptions of this feature.

Case search results. Dr. Walker provided a succinct description of the role that case search results plays. He stated that “it summarizes the choices I have made, but it also gives me a more holistic view of those factors put together.” Participants used this feature to help them evaluate the relevance of the results and determine which cases to examine. For example, Dr. Davis thought that the list of results provided a “synopsis” for him to “ferret out” and determine which cases to concentrate on. Dr. Walker stated that the results gave him an idea of whether “this sounds like or doesn’t sound like the pedagogical components that would be important” to him. Other participants also reported that they used this feature to identify the most relevant cases from the search results.

Topic browse. In this OTCL, topic browse (see Appendix R) allows the user to access a list of common topics and navigate to the subtopic that is of interest to him/her. For example, in the second scenario, the user can choose the common topic “Collaboration and Interactions” and then navigate to view the subtopic “Facilitating Student Online Discussions.”

Participants provided a list of situations for using topic browse. First, this feature might be appropriate when there is limited information in an OTCL. Dr. Davis stated that

if there are not many relevant topics in an OTCL, he would browse them; otherwise, keyword search would be more appropriate. Second, faculty members who have poor prior experiences with keyword search might prefer to use topic browse. Dr. Robinson talked about how she recently failed in looking for an article on the Internet using keyword search and she has a preference for browsing rather than searching because of experiences like this. Dr. Davis would agree. He stated, “I don’t tend to have much luck with keyword when I search by that. I usually get back nothing relevant really.” Therefore, “practically speaking,” he would browse topics. Poor experiences may also explain why Dr. Smith was suspicious of “how extensive the keyword search is.” Third, topic browse would be appropriate for professors who do not have any specific keywords or topics in mind. To successfully use keyword search, one would need to know the appropriate keywords, whereas in topic browse a list of topics are available. Dr. Nelson stated that she liked the list of topics, because as a “newcomer” to online teaching, she would not know what keywords to use. Topic browse would also be a good tool for faculty who do not have specific topics in mind. For example, Dr. Campbell wanted to browse topics simply to see what was out there.

Keyword search for topics. In this OTCL, users can conduct a keyword search for topics just like they can do a keyword search for cases (see Appendix O). They can search on a single keyword or multiple keywords. For example, for scenario two (see Appendix D), they can access the needed content by typing keywords such as “discussion board meaningful contribution.”

Participants perceived that keyword search could be used to access topics in the following situations. First, Dr. Davis stated that if there is a lot of “inventory” of

information in an OTCL, he would use keywords to search for topics. Second, several participants, including Drs. Campbell, Robinson, and Davis said that they would use keyword search to look for topics if they have a specific purpose, such as searching for answers to a specific question.

However, many participants had concern with keyword search because of two reasons. First, as discussed in the previous section, several participants had poor experiences with keyword search in the past. Second, participants did not know what keywords to use. Drs. Smith, Robinson, and Nelson all mentioned this problem. To address this issue, Dr. Walker suggested that a list of keywords be provided so that the users can choose the ones appropriate for their purposes. Dr. Randal had a similar recommendation when examining keyword search for cases. However, when the keywords are provided, this feature will be the same as either topic browse or topic search. Topic browse allows the user search on one criterion, whereas topic search enables searching on multiple criteria. Future research may examine whether keyword search for topics should be replaced by topic browse and topic search.

Topic search. This feature is not included in the original conceptual model of features. It may be added as a feature with which the user can search on multiple criteria for topics. There are two reasons for this modification. First, Dr. Campbell suggested that the user might need this feature to quickly access specific topics such as how to facilitate collaboration among a certain type of students. With topic search, the user could search on two criteria: collaboration and student type. Dr. Robinson disagreed with Dr. Campbell’s recommendation. She believed that a topic was more categorical than the little specifics. However, some of the issues that participants wanted to resolve with the

use of this OTCL were indeed very specific questions that needed to be retrieved on multiple criteria. For example, Dr. Nelson was interested in finding out how other professors taught content such as indirect object pronouns in a foreign language, and Dr. Randall needed information on how to embed writing assignments when teaching critical thinking skills. In those cases, one can argue that topic search could be a useful feature. The second argument for including topic search as another content access feature is that it can address the weaknesses of keyword search. As reported in the last section, participants did not know what words to use for keyword search and Dr. Walker suggested that a list of keywords be provided. Topic search would meet the needs of participants who wanted to do a keyword search on multiple criteria but who needed a list of keywords from which to choose.

Topic search results. After the user conducts a keyword search or topic search, this OTCL can take them to topic search results (see Appendix S). The following paragraph presents faculty perceptions of this feature.

Similar to case search results, topic search results helped participants select the information that they would review. The few comments that participants made on this feature focused on how to organize the page to facilitate quick access to the related results. For example, Dr. Robinson suggested that each search result take up only one row, so that more results could fit on one page.

Access to Secondary Content Types

The following paragraphs present faculty perceptions of what features they would need to access the secondary types of content in an OTCL. These features included links to technical resources and access to user contributions.

Links to technical resources. As reported in the last chapter, several participants expressed the need for technical resources related to how to implement courses and related problem solutions online. Dr. Robinson had a specific idea about how to integrate the technical part of online teaching to an OTCL. She anticipated that when she needed information on how to implement something in WebCT, she could click on a link to access relevant WebCT resources.

Dr. Walker had a different perspective on this. He believed that the technical aspect should not be of immediate concern at this stage of the development for an OTCL, because it is a totally different area from the focus of an OTCL.

> …the question is how deep or how wide…(Adding the technical resources) is getting into broader applications, which is fine, but if it is not sufficiently deep enough, then you don't want to promise too much and not be able to deliver on various areas. So I think (you need to) keep it focused the way you have it right now and make it rich and deep and useful. And then you can expand it.

Access to user contributions. Dr. Campbell was the only one who described her vision about how user comments could be accessed. She stated that on the topic page, user comments could be grouped and associated with specific stories.

> So you would have story number 4 (point to story 4), and responses to story number 4 (point to the space underneath story 4); then story number 5 (point to story 4), and responses to story number 5 (point to the space underneath story 4).

Internal and External Links

When asked, "What did you find to be the most useful feature?" Dr. Randal said that she liked the interrelationship and the "circular link" that allowed her to go back and forth to gain more than what she had expected to learn when coming to an OTCL.

Participants made specific comments on three types of internal links in this OTCL: links from cases to topics, from topics to cases, and from summaries to examples and elaborations. They also asked for external links to outside resources. The following presents participants' perceptions of these links.

Cases to topics. When discussing the most useful component in this OTCL, Dr. Walker talked about the strength of connecting cases with topics.

> … the topics don't hang together until you put them in a context of teaching… the topics are going to be useful, but their usefulness is because it's understood in a class…for example, (the topic of) group work (is) related to a disciplinary area, related to learning outcomes, related to assessments, so it's … contextualizing topics in the cases. I think it is the powerful thing you are adding.

In this OTCL, if a user is interested in a lesson that the instructor of a course has learned, s/he can navigate to the topic related to this issue (see Appendix U). For example, in a case described in this OTCL, one of the lessons the instructor has learned is about her experience in developing cooperative group skills among students. The user can click on a link on this page to read more on this topic. Most participants liked the idea of accessing the topics associated with a specific case. They provided two reasons. Dr. Walker said that if he came to the case from the standpoint of looking at how to address a specific problem such as group learning, he would "look at ways folks did group learning in a whole bunch of different contexts." The connection between Cases to Topics would be useful in this situation. This is similar to the findings in the information seeking literature that a user may shift information seeking purposes during Web searching (Sawasdichai & Poggenpohl, 2002). A faculty member may start with the purpose of exploring the possibilities for teaching a course, and then shift the focus to a specific issue. This pattern of behavior was evident in Dr. Randal's comments. While reviewing a

list of cases on the case search results, Dr. Randal stated that she wanted the keywords to be highlighted and linked to related topics. For example, if she was examining a case that employed case study as a teaching method, she would expect the keyword “case study” to be a hyperlink, so that after she finished reviewing the case she might click on this link to explore various perspectives on the use of case study as an instructional method.

Dr. Campbell provided a different reason for linking Cases to Topics. She stated that it was important to make the connection, because a case was one person’s experience, whereas topics were backed up by “resources and references”, and they described the consensus of many people.

Topics to cases. In this OTCL, a topic usually has a series of stories illustrating several professors’ experiences related to the topic. A hyperlink is available for the user to navigate from a story to the case, which provides the context of the story (see Appendix V). Participants had positive perceptions of such links from topics to cases. Dr. Walker commented that having access to the case from which the story was drawn would help him determine whether the solution would match his situation. Similarly, Dr. Robinson said that users would need the context of the stories to see how the story was similar to or different from their own experiences. Dr. Campbell and Dr. Smith also stated that having access to the case would help them better understand the stories.

Summaries to details. One of the cognitive behaviors users tend to demonstrate in seeking information is to investigate the details after some general information is retrieved (Sawasdichai & Poggenpohl, 2002). This pattern of navigation is apparent in the current study. The following paragraphs describe four places in this OTCL where participants would need features to support them to navigate from summary information

to the specific details that elaborate the summaries. These features are not in the original conceptual model of features.

Several participants wanted to link the summary of a case to the case details so that the summary would serve as a gateway to specific case information. This is the first place where this navigation pattern was evident. For example, in the summary of a case in this OTCL, it is stated that content specific, but ill defined problems would be used as starting points for the students to learn the content (see Appendix W). While she was reading this, Dr. Robinson wanted to "see actual examples of these problems" because the statement would not mean much to her without an example. Dr. Walker made similar suggestions. Although he could find the learning objectives in the syllabus, he would prefer to have a link to them from the summary of the case. This feature would also be useful for Dr. Randal, who wanted to explore different aspects of a case. For example, from the case summary, she could navigate to view the details on how to facilitate problem-based learning, how to lead a chat session, or how to embed writing intensive assignments in the case.

The link from topics to the related case details is the second place in this OTCL where this navigation pattern should be supported. When Dr. Randal was reading a topic guideline about establishing expectations and rules for online discussions, she expressed the need to know "what was established, what was in the syllabus that describes this." (see Appendix X) When she came across a story about integrating a debate in the online teaching environment, she made the comment that the details of the activity and all the related case components should be provided to faculty so that they could apply it in their own context.

The third place where this pattern might be supported is the connection between the lessons that an instructor has learned and the associated case details. Dr. Campbell criticized that the report of a lesson learned was not detailed enough in this OTCL (see Appendix Y). On the other hand, however, she pointed out that the description should not be too long to lose the reader. One can argue that the solution to this issue is to provide links from lessons learned to the case details so that the depiction of the lesson learned remains concise but the details are readily accessible when needed.

This pattern of navigation should also be supported for the participants to go from theoretical guidelines of a topic to the stories that illustrate the guidelines. Dr. Campbell stated that if she was interested in a guideline called “structure the discussions,” she would want to navigate directly to the stories that described this principle. Dr. Robinson would agree that this was a good idea, because if a user is interested in one guideline, it would save their time by going directly to the relevant stories.

External links. Several faculty members suggested that hyperlinks be provided to connect an OTCL with external resources. Dr. Walker provided an explanation for this recommendation. He believed that “the power of online work is the whole world of things that are out there,” so it is important to provide access to “a broader context of a whole world out there.”

The external resources that participants mentioned include references, standards and evaluation rubrics. When Dr. Robinson came across a reference in this OTCL, she commented that she wanted to navigate to the actual documents, emails or Websites associated with this reference. Likewise, Dr. Walker mentioned his need to access relevant articles and references. A couple of participants talked about linking this OTCL

to external standards. Dr. Randal stated that there are large groups such as “writing across curriculum” on campus. If her class is a writing intensive course, she would want to access resources available to these groups, including national standards. Dr. Walker concurred. An example he gave is to make information literacy standards available for a course that has critical thinking component. In addition, he suggested providing access to resources such as “rubrics for evaluating written communications.”

User Contribution Features: Add Stories/Comments

In this OTCL, users can access a form to submit stories or comments (see Appendix T). Several issues related to these two features have emerged from the data.

What to Contribute and Where to Contribute?

Several participants wanted to contribute comments and stories to the two primary types of content: cases and stories. For example, Dr. Robinson and Dr. Randal mentioned the need to make comments on cases, and five participants talked about adding comments and stories to the topics.

Web Form vs. Listserv

Most participants liked the idea of using a Web form to post comments or stories, whereas Dr. Smith maintained that posting on the Web would be less interactive than the listserv. She stated that she would not post a story or comment on the Web, but she might contribute if it is something as interactive as a listserv. Dr. Davis also seemed to think direct correspondence would be more interactive than posting comments. He expressed the need to contact the author of the story directly if he was unclear about something or needed more details.

Logistical Issues

Participants identified a couple of logistical issues with user contributions. The first issue concerns whether the user contribution should be monitored. Drs. Campbell, Robinson and Smith recommended that postings be monitored and cases be selected carefully, because users might post extreme experiences which might either “scare some people off” or set unrealistic expectations. For extreme experiences, Dr. Campbell recommended that explanatory information about how the instructor had dealt with extreme situations be provided so that users could judge the applicability of the information in their own context. Drs. Campbell, Robinson, and Smith mentioned another reason for monitoring user contributions. Posting should be inspected because information such as stories might be posted in the wrong place. However, if monitoring is needed, how much control should the moderator have over user contributions? This is another related issue. Dr. Campbell was concerned that the moderator might exert too much control. For example, the moderator might think highly of certain content in an OTCL so as to let users post only positive comments. In contrast, there might be situations where control is needed. Dr. Walker hinted that the moderator should control situations where an instructor posts a message stating that when students failed to participate on the discussion board, s/he simply flunked them.

Non-Functional Features

As defined in chapter 1, non-functional features are constraints or properties of the system in satisfying the functional requirements (Kang et al., 1998). In this study, the non-functional features that faculty members would need include two system properties participants perceived that an OTCL should have: effectiveness and efficiency. These are

two dimensions of usability, which would impact faculty decision to use an OTCL. Effectiveness enables users to complete the tasks completely and accurately, and efficiency allows them to finish the tasks rapidly. Many issues are involved in achieving effectiveness and efficiency. This section presents faculty perceptions of the issues related to these two features.

Effectiveness: Language Issues

Faculty requirement for system effectiveness is reflected in the following four language issues that came out during the interviews. First, participants' definitions of cases caused confusion in their use of an OTCL. Second, instructors did not know what keywords to use when conducting a keyword search and they would need a list of vocabulary to assist them. Third, browsing and searching on multiple criteria do provide a list of vocabulary, but the terminology provided sometimes failed to match those that participants had in mind. This is the issue of indexing. Fourth, the terms used for hyperlinks were sometimes a source of confusion for the users.

Language Issues with Case Definitions

In this OTCL, the term "case" refers to an online course and all the related components, including the descriptions, materials, and lessons learned associated with the course. This definition is different from the participants' conception of a case. The differences led to the confusion in the instructors' use of this OTCL. The following presents participants' definition of a case and the confusions this discrepancy of definition caused.

Participants' case definitions. Participants' definitions of a case vary but share some similarities. The majority of cases discussed by participants are similar to those

found in the case methods literature. This type of case usually starts with a scenario and it requires students to make certain decisions based on the scenario. Cases defined by five participants all fall into this camp. For example, Dr. Smith stated that a case has “an overview of a scenario” that “presents the challenges the company has faced,” and students are required to “think about ways the company can solve the challenges.”

Dr. Randal’s definition seems to be broader and less structured. To her, a case is “a description of what someone has done or what they are currently doing.” It “looks at several factors that may have contributed to the success or failure of what they’ve done or the development of what they’ve done.” An example of a case she gave is a decision that General Food made on how to package a certain type of food.

Unlike other participants, Dr. Davis was familiar with the cases in both business and law settings. The business cases he talked about are similar to those found in case methods. His definition of a case in the legal courses is different.

> You are looking at (a) dispute between two parties. Lower court has ruled favoring one, and losing party (is) appealing… higher court is rendering the decision. (They) may reverse it or affirm it, and more importantly, they give you the rationale as to why they decided it the way they did in terms of interpreting the law.

Dr. Davis is the only participant who was familiar with two definitions of cases. He is also the only one who claimed to be familiar with cases but who did not have confusion with the use of this term in the study. His familiarity with different case definitions might have provided him with the flexibility to adapt to the new definition in this study.

Despite the variations, the definitions provided by the participants have something in common. They are concerned with specific issues. They are more similar to lessons

learned or topics rather than the cases in this OTCL. This may have led to the following confusion with the use of this OTCL.

Confusion with case use. Most participants in this study reported confusion with the cases in this OTCL. While reviewing the content model, Dr. Randal stated that she had problem understanding the setup of a case in this OTCL. When she thought of cases, she expected something specific instead of a whole course. Dr. Smith and Dr. Robinson had similar views. When Dr. Smith reviewed a case in this OTCL, she expected to see "some specific issues, problems that the instructor had" when teaching that course. Dr. Robinson explicitly stated her confusion with the understanding of a case in this OTCL. A case in her field is usually about how a student teacher encountered a problem in the field and what s/he should do to address the problem.

Participants' confusion with the definition of a case in this OTCL was revealed in their difficulty in determining whether they would need to search for a case or a topic in this OTCL. Both Dr. Campbell and Smith experienced this problem.

Language Issues in Keyword Search

Several participants reported that they refrained from using the keyword search feature because of language issues. The concern was that they might not know what keywords were available for them to search for the information needed. Dr. Randal told a story about a conversation she had with a help desk concerning a piece of word processing software. She wanted to sort a table alphabetically in a column. She could not find out how to do that in the Help document available in this software. She called the help desk, and the associate told her that she would need to sort by alphabet. He also commented that anybody would know what keyword to use. Dr. Randal said that her

keyword was “alphabetize” and she failed to find the information using this keyword. Three other participants reported similar issues with keyword search.

As discussed in previous sections, Dr. Randal and Dr. Walker both suggested that keywords be provided to the user in order to address this problem. However, when keywords were available, some other language issues emerged. The participants’ mental model of the online teaching domain might not have matched with mine. This has resulted in the issues related to the indexing of cases and topics. The next section presents these issues.

Language Issues in Indexing Cases

Chapter 3 described how I rapidly developed an indexing vocabulary for cases while building the prototype. A series of language issues (Table 11) with the case indexing vocabulary have emerged from the data. They can guide the future efforts in developing an indexing vocabulary for an OTCL. These issues are elaborated in the following sections.

Table 11

Language Issues in Case Indexing

	Cases
Indexing Dimensions	• Incompleteness • Different terminology
Indexing Value	• Incompleteness • Mismatch in meaning • Different terminology • Level of generality

Indexing dimensions: incompleteness. I used four dimensions to index cases in this OTCL, including subject areas, learning outcomes, instructional strategies, and student types (graduate or undergraduate). Participants held that these dimensions were incomplete and they recommended that additional dimensions be considered. For example, class size and assignment types were mentioned by more than one participant. In addition, Dr. Randal would need to select cases based on whether it is a single-session or a multi-session course; Dr. Smith wanted the option to choose either fully online or hybrid courses; Dr. Davis was interested in selecting students based on their majors.

The data indicates that participants varied in their opinions with regard to what indexing dimensions to include. Dr. Walker provided insight on this issue. He stated that the key is to identify the dimensions that would impact teaching.

Indexing dimensions: different terminology. Another issue with the indexing dimensions is that terminology used by participants may not match those used in this OTCL. For example, Dr. Randal suggested that the index dimension “learner type” be changed to “learner level”.

Indexing values: incompleteness. Participants pointed out that the current values for the indexing dimensions were incomplete. Dr. Walker examined the values for the dimension of subject areas and stated that he wanted to make sure that no subject matter would fall through the cracks. He suggested adding Humanities as another value for subject areas in order to cover subject matter such as foreign languages and literature. Faculty participants also proposed additional values for the dimensions of learning outcomes and instructional strategies. For example, for learning outcomes Dr. Randal added “vocabulary learning, writing, communication, technology use,” and Dr. Robinson

suggested “discussing main ideas” or “discussing issues.” A series of instructional strategies were recommended. Dr. Campbell and Dr. Smith suggested “case study” as an additional strategy; Dr. Robinson recommended “inquiry learning;” Dr. Nelson added “writing.”

Indexing values: mismatch in meaning. Participants interpreted some indexing values differently from what was intended. There were three variations of this issue. First, participants had narrower interpretations of the indexing values than intended. Some of the teaching strategies used in this OTCL, for example, “discussion, seminar” and “problem-solving,” were used in the broad sense. However, Dr. Randal attached specific meanings to these terms. She used discussions and problem solving in her class, but she did not select these two strategies in this OTCL because she did not consider her class as a seminar class or a formal problem-based learning course that would require the use of specific problem-based learning tools. Second, in some other instances, participants might have broader understanding than what I had in mind. Some of the learning outcomes in this OTCL were borrowed from Jonassen’s (2000) typology of problem solving, including “diagnose and generate solutions,” “analyze systems to generate problem solutions,” and “address dilemma (issue-based) problems.” Dr. Randal interpreted these outcomes in their broad meaning and criticized that they were basically the same. The third variation of this issue involves the different understanding of the relationships among the concepts represented by indexing values. Dr. Smith maintained that that teaching strategies such as “problem solving” and “simulations” could be subsumed under “the general umbrella of lecture, presentation, discussion, and seminar.” This is contrary to my assumption that these two groups of teaching strategies are based

on competing philosophy of teaching. I thought it is appropriate to separate them rather than including one group of strategies as the subgroup of another.

Indexing values: unfamiliar/different terminology. Participants were not familiar with some of the terminology used for the indexing values. Dr. Robinson said that she did not know what “use tactic to meet strategy” means as a learning outcome, and Dr. Smith stated that she would replace the learning outcome “analyze systems to generate problems and solutions” by “analyze the data to make decision and solve all problems.”

Indexing values: levels of generality. Another language issue related to the indexing of cases is the level of generality for the dimension of subject areas. Some participants wanted the subject area to be divided into general categories, whereas some other participants asked for very specific list of disciplines. Dr. Randal suggested that the subject matter be divided into broad areas such as biological sciences or natural sciences. She is teaching interdisciplinary courses, so she would review cases in broad categories of subject areas. Dr. Smith shared similar views. Her subject matter is not very common. She did not expect that this OTCL would have many cases in her discipline. She would prefer to have general subject areas listed so that she would not have to go through a long list to navigate to her discipline. Similarly, Dr. Davis thought it would be difficult to browse through all the specific subject matters to find his subject matter. Instead, he would rather browse the broad categories.

Some other faculty members had a different perspective on this. They wanted to search on specific fields. Dr. Campbell recommended that the broad category of education be broken down into disciplines such as educational psychology, educational leadership, and instructional technology. Dr. Nelson had similar ideas. She expected to

see the foreign language that she was teaching listed as an indexing value for the subject area, because she believed that foreign language instruction was different from courses in other fields.

Participants recommended solutions for this issue. Dr. Robinson suggested that after the user selected a broad subject area such as education, the results be chunked into more specific disciplines if necessary. Dr. Davis had a slightly different solution. He would start with a broad category. If there are many results, he would then refine the search and go to the specific discipline. The need for subcategories would depend on the number of results returned by an OTCL.

Participants also commented on the level of generality related to the values for other indexing dimensions. They generally agreed that the values for these dimensions should be general enough to be applicable to all disciplines.

Language Issues in Indexing Topics

An indexing vocabulary was not created for topics during the development of this OTCL, because like Dr. Robinson, I thought of topics as general categories of issues rather than very specific problems that need to be indexed. However, contrary to my assumption, the data suggests that an indexing vocabulary be created. The following discusses the support for indexing topics and the related language issues.

Support for indexing topics. There were two indications that topics should be indexed. First, as discussed in a previous section, participants expressed the need to add a topic search feature so that they could search for topics on multiple criteria. This would require that an indexing vocabulary be created for topics. Second, this need was further substantiated by participants’ suggestion on organizing the topics. Participants had

difficulty identifying what topics to focus on while trying to resolve the problem presented in scenario two. They suggested that the topics be organized into broader categories to help them determine which topic to choose. Dr. Campbell suggested that several umbrella sections be generated and topics be subsumed under these areas. For example, if assessment is a category, online testing strategies, multiple choices, and case study analysis could be topics in this category. Four other participants also mentioned the need to cluster the topics. This idea coincides with the requirement for indexing topics. Both necessitate a framework to organize the topics. The topic categories are equivalent to the indexing dimensions and the topics in a category are similar to the indexing values of a certain dimension.

Potential language issues in indexing topics. Although an indexing vocabulary has not been developed for topics in this OTCL, the data indicates some potential language issues. Similar to case indexing, participants might have different interpretations of the indexing vocabulary. For example, the problem described in scenario two requires solutions on how to facilitate meaningful interactions on the discussion board. When I developed this OTCL, I put this solution under the topic of "collaboration and interaction." Dr. Smith did not expect this, because she believed that "collaboration and interaction" is more dynamic than discussion board, which to her, is static. Participants in this study all had different expectations in terms of under which topic they could find this problem solution. Different interpretations of the topics might have contributed to the differences.

Language Issues with Hyperlinks

Another type of language issues is related to the terminology used for hyperlinks. In several instances, participants reported that they would use different terms than the ones used in this OTCL. For example, Dr. Campbell wanted to change a link from “case search on multiple criteria” to “advanced search,” and Dr. Robinson would prefer “case examples” to “case materials.” A closely related issue is the confusion with the terminology used for some hyperlinks. For example, Dr. Nelson did not understand the hyperlink for a lesson learned, and three participants suggested that the link “give me background information about the story” did not make sense to them.

Efficiency: Information Presentation and Organization Issues

Efficiency is another non-functional feature that participants asked for during the interviews. In addition to explicitly stating that they wanted this OTCL to be quick to use, participants pointed out that information presentation and organization issues should be addressed to achieve system efficiency. This section presents faculty perceptions of the following issues: meaningful headings, concise information, information sequencing, and information clustering.

Meaningful Headings

Meaningful headings would help faculty determine the relevance of the content so as to enable fast access to the information needed. Dr. Randal asked for more headings in this OTCL so that she could “scan through and then go back and read the things that may be important” to her.

Participants wanted the existing headings to be more meaningful. In this OTCL a list of cases or stories are presented on several pages. The heading for each case or story

consists of only a case number or a story number. Participants argued that these numbers should be replaced by more meaningful headings so that they could focus only on the cases or stories relevant to them. For example, for case headings, Dr. Campbell suggested using case titles and Dr. Robinson recommended keywords; for story headings, Dr. Randal and Dr. Walker proposed using keywords such as “story 5: debate” or “undergraduates, social science, collaborative learning.”

Concise Information

Most participants expressed the need to have concise information in an OTCL. While reviewing the task model, Dr. Robinson was worried about the amount of time it would take her to find the relevant information. She was hoping that the second task, “issue exploration and solution generation,” could be addressed by something as short as “questions and answers.” When she was reviewing a lesson that an instructor learned, she commented that this page was “very clearly organized,” “very to the point,” and “not very time-consuming” to read. Dr. Smith had a similar issue. When reviewing the content model, she uttered concern with the length of the content. She commented that if it were to take her a while to read something, she probably would not read it. She suggested that information such as lessons learned and guidelines be presented using bullet points; stories be presented in high level summaries; and case summary be limited to only paragraph in length. When she reviewed the prototype, she commented that one of the stories was too detailed. She only wanted the summary of the story rather than a phone conversation between a student and an instructor. Three other participants also mentioned the need to have concise information.

Information Sequencing

To quickly access the information they need, participants proposed that important items be placed at the top of the page. When she reviewed a summary of a case, Dr. Robinson was frustrated that she had to go through a lot of background information before she could get into course activities, which are the most useful component to her. Dr. Smith had similar comments. She considered background information as secondary as compared to content such as learning objectives and activities. She recommended that important information be presented prior to the background information. Likewise, on the case search results page, she suggested that the case summary be moved to the beginning of the record, because that information is "very prominent" and it should "jump out at you."

Information Clustering

The previous sections discussed that participants suggested clustering the cases or topics if a large number of them are presented on one page. Information clustering may also apply to stories. Dr. Walker commented that when the number of stories related to one topic increases, they might need to be clustered.

Usability, Tasks, Content Types, and Features

Chapter 6 and 7 argued that faculty perceptions of tasks and content are driven by their need for an OTCL to be applicable and relevant. Then, what factors have determined faculty perceptions of the system features they would want? This section

discusses how usability and faculty perceptions of tasks and content types have impacted their perceptions of what system features that an OTCL should support.

Chapter 5 discussed that usability is an important user requirement for an OTCL. For this tool to be usable, it should be effective and efficient in supporting users with their tasks. Figure 28 shows that effectiveness and efficiency, the two dimensions of usability, are two non-functional features required by faculty.

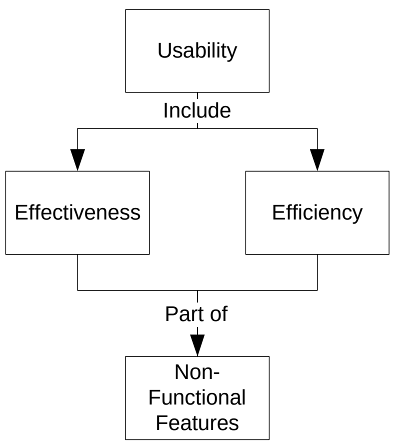


Figure 28. Usability influences participants' needs for non-functional features.

Functional features that faculty deemed as important are determined by faculty perceptions of the tasks that an OTCL should support and the types of content it should provide. Figure 29 reveals how tasks and content types have driven faculty perceptions of the functional features they would need. Most of the tasks that professors would perform in an OTCL could be facilitated by providing access to the relevant content, which could be enabled by content access features. In addition, user contribution features should be made available for the instructors to add their own stories or comments.

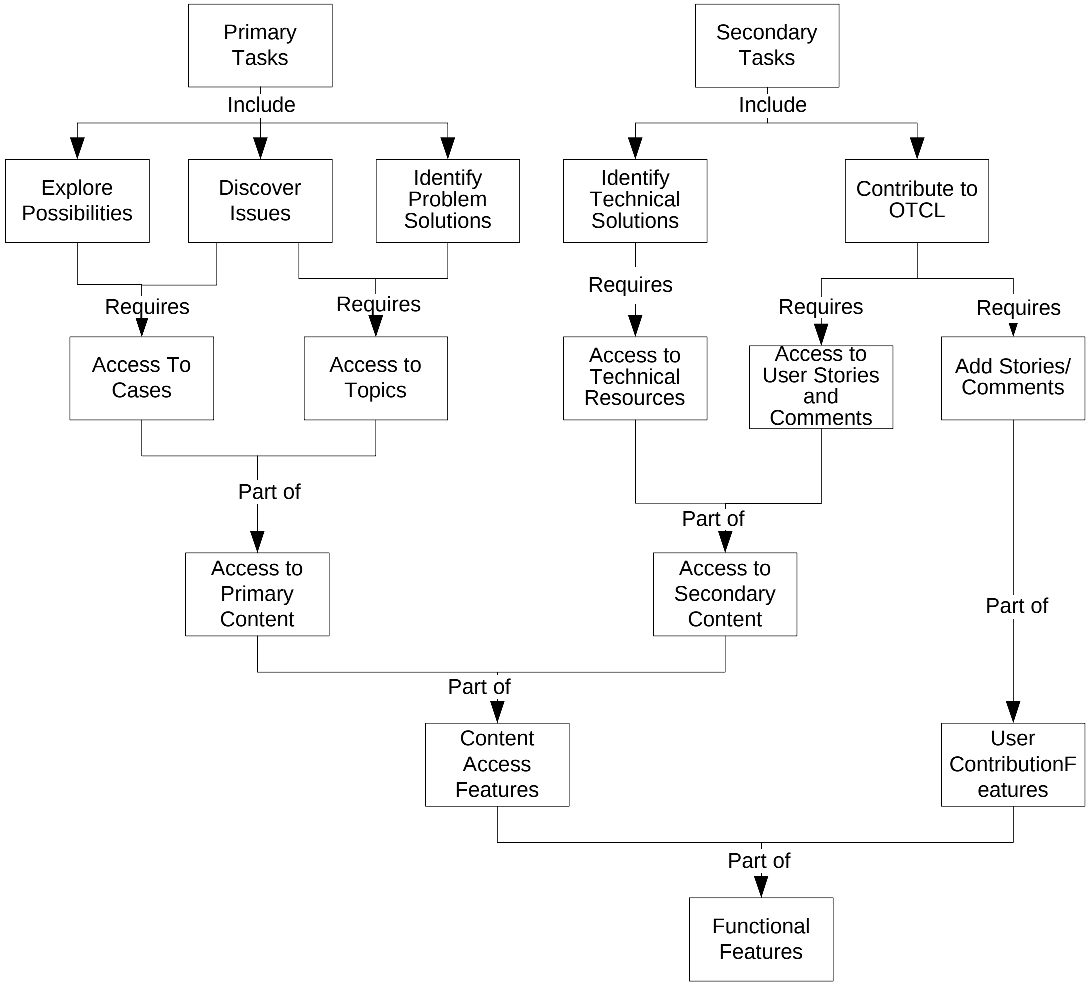


Figure 29. Tasks, content types, and functional features.

Participant Types and Their Perceptions

Participants with different amounts of online teaching experience seemed to perceive non-functional features differently. As I discussed in chapter 5, novice instructors were very vocal about the usability of an OTCL. They had a strong desire to have a tool that is effective and efficient. Experienced online instructors were more impressed with how an OTCL could support the way they learn to teach. As a group, they were less concerned of the effectiveness and efficiency of this system.

Moreover, faculty members differed in their perceptions of the user contribution features. For example, Ms. Nelson stated that she would not use the add stories/comments features, because with little online teaching experience, she would not have much to contribute for a long time. She stated that these features would be for those who had experience teaching online. Participants with different levels of familiarity with case methods did not seem to have different perceptions of the features.

Summary

This chapter presents the system features that an OTCL should offer. Professors discussed both functional and non-functional features. Functional features consist of content access features and user contribution features. Content access features include (a) tools to retrieve the primary types of content, (b) tools to access the secondary types of content, (c) internal links between content components and external links to outside resources. User contribution features consist of adding stories and adding comments.

Non-functional features that participants focused on include effectiveness and efficiency. For an OTCL to be effective, language issues should be addressed with regard to: case definition, keyword search, indexing, and hyperlinks. The following information presentation and organization issues need to be addressed for an OTCL to be efficient: meaningful headings, concise information, information sequencing, and information clustering.

Usability is a factor that has impacted professors' perceptions of the system features that an OTCL should offer. The two dimensions of usability, effectiveness and efficiency, are two non-functional features. Faculty perceptions of the tasks that they

would accomplish in an OTCL and the types of content that they would need determine the functional features that an OTCL should provide.

Novice online instructors differed from experienced online instructors in their perceptions of the features they would ask for in an OTCL, whereas professors with different levels of familiarity with case methods did not seem to have different perceptions of the features. The next chapter answers the research questions, discusses the implications of the findings, and proposes a research agenda for future studies.

CHAPTER 9

DISCUSSIONS AND CONCLUSIONS

Introduction

The previous chapters presented the themes that have emerged from the data. This chapter first synthesizes the findings to answer the research questions. It then discusses the implications of this study for decision makers and researchers interested in an OTCL. Finally, it discusses the limitations of the study and provides suggestions for future research.

Research Results

This study intends to answer four research questions related to faculty overall perceptions of an OTCL as well as their perceptions of the tasks, content, and features that this case library should support. The following presents the answers to these four questions and discusses the findings in the context of the literature.

Question 1: Overall Perceptions

Question 1: How do faculty members perceive a case library as a tool that supports online teaching?

a) Is there a difference among faculty with different amounts of online teaching experience?

b) Is there a difference among faculty with different levels of familiarity with case methods?

Results

Faculty members' perceptions of an OTCL focus on their decision to use this tool. Figure 30 shows that professors' perceived decision to use an OTCL can be explained by three main factors: (a) perception of how an OTCL would support the way they learn to teach (b) perceived usefulness, and (c) perceived usability of an OTCL. For the ease of communication, this figure is called Model of Perceived Decision to Use an OTCL (MPDUO).

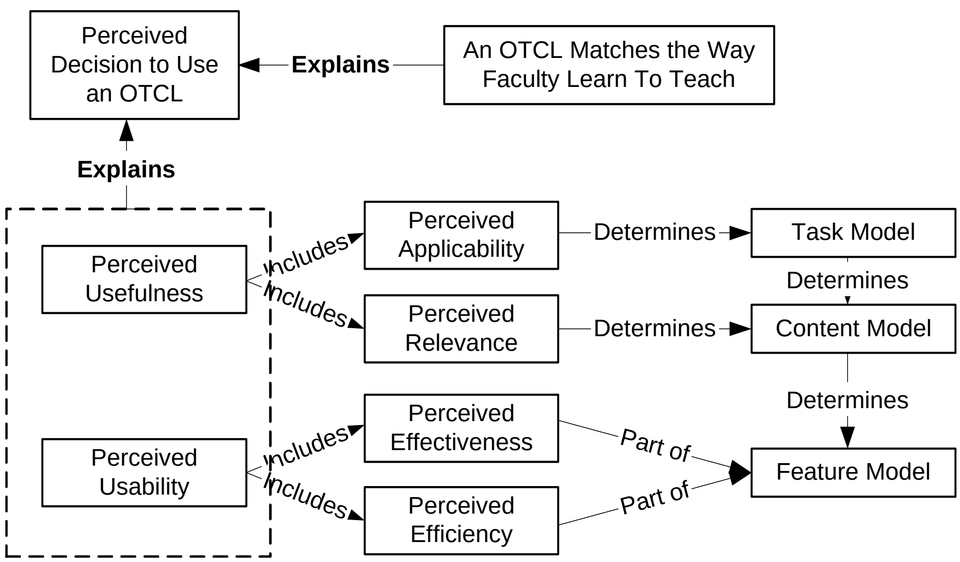


Figure 30. The Model of perceived decision to use an OTCL (MPDUO).

Faculty participants in this study learned to teach from trial and error and from the experiences of other faculty members. They believe that an OTCL could support this type of learning. It could serve as an alternative to human mentors. Moreover, this tool could offer them a variety of perspectives and provide them with experiential knowledge at the time when they need it.

However, faculty might not adopt an OTCL unless it is perceived as useful and usable. Usefulness consists of two dimensions: applicability and relevance. An OTCL should be applicable in the sense that it supports the tasks that professors would complete during both course design and delivery, and it meets the needs of faculty who have different amounts of experience and preferences. This is the factor that has driven participants' perceptions of the types of tasks that they would accomplish with the use of an OTCL. Relevance is another dimension of usefulness. It refers to instructors' requirement that all the resources related to their tasks should be available in an OTCL, regardless of whether they are related to pedagogy, content, or technical solutions. This has influenced faculty perceptions of the types of content they would needed in an OTCL.

Usability includes two dimensions: effectiveness and efficiency. An OTCL should be effective in the sense that it provides a shared language for the user to communicate with the tool. Efficiency is another important dimension of usability. Faculty wanted to quickly access the content to carry out their tasks. This need is reflected in their requirements for appropriate information presentation and organization features. Both effectiveness and efficiency are non-functional features faculty would need.

Faculty members with different amounts of online teaching experience varied in their overall perceptions of an OTCL. Compared to novice online instructors, experienced online instructors better perceived the match between an OTCL and professors' apprenticeship approach to learning to teach. They also had more detailed vision of how an OTCL could support online teaching. The following provides an explanation for the differences. Experienced online professors were probably more

familiar with the process in which professors acquire online pedagogy. Their personal experience in learning to teach online might have contributed to this knowledge. Moreover, the experienced online instructors in this study are either faculty in the College of Education or advocates of teaching and learning excellence in the university. Their professional experiences might have also added to this knowledge. The understanding of how faculty members acquire online pedagogy might have helped experienced online instructors see the match between an OTCL and the way professors learn to teach online.

Novice online instructors, however, were more concerned of the usefulness and usability of an OTCL, and they were more forthright in pointing out that they would not use an OTCL unless it could meet their needs. Their concern might be explained by the fact that the prospect of teaching online is already a challenge for novice online instructors and they would be pressed for time to put together a course; the idea of having to learn to use another tool in order to teach online can add to the stress. Despite their concerns, however, novice online instructors became more positive toward this OTCL once they had more experience with it. This finding has implications for the development as well as the diffusion and adoption of an OTCL. Online instructors, especially novice online instructors, may have concern about technical issues. Therefore, it is important to enhance the perceived usefulness and usability of this tool so that instead of considering an OTCL as another technical barrier, faculty may think of it as an intuitive tool that supports online teaching. Moreover, instructors, especially novice online instructors, should be encouraged to try this tool. Exposure to an OTCL may help them experience the strength of the tool and accept it more quickly.

The findings do not support my expectation that novice online instructors might have a stronger need for an OTCL than experienced online instructors. I predicted that with less personal knowledge to guide their online teaching, novice online instructors might have more desire for external resources like an OTCL than experienced online instructors. The data shows that novice online instructors were more concerned of the usefulness and usability of an OTCL and could not appreciate the benefits of an OTCL at the same level as experienced online instructors did.

Faculty members with different levels of familiarity with case methods did not seem to have different overall perceptions of an OTCL. This is not what I expected. I assumed that faculty familiar with case methods might have a more positive view of an OTCL than those unfamiliar with this instructional method, because an OTCL is based, in part, on case methods. The data does not support this assumption. Participants' online teaching experience and their needs at the time of the interview seem to have more impact on their perceptions than their levels of familiarity with case methods.

Discussion

The following discusses how the answers to question one relate to the literature. The first part of the discussion focuses on the finding that an OTCL can support the way faculty learn to teach, and the second part compares MPDUO with existing theories.

As I expected, this study found that faculty participants learned to teach from the experiences of their own or other colleagues. They believed that an OTCL could be a tool from which they could access the experiential knowledge of professors. However, the finding has expanded my conception of an OTCL from a repository of case-based knowledge to an electronic environment that supports a learning community of online

instructors. The former is an information delivery vehicle with a static body of experiential knowledge, whereas the latter not only offers knowledge, it also enable knowledge sharing and construction so that its knowledge base evolves over time. This new conception is similar to the notion of a dynamic electronic performance support system (EPSS) advocated by Laffey (1995). An EPSS generally refers to a system that provides just-in-time support for performance and learning with a repository of information, resources and tools (Gery, 1991; Hannafin, Hill, & McCarthy, 2000; Harmon, 1999). Unlike a conventional EPSS that serves as an information delivery tool with an existing body of content and support, a dynamic EPSS also includes knowledge capturing and community building tools that can continuously update and adjust the knowledge base. The key difference between the two conceptions is the notion of sharing and knowledge construction in a community. Instead of simply making a library of cases available to individual instructors to support their learning, an OTCL could better meet the needs of faculty if it provides an electronic environment where professors can share experiences and collectively construct context specific knowledge. As Dr. Randal envisioned, with this tool, a cohort of faculty might develop teaching models readily applicable to a variety of situations.

This finding is consistent with the latest thoughts on teacher learning and faculty development. Lee Shulman, a leader and long-term advocate of teaching improvement, called to “make teaching community property” (Shulman, 1993; Shulman & Hutchings, 2004). He provided a new framework (Shulman & Shulman, 2004) to conceptualize how teachers learn in the community context. This framework expands the understanding of faculty learning from the individual to the community level. The individual level of

analysis is similar to the faculty learning model (McAlpine & Weston, 2000) reviewed in chapter 2, which describes how individual teachers learn by practicing and reflecting on their experiences. The community level of analysis describes how the individual learns by interacting with the vision, knowledge base, commitment and practice in the community. This focus on the role of community in teacher learning is reflected in the increasing number of faculty learning communities (Cox & Richlin, 2004) in American universities, which have been developed to foster knowledge sharing and construction among professors.

The second part of the discussions focuses on MPDUO. It explains faculty's perceived decision to use an OTCL. How is this model compared to related theories in the literature? The following addresses this issue.

A couple of leading theories connect user perceptions of a technology with their behavior to adopt it. The Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) is a predominant theory for explaining and predicting individual technology acceptance. Based on TAM, a person's decision to accept a technology is explained by the perceived usefulness and ease of use of this tool. Perceived usefulness refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320) and perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). People tend to adopt a technology if they perceive that it can help them perform their job and it is easy to use. Another widely used model that explains user adoption of a technology is Roger's Diffusion of Innovation (DOI) (Rogers, 2003) theory. It explains and guides the

diffusion of a variety of innovations, including technological ones. It differs from TAM in that it focuses on the diffusion of innovations within a social cultural system rather than at the individual level. One of the main ideas of this theory is that a key to the diffusion of an innovation is to communicate the following attributes of the innovation, including relative advantages, compatibility, complexity, trialibility, and observability. The first three traits refer to the extent to which an innovation is perceived as (a) “being better than the idea it supersedes”(Rogers, 2003, p. 229), (b) “consistent with the existing values, past experiences, and needs of potential adopters” (Rogers, 2003, p. 240), and (c) “relatively difficult to understand and use” (Rogers, 2003, p. 257) respectively. Trialability is “the degree to which an innovation may be experimented with on a limited basis” (Rogers, 2003, p. 258) and observability is defined as “the degree to which the results of an innovation are visible to others” (Rogers, 2003, p. 258). Four of the five factors are positively related to the rate of adoption. The only exception is complexity, which is negatively related to the rate of adoption.

Table 12 shows that MPDUO has some similarities with both TAM and DOI. The usefulness and usability factors in MPDUO appear to be equivalent to the two dimensions of TAM: usefulness and ease of use. The usefulness factor in both models focuses on how technology helps users perform their tasks. Perceived effectiveness and efficiency, the two elements representing usability in MPDUO, may contribute to the perceived ease of use in TAM. MPDUO is also compatible with DOI. For example, one of the main factors that impacted faculty’s perceived decision to use an OTCL is the belief that this tool would support the way they learn to teach. This is similar to the compatibility factor in DOI, because faculty believed an OTCL is consistent with their

teaching improvement process. Usability is another factor that would impact faculty perceived decision to use an OTCL. One may argue that a complex system probably will not be perceived as very usable because complexity may negatively impact the effectiveness and efficiency of the tool. Therefore, the usability factor in the current model may be inversely correlated to the complexity factor in DOI. Although the other three attributes in DOI were not identified as salient factors in MPDUO, they were reflected in the interview data. First, participants believed that an OTCL would be better than traditional faculty development activities because it matches the way faculty learn to teach. This reveals the relative advantage attribute in DOI. Second, when presenting the findings to this research question, I discussed that participants, especially novice online instructors, might have a more positive perception of an OTCL if they actually taught online and saw the benefit of this tool. This reflects the trialability and observability factors in DOI.

Table 12

Comparison between MPDUO with TAM and DOI

MPDUO	TAM	DOI
An OTCL matches faculty learning approach		Compatibility
Usefulness	Usefulness	
Usability (Effectiveness and Efficiency)	Ease of use	Complexity
		Relative advantage
		Trialibility
		Observability

Compared to other models, MPDUO has a couple of strengths. First, it emerged from the data, and it provides a context specific view of the important factors that would impact individual instructor's perceived decision to use an OTCL. Second, it links users' perceptions of usefulness and usability directly with the task, content, and feature models, which provide a base for developing an OTCL.

However, there are limitations to MPDUO. This is a conceptual framework synthesized from an exploratory study. The variables in this model are defined at the conceptual level and they have not been operationalized or validated. Therefore, current discussions on the similarities and differences between the current model and existing models are based on face value and speculation. Further research may be needed to validate this model and to understand its relationship with other models.

Question 2: Perceptions of Tasks

What tasks do faculty members perceive that they would accomplish with a case library that supports online teaching?

a) Is there a difference among faculty with different amounts of online teaching experience?

b) Is there a difference among faculty with different levels of familiarity with case methods?

Results

The tasks that participants perceived that they would carry out in an OTCL can be categorized as three primary tasks and two secondary tasks (Figure 31). The primary tasks include exploring possibilities, discovering issues, and identifying problem solutions. They would drive professors to use an OTCL during course design and

delivery. The secondary tasks consist of contributing to an OTCL and identifying the associated technical solutions. The need for completing these tasks would naturally arise as the user performs the primary tasks. Chapter 6 describes the details of these tasks.

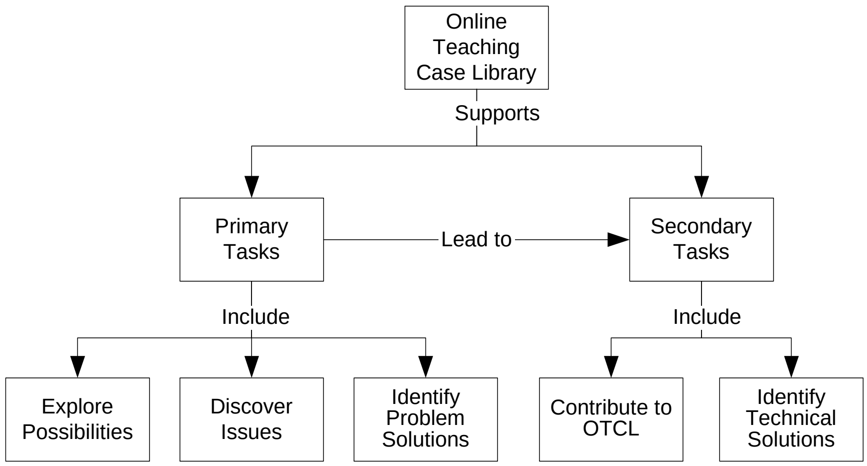


Figure 31. Evolved task model.

Figure 31 is an evolved task model based on the data. It is different from the original task model in two ways. First, the original task model includes only primary tasks, whereas the evolved model has both primary tasks and secondary tasks. Second, the two tasks in the original model have been elaborated into three primary tasks in the evolved model.

Participants with different amounts of online teaching experience had different perceptions of the tasks. Similar to what I predicted in chapter 3, novice online instructors tended to focus on exploring possibilities and identifying issues in online teaching, whereas more experienced instructors were apt to use an OTCL to identify solutions to specific problems. In addition, I expected that experienced online instructors might be more interested in adding stories and comments than novice online instructors. There was some evidence to support this assumption.

Participants with different levels of familiarity with case methods did not seem to have different perceptions of the tasks. This was not surprising. The three primary tasks identified in this study are common problem solving components. They should be equally meaningful to all the participants.

Discussion

The tasks in the original model have been confirmed as tasks that professors would perform. However, participants indicated that while completing these tasks, they might want to contribute to an OTCL or identify technical solutions. These are added as two secondary tasks to the original task model. The following addresses these two tasks in the context of the literature.

In this OTCL, although a feature is provided to allow the user to add stories and comments, user contribution is not considered as a separate task. This may be because I thought of an OTCL primarily as a resource that faculty could draw upon to help with their teaching, so user contribution was almost an add-on feature. My initial conception of an OTCL has been expanded during this study. My new perception of an OTCL as a case-based tool that supports knowledge sharing and construction among faculty suggests that user contribution be added as a separate task. The reason is that user participation in communities plays crucial role in technology-based faculty learning communities (Barab, MaKinster, Moore, Cunningham, & The ILF Design Team, 2001; Vaughan, 2004).

Identifying technical solutions is added as another secondary task to the model. This is against my initial intention to provide only pedagogical knowledge. I thought that technical issues are the primary focus for most faculty development activities, and online pedagogy is the area that faculty would need more assistance. However, the data helped

me understand that technical issues are intertwined with issues related to pedagogy and content. Faculty would need to have all the issues addressed in order to teach their classes. Resources relevant to every aspect of their teaching should be provided. The literature provides some support for this contention. For example, faculty reported that they wanted to learn about technologies in the context of their own instructional problems (Goodale et al., 2002; Laga & Elen, 2001). This may also suggest that information on technical problems be provided together with instructional resources to help someone resolve technological problems while dealing with instructional issues.

Question 3: Perceptions of Content

What types of content do faculty members perceive that they would need in a case library that supports online teaching?

a) Is there a difference among faculty with different amounts of online teaching experience?

b) Is there a difference among faculty with different levels of familiarity with case methods?

Results

The types of content that participants perceived that they would need in an OTCL include primary types of content and secondary types of content (Figure 32). The primary types of content are composed of cases and topics. A case has a case background, case details, and lessons learned. Case details consist of learning outcomes, teaching strategies, and course effectiveness. A topic is represented by guidelines and the stories that exemplify the guidelines. Stories come from the lessons learned. The secondary types of content refer to user stories and comments, as well as technical resources.

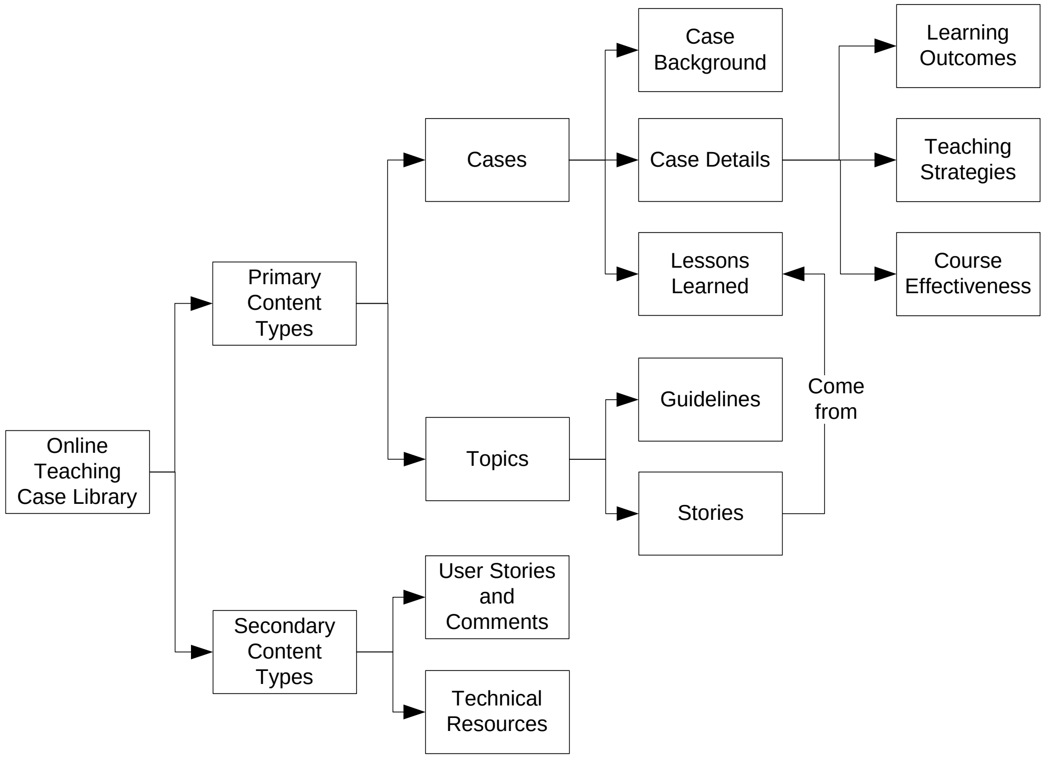


Figure 32. Evolved content model.

Note: Unless otherwise indicated, an arrow indicates that a content component includes other components.

Figure 32 is an evolved content model developed based on the data. It differs from the original content model (Figure 15) in the following areas. First, the original content model includes only primary types of content, but the evolved model has both primary and secondary types of content. Second, the components of a case are different in these two models. In the original content model, a case consists of a case description, case materials and lessons learned. This composition is not clear. Case description is more similar to a summary of a case rather than a distinct case component. It includes both the case background and an overview of the case details. Case materials consist of everything in a course Website. The evolved content model provides a clearer view of the

structure of a case and the role of each case element. The three case components in the original model have been changed into case background, case details, and lessons learned. Participants believed that case background would help them determine the relevance of a case; case details would provide the core information that they would need to teach online; lessons learned would inform them with regard to what did or did not work. Moreover, the evolved content model identifies three distinct elements for case details: learning outcomes, teaching strategies, and course effectiveness. Components similar to these are listed as part of the case description in the prototype. However, participants indicated that these components should be elaborated as individual components, because they would provide the details on how a course is taught.

A little evidence shows that participants with different amounts of online teaching experience might perceive the content types a little differently. The previous chapter discussed the professors' perception that novice online instructors might focus on exploring possibilities and identifying issues in online teaching, and more experienced online instructors might tend to use an OTCL to help them address specific issues. Because of the connections between tasks and content, I would expect that novice online instructors would be more interested in cases, and topics would be more pertinent to experienced online professors. Dr. Walker confirmed this prediction, but other participants did not make any comment on this. Participants with different levels of familiarity with case methods did not seem to have different perceptions of the content.

Discussion

Interestingly, the components of a case identified in this study, including the case background, case details, and lessons learned, are similar to the elements of an

instructional design theory. Reigeluth (1999) defines an instructional design theory as consisting of methods of instruction and the situations in which these methods should be used. Methods of instruction are the strategies for facilitating learning, and an instructional situation includes (a) the conditions under which the instruction will occur and (b) the desired instructional outcomes. These elements can be mapped to the components of a case identified in this study. Methods of instruction are similar to the teaching strategies component in an OTCL; instructional conditions can be represented by case background; instructional outcomes are equivalent to the learning outcomes in an OTCL.

This association provides support for the evolved content model. The field of artificial intelligence distinguishes rule-based reasoning from case-based reasoning as two models of human cognition and machine reasoning (Kolodner, 1993). Rule-based reasoners use rules to solve problems, whereas case-based reasoners resort to cases in establishing expectations and identifying solutions. Rules and cases are two complimentary resources to support problem solving. Rules have the advantage of economy of storage, whereas cases are more operationalizable. Instructional design theories are prescriptive theories developed to provide direction on instruction (Reigeluth, 1999). They guide rule-based reasoning in designing instruction. With the similar structure to instructional design theories, cases in an OTCL may help instructors to use case-based reasoning in solving instructional problems.

Question 4: Perceptions of Features

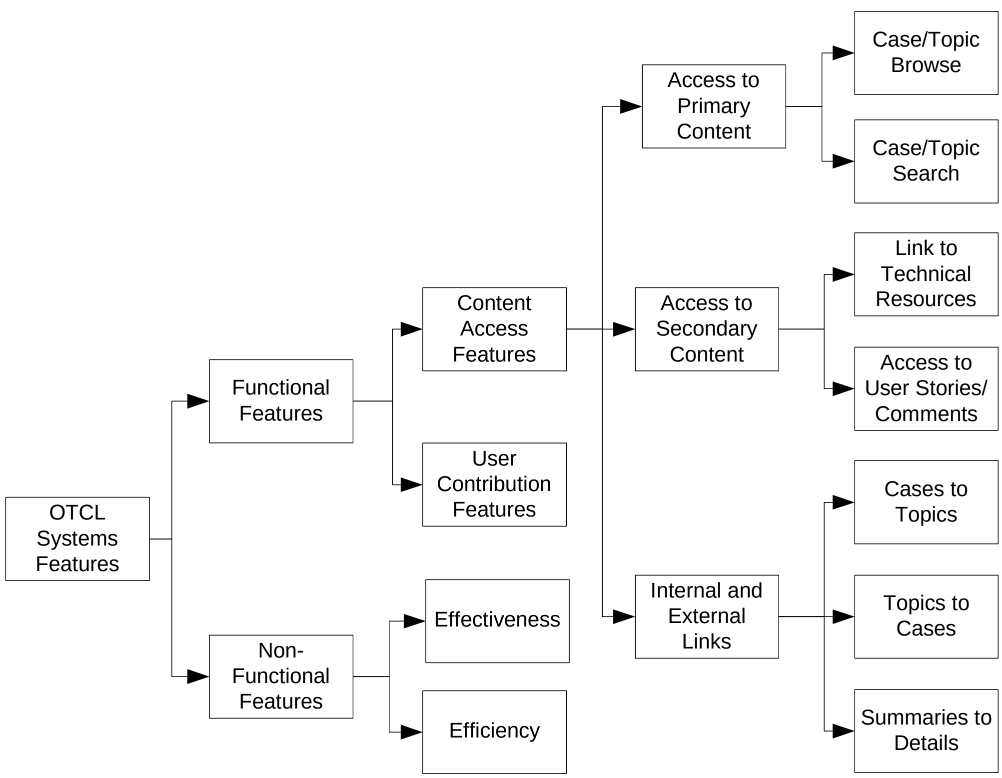
What major system features do faculty members perceive that they would need in a case library that supports online teaching?

a) Is there a difference among faculty with different amounts of online teaching experience?

b) Is there a difference among faculty with different levels of familiarity with case methods?

Results

Figure 33 shows that the system features that faculty members perceived that they would need fall into the categories of functional and non-functional features. Functional features are services that an OTCL should provide to enable professors to accomplish their tasks, and non-functional features describe system properties with regard to how well the system provides the functional features.



* The arrow indicates that a type of features includes sub-types of features.

Figure 33. Evolved conceptual model of features.

Functional features faculty perceived that they would require can be classified as content access features and user contributions features. Content access features consist of those that give access to the primary types of content and secondary types of content as well as those that provide internal or external links. Case browse, topic browse, case search, and topic search are four content access features that provide access to the primary types of content; links to technical resources and access to user stories and comments are two content access features enables the retrieval of secondary types of content; case to topics, topics to cases, and summaries to details are three content access features that give users flexibility to navigate among different types of content in and out of an OTCL. In addition to content access features, the other type of functional features is user contribution features, which are composed of add stories and add comments.

Non-functional features that participants considered as important are comprised of two usability dimensions: effectiveness and efficiency. These two features suggest that a variety of language issues as well as information presentation and organization issues be addressed. Chapter 8 presented the details of these issues.

Figure 33 presents an evolved conceptual model of features based on the data. It differs from the original model of features (Figure 16) in the following aspects. First, the original model focuses exclusively on functional features, but the evolved model includes both functional and non-functional features. Second, topic search has been added as a new feature for faculty to search for a topic based on multiple criteria. This would allow them to narrow down the search quickly and access the specific issues that are of interest to them. Third, keyword search has been removed from the original model, because most participants expressed concern with this feature. Some faculty suggested providing a list

of keywords, which would make keyword search the same as case/topic browse or case/topic search. This would eliminate the need for keyword search. Fourth, links to related technical resources has been added to assist faculty with the technical aspects of online instruction. Fifth, the data confirmed the importance of connecting topics with related cases, and recommended more internal links. For example, the synopsis of guidelines, stories and cases could be linked with the details that elaborate them, and topic guidelines could be connected to associated stories. Finally, this study suggested creating external links to enable access to related external Web resources.

Participants with different amounts of online teaching experience perceived some features differently. Compared to experienced online instructors, novice online instructors were more concerned with effectiveness and efficiency and would not tend to add stories or comments to the tool. I explained similar differences in a previous section presenting the findings related to question 1.

Participants with different levels of familiarity with case methods did not seem to have different perceptions of the features. This is consistent with the findings for the first three questions. Faculty members who had different levels of familiarity with an OTCL shared similar overall perceptions of an OTCL, as well as the related tasks, content types, and features.

Discussion

This following presents how the findings to question four relate to the literature. The first part focuses on the content access features, and the second part discusses the issues related to language as well as information presentation and organization.

The content access features identified in this study are similar to those commonly found on the Web. Browsing and searching are two complimentary search mechanism on the Internet (Jul & Furnas, 1997; Manber, Smith, & Gopal, 1997; Olston & Chi, 2003). These search mechanisms are comparable to the three content access features in this study: browsing, keyword search, and search on multiple criteria. In addition, participants' reasons for using different access features are also consistent with the literature. Jul and Furnas (1997) found that browsing was appropriate when the user was not certain about what to look for, or when s/he did not have the keywords to conduct search. Searching, on the other hand, was a good strategy for someone who was looking for a known target. This matches the findings in this study.

However, not all the results in this study are consistent with the literature. For example, the KITE project team (F. Wang, Means et al., 2003) purposefully added keyword search after their initial usability testing, because they found users were more comfortable with conventional search mechanisms such as keyword searching and browsing, rather than case-based search tool with which the user searches on multiple criteria. In this study, however, participants had problems with keyword search, and this feature may need to be replaced by case/topic search. This issue should be revisited during the usability testing of an OTCL.

Faculty's concerns with language and efficiency issues are confirmed by Web design guidelines generated from usability evaluations of Websites or experimental research. These guidelines generally (a) discourage the use of words that typical users may not understand (National Cancer Institute, 2003), (b) require putting important information at the top of the page (National Cancer Institute, 2003; Shneiderman, 1998),

(c) promote concise information presentation (National Cancer Institute, 2003), (d) encourage clustering Web search result so that the user can discriminate and select the ones they need (Kummamuru, Lotlikar, Roy, Singal, & Krishnapuram, 2004; Y. Wang & Kitsuregawa, 2002; Zeng, He, Chen, Ma, & Ma, 2004), and (e) call for descriptive headings to support scanning (National Cancer Institute, 2003).

Implications of the Study

This study has three implications. First, it has identified both support and challenges for developing and implementing an OTCL. This could help decision makers evaluate the feasibility of choosing an OTCL as a resource to assist faculty with online teaching. Second, this study has generated design knowledge, including several high-level design guidelines and a methodology on how to develop an OTCL and related case libraries. This knowledge could be of value to researchers and developers who are interested in building similar case libraries. Third, this research has contributed to the theories and research in several related areas, including challenges of online teaching for professors, faculty change and teaching improvement, faculty needs in online teaching, EPSS, knowledge management systems (KMS), technology acceptance, as well as case-based reasoning and case methods.

Implications for Decision Makers

The first purpose of this study is to identify the initial support for or evidence against an OTCL so that researchers and stakeholders of faculty development could use the findings to help them determine whether to pursue an OTCL as a faculty development solution. This purpose has been fulfilled. The following section discusses the support for developing and using an OTCL as well as the challenges involved.

Support for an OTCL

The results of the study provide support for an OTCL. The underlying concept of an OTCL appealed to faculty participants, because it matches their apprenticeship approach to learning how to teach online. Compared to traditional faculty development resources such as workshops and online teaching books and materials, an OTCL has the following advantages. First, an OTCL provides an environment for faculty to share online teaching experiences. Suggestions in an OTCL are provided in the format of authentic and contextualized stories and case examples. Instead of trying to come up with ways to apply tips and guidelines, the user can modify the existing examples and use them in their own context. Second, as a Web resource, an OTCL is available anytime anywhere. This would be helpful for faculty members who run into a problem and need solutions right at the moment. Third, faculty participants perceived that an OTCL could serve as a "one-stop shop" to provide them with all the relevant resources. Rather than going to different tools for different purposes, faculty may come to an OTCL to address the different aspects of their needs for online teaching.

An OTCL promises to provide a virtual space for a community of online instructors to share course materials and the practical lessons that they have learned from their online teaching experience. This idea coincides with the increasing trend of knowledge management and communities of practice. With more and more tools developed to enable knowledge sharing, faculty may expect to have tools like this to support their teaching.

Challenges

An OTCL is a conceptually appealing tool to faculty. However, faculty may not use this tool unless it provides relevant content to support them in completing their tasks and retrieving the content accurately, completely, and efficiently. It will be time and resource consuming to meet these requirements. First, content gathering may be a complex process. This study indicates that faculty may have diverse needs and may look for both discipline dependent and independent resources. This would require that a lot of information be gathered to make an OTCL useful. All the related projects (Chandler, 1994; Domeshek & Kolodner, 1991, 1992; Domeshek & Kolodner, 1993, 1997; Kolodner, 1991, 1993; Krueger et al., 2003; The Online Tutoring Skills Project Team, 2000; F. Wang, Means et al., 2003) reviewed in chapter 2 follow complex procedures for content gathering and a team of people were involved in this task. Second, faculty members' requirement for usability is another concern. Many usability related issues have emerged from this study. It would require significant amount of time and resources to address them. Most of the related projects involve a group of technical personnel who usually spend several years going through multiple iterations to refine the usability of those case libraries.

Moreover, investing time and resources to develop an OTCL does not necessarily lead to the success of the project. Limited case libraries have been built in related areas, so there is no exact road map to follow and there are many issues to be addressed in future research and development. Some of the issues include determining the optimal scope of the case library, identifying the content gathering procedures and tools, developing a content indexing and retrieval engine, building the user interface,

determining the strategies for building the community and managing the tool, building scaffolds to support case use, and evaluating the effectiveness of the tool. The last section of this chapter will discuss the details of these issues.

Contributions to Design Knowledge

The second purpose of this dissertation research is to generate design knowledge to guide the development of case libraries in the similar context. Two types of design knowledge have been generated, including a set of high-level design guidelines and a methodology on how to develop similar tools. This section presents these two types of design knowledge.

High-Level Design Guidelines

I developed the following design guidelines from the research findings: (a) enhance the perception that an OTCL supports the way faculty learn to teach, (b) enhance perceived usefulness of an OTCL, and (c) enhance the perceived usability of an OTCL.

Enhance the perception that an OTCL supports the way professors learn to teach. Participants in this study perceived that an OTCL could enable their apprenticeship approach toward teaching improvement. They envisioned that an OTCL could help faculty share their experiential knowledge, which could be available anytime anywhere to other faculty. In addition, rather than learning from one or two colleagues, professors could access different perspectives on a problem in an OTCL. This perception has attracted the participants to use an OTCL.

Some design strategies may be taken to enhance this perception. For example, as suggested by Dr. Walker, the metaphor of a human mentor might be considered to design the interface, which could enhance this perception and at the same time improve the

usability of the tool. The use of metaphor has been a common strategy in interface design (Blumenthal, 1990; Marcus, 1994, 1998; Moll-Carrillo, Salomon, Marsh, Suri, & Spreenberg, 1995). For example, it has been part of the design in a related online learning community (Barab et al., 2001), in which a “visiting-the-classroom” metaphor was incorporated into the design to facilitate the navigation of the tool and to augment the perception of a community. Future research may be needed to identify the most appropriate metaphor to use in an OTCL.

Enhance perceived usefulness of an OTCL. Participants in this study would use an OTCL if it could provide relevant resources applicable to their own teaching. To enhance this perception, a task driven strategy should be used to design an OTCL. This strategy has several components.

First, the case library should support both online course design and delivery, and assist faculty who have different experiences and preferences. The task model identified in this study provides guidance on this issue.

Second, a “one-stop shop” of content should be provided to help the user accomplish the tasks. Information related to the subject matter, pedagogy, and the technological solutions should be integrated and organized around the tasks. The types of information and the level of details needed all depend on their relevance to the tasks. The content model identified in this study provides guidance on implementing this strategy.

Third, user tasks not only prescribe the types of content that should be provided, they also provide guidance on system features. The next section discusses guidelines related to the usability of the case library.

Enhance perceived usability of an OTCL. Participants in this study were concerned about how effectively and efficiently they could retrieve relevant information from an OTCL. These issues should be addressed to enhance the perceived usability of the case library. The effectiveness dimension of usability requires that various language issues be addressed. The requirement for efficiency calls for meaningful headings, concise information presentation, appropriate information clustering and sequencing. Findings related to these features provide details on this guideline. This study does not focus on the detailed design of the interface. Therefore, interface design guidelines (Lynch & Horton, 2002; National Cancer Institute, 2003) may be followed to enhance the usability of an OTCL.

A Methodology for Developing Case Libraries for Faculty Development

A methodology on how to develop a case library has evolved from this study. This methodology consists of three components: development research, rapid prototyping, and qualitative methods. Development research (Reeves et al., 2004) (Figure 11) describes the nature of this methodology; rapid prototyping frames the development and research process; qualitative methods may guide data gathering and analysis. The following describes these components and provides a brief rationale for choosing them.

Development research is a unique methodology involving both *development* and *research*. It differs from conventional development method in that development is not its only purpose; the other purpose is to study the development process in order to generate knowledge (Reeves et al., 2004; Richey et al., 2003). This focus on research renders this methodology more rigorous than other development methods. As a research methodology, development research is different from traditional empirical research

methodologies. It deals with real world problems and solutions; Researchers and practitioners work closely with each other to attain the dual purposes of theory and practice; it usually involves an iterative process, during which problems, solutions, and methods evolve over time.

Development research is appropriate to guide the development of case libraries for faculty development. Only a few case libraries have been built in this area, and there are many unresolved issues involved in creating these tools. Developers need to work collaboratively with researchers to address various issues while building these tools. Development research may provide a framework to guide this type of work. Chapter 3 offers more detailed rationale for selecting development research in developing an OTCL.

Rapid prototyping, the second component of this methodology, provides a process view on how individual studies fit into a long-term research agenda to build case libraries (Figure 14). For example, this dissertation project focuses on the first rapid prototyping development cycle to examine faculty members' perceptions of a case library. Rapid prototyping serves as a research model to rapidly prototype and recursively refine design theories (Tripp & Bichelmeyer, 1990). This approach is similar to the idea of incremental theory development (Baldwin & Yadav, 1995) in information systems research, in which research problems are progressively unveiled and addressed in individual research projects, and theories are incrementally developed.

Rapid prototyping can also help structure the development and research procedure for individual studies. Figure 14 reveals that there are three major stages in this dissertation project: conceptualization, development, and research. Figure 1 describes the

details of this process. At the conceptualization stage, I identified the research problem and research questions. Then, I synthesized a problem solution from the literature and developed this solution into the conceptual models of task, content, and features. During the development phase, I implemented the conceptual models in a prototype and addressed a variety of issues involved in prototype development. At the research phase, I conducted a pilot and then a formal study to answer the research questions and identify future research and development issues. This study may serve as a working model to guide prototype development and research in future efforts to build case libraries. Chapter 3 presents the details of the development and research procedure.

A rapid prototyping model is appropriate to structure the development process of case libraries for faculty development. The complexity involved in developing case libraries requires a rapid prototyping process to address various research issues during multiple iterations of the prototype development. Chapter 3 provides detailed justifications for using rapid prototyping in developing an OTCL.

Qualitative methods, the third component of this methodology, may guide data gathering and analysis in some individual studies involved in developing case libraries. One of the contributions of this study is the data gathering process that has evolved during the pilot (Figure 22). This process has three steps: initial interviews, contextual interviews, and final interviews. Initial interviews explore the participants' experiences to ground the evaluation in real situations. Contextual interviews start with an introduction to the conceptual models, followed by scenario reviews, prototype evaluation, and prototype walkthrough. Final interviews examine follow-up questions, participants' overall perceptions, and demographic information. This data gathering process may serve

as a model for those interested in conducting similar studies. Chapter 3 and appendix D present the details on this data gathering process.

Qualitative methods can be appropriate for some individual studies in developing case libraries. For example, it is a proper method for this dissertation research because of the exploratory nature of this study. Chapter 3 offers more detailed justification for the selection of qualitative methods in the dissertation research. However, the reader may need to keep in mind that qualitative methods are only one of multiple types of research methods available to researchers interested in studying the development of case libraries. Van den Akker (1999) argues that research methods in development research are not necessarily different from those in other research approaches. This study shows that quantitative methods may also be appropriate in development research depending on the research issues addressed in individual studies. For example, the qualitative findings from this study may need to be quantified, and quantitative methods may be needed in future research. The section on Suggestions for Future Research discusses this issue.

Other Contributions

Advocates of development research (Reeves & Hedberg, 2003; Reeves et al., 2004; Richey et al., 2003) claim that development studies can be taken to achieve both practical and theoretical goals. On one hand, these studies may address practical problems; on the other hand, they may produce design knowledge. This study has not only attained these two goals, but also contributed to the following overlapping areas of theories and research: challenges of online teaching for professors, faculty change and teaching improvement, faculty needs in online teaching, EPSS, knowledge management

systems (KMS), technology acceptance, as well as case-based reasoning and case methods.

Challenges of Online Teaching for Faculty

The literature reviewed in chapter 2 indicates that online teaching poses many challenges for faculty. This study has contributed to this body of knowledge. It reveals both technical and non-technical issues that online instructors were faced with while teaching online. Technical issues were not the focus of this study, so I did not explore the details of these issues during the interviews. The major non-technical issues include lack of interactivity, requirement for clear instructions, optimal use of online course materials, as well as students' frustration and lack of comfort with the online learning environment. These issues are usually caused by the lack of physical presence in the online environment.

The literature presented in chapter 2 shows that faculty members usually have limited applications of online tools and they have failed to adopt student-centered approach in online teaching. This study provides some contradictory findings. Some professors in this study have used the online tools only to post course materials or to provide students with drill and practice opportunities. Online teaching had no impact on their instructor-centered teaching. However, several others have employed the Web to facilitate student collaboration and discussions or organize problem solving activities. They have adopted innovative and more student-centered approaches to online teaching. This finding is encouraging. However, the reader should be aware that these participants are either faculty in the College of Education or those dedicated to teaching and learning excellence in the university.

Faculty Change and Teaching Improvement

The literature reviewed in chapter 2 shows that faculty change and teaching improvement may occur as professors reflect on their teaching. The practice of teaching and the process of reflection are important for them to learn to teach. This study adds to this body of literature. It confirms professors' apprenticeship approach toward learning to teach. This approach emphasizes the role of trial and error in faculty learning as well as the importance of learning from other professors.

As reviewed in chapter 2, the literature identifies several types of knowledge that can contribute to the faculty reflection process: general pedagogical knowledge, pedagogical content knowledge, content knowledge, knowledge of learners, and experiential knowledge. This study provides more empirical support for these types of knowledge. Moreover, the emphasis on presenting directly applicable technical knowledge together with other types of knowledge to support professors' problem solving is a unique contribution of this study.

Faculty Needs in Online Teaching

Chapter 2 presented the literature related to faculty perceptions of their needs for support in online teaching. Professors prefer to learn about technologies while practicing online teaching, and they need customized and immediately applicable resources in a timely manner. This study has corroborated these findings. Participants in this research perceived that they would need just-in-time resources to support their apprenticeship approach to learning to teach. They would require experiential knowledge representing multiple perspectives to be provided at the time when they encounter problems.

Moreover, this study has the following contributions to the understanding of faculty needs in online teaching.

First, faculty members would ask for a “one-stop shop” of resources to help them with online teaching. Their needs would be driven by their tasks at hand, and they would want a gateway to the following types of knowledge organized around their tasks: technical knowledge, content knowledge, pedagogical and content pedagogical knowledge, as well as experiential knowledge. This finding is in contrast to my original intention to design a tool that solely focuses on providing pedagogical support.

Second, faculty would need a tool that allows them to contribute their own experiences. This has expanded my original vision of this tool from a resource that provides professors with vicarious online teaching experiences to a tool that evolves and grows when users share and add to the knowledge base over time. The new conception of this tool has the characteristics of an EPSS (Gery, 1991; Hannafin, Hill, & McCarthy, 2000) and a KMS (Alavi & Leidner, 2001; KPMG, 1998). It can be thought of as a component of EPSS because it provides just-in-time support with a repository of knowledge; it is also a knowledge management tool because it captures faculty online teaching knowledge and helps develop a community that practices online teaching. Two following sections will discuss contributions of this study to the fields of EPSS and KMS.

Third, the conceptual models of tasks, content types, and features have evolved from this study. They describe the types of support faculty would need from online teaching resources. The task model describes professors’ problem solving tasks in online teaching. The content model illustrates how different types of knowledge may be organized and presented to instructors. This model also identifies the compositions of

cases deemed as important by online instructors. The model of system features presents both functional and non-functional features required by professors. These features reveal faculty information access patterns and requirements. These models can not only provide guidance for researchers and developers interested in case libraries, they may also be of value to other audiences. For example, the task model may be interesting to those concerned with professors' problem solving behaviors in teaching or online teaching. The content model can be useful for researchers investigating the use of cases to support teaching or online teaching. The model of system features may benefit those interested in faculty information seeking behaviors and Website design guidelines.

EPSS

The section on Faculty Needs in Online Teaching argues that an OTCL can be conceptualized as a component of an EPSS. This section discusses two contributions that this study has made to the literature on the EPSS. First, this study provides empirical support for the adopting EPSSs in higher education settings. EPSSs originated as an alternative performance improvement solution in business training settings (Gery, 1991). Recently, researchers (Barab et al., 2001; EduCatalyst, 2004; The Knowledge Loom Project Team, 1999) have made efforts to adopt this approach in the educational settings to provide on-demand information, resources, and tools to teachers. This study adds to this body of literature by providing support for taking the EPSS approach to faculty development in higher education. Second, this study identifies support for providing just-in-time support to faculty with a repository of experiential knowledge integrated with other types of knowledge. This may contribute to the body of literature on the types of information that should be made available in an EPSS.

KMS

As a resource that captures and shares online teaching knowledge, an OTCL can be thought of as a KMS. The following presents two contributions that this study has made to the literature in this area. First, this study identifies empirical support for KMS by examining the perceptions of professors. This adds to the current literature on faculty learning communities. Second, this study enriches the understanding of how individuals with different amounts of experience perceive KMS. As discussed in the Research Results section in this chapter, experienced online instructors expressed more positive perceptions of an OTCL than novice online instructors. This finding was surprising because I intended to capture knowledge in an OTCL in order to help novice online instructors obtain online teaching expertise. I assumed that novices would express more interest in this tool because of their lack of online teaching knowledge. Contrary to my expectation, experienced online instructors shared much interest in this tool. This finding is corroborated by a case study of knowledge management at the National Aeronautics and Space Administration (NASA) (Leonard & Kiron, 2002). In this case study, the researchers expected that the users of the knowledge management systems would be mainly novices, but it turned out that many of the users are those who already have much experience but lack experiential knowledge on certain areas. These findings suggest that knowledge management tools be designed to meet the needs of both novices and those who already have some experience.

Technology Acceptance

In this chapter, the Research Results section compares MPDUO with TAM and DOI, two existing theories on technology acceptance. MPDUO is consistent with these

two theories. Moreover, it contributes to the understanding of technology acceptance in that it translates factors that would impact an individual's perceived decision to use a technological tool directly to the conceptual models that guide the development of this tool. For example, in this study, perceived usefulness and usability are two factors critical to an instructor's decision to adopt an OTCL. These factors require that an OTCL should be applicable, relevant, effective, and efficient. These requirements are embedded in the conceptual models of tasks, content types, and features to guide the development of an OTCL.

Case-based Reasoning and Case Methods in Faculty Development

The use of cases in teaching and learning is a research focus for both the case-based reasoning (CBR) and case methods communities. Little research has been conducted on the use of cases or case libraries in faculty development. This study provides some initial evidence that supports research in this area. Moreover, it provides design knowledge on how to develop case libraries that support faculty online teaching. Details of these design knowledge are available in this chapter. Furthermore, this case library may add to the existing repository of case libraries related to teaching and learning to serve as a sample project to inform similar research.

Limitations

Chapter three presented a set of limitations of the study from the perspective of research design. This section describes additional limitations that emerged during the study.

First, the participants I recruited fall into two extreme camps in terms of their online teaching experience. They are either very experienced online instructors or

professors with little or no online teaching experience. Moreover, experienced online instructors in my study all have backgrounds in education. They are either faculty in the College of Education or advocates of teaching and learning excellence in the university. The characteristics of my sample pose some limitations on the study. The data does not represent the perspectives of professors who are in the middle of the two extreme camps. Moreover, all experienced online instructors in the study have backgrounds in education, so it is unknown whether the differences between experienced online instructors and novice online instructors are associated with their length of online teaching experience, their fields of study, or professional experience advocating teaching and learning. More studies may be needed to validate the findings in this research.

Second, MPDUO, the model I generated to describe faculty overall perceptions of an OTCL does not include social and cultural factors that may impact faculty adoption of this tool. The limitation is caused by the bias in the design of the study. When I interviewed the participants, I directed the participants to focus on factors at the individual level and did not explore social and cultural issues related to an OTCL. Readers of this research should keep in mind that although this study reveals some important findings about faculty perceptions of an OTCL, many more issues should be considered in making any decision related to the adoption of this system. These issues are discussed in the suggestions for future research.

As a first time qualitative researcher, my knowledge, skills, and experience related to qualitative research is the third source of limitation. Although I conducted four pilot studies to practice my interview skills, I noticed multiple occasions where I could have followed up on the participants’ responses, probed more deeply, or asked open

ended questions. There were also situations in which I was distracted by unexpected events or responses and could not focus on the interviews as I would have liked to. For example, when Ms. Nelson tripped over my camcorder and became annoyed by a series of similar incidents, I was so frustrated that I failed to ask some follow-up questions and ended my interviews with her 20 minutes earlier than the other ones. Ms. Nelson is a unique participant in this study. She represents the perspectives of those who have negative attitude toward online teaching and technology in general. Shorter than average interviews with her might have produced inadequate data related to her perceptions. Readers whose job involves providing online teaching assistance to professors like Ms. Nelson may need to be reminded that her perspectives might not have been adequately presented in this study.

Suggestions for Future Research

As discussed in chapter 1, this study can be viewed as the beginning piece of research in a long term development study. Figure 34 shows the outline of a research agenda associated with multiple iterations of an OTCL.

The first iteration of an OTCL is a proof-of-concept prototype. This study is the first step in this iteration. The next step is to quantify findings from the current study.

If researchers or faculty development personnel decide to pursue this solution, multiple iterations would be needed to build a working prototype, and a series of research issues may be addressed in a concurrent or sequential manner.

The first issue relates to the scope of the case library. Should it focus on one or multiple subject areas? Should it be limited to one university or a consortium of

universities? Making it too broad would make it difficult to retrieve and manage the information; if it is too narrow, the tool may not be applicable to many people.

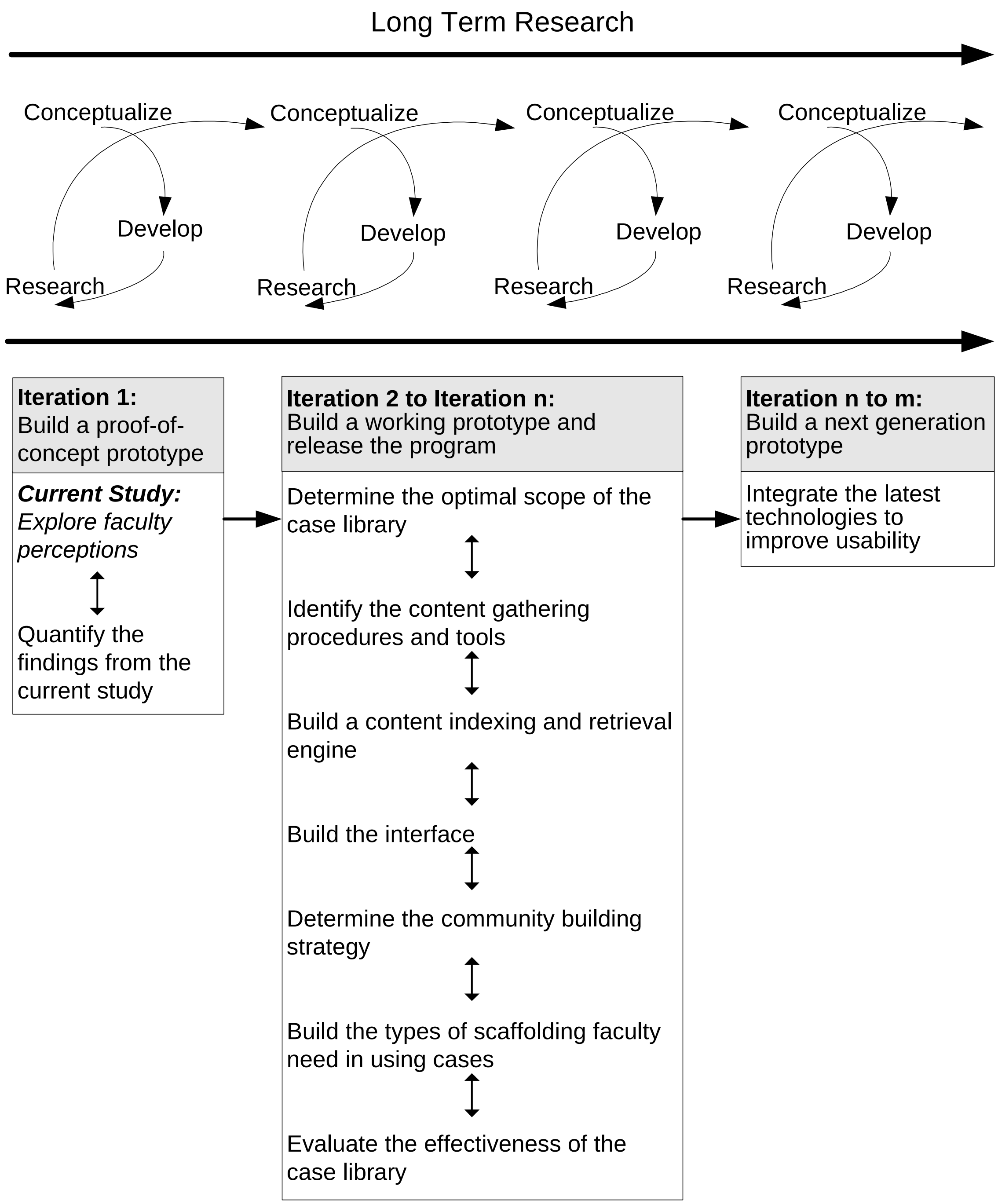


Figure 34. Suggested future research outline.

The second issue involves identifying a set of criteria, processes and tools needed for gathering, selecting and organizing content. In my previous discussions about the challenges involved in developing an OTCL, I stated that other case library projects all involved a team of people in this process. It is important for the teams to follow a common procedure to ensure the consistency and quality of work across team members. Various concerns should be addressed in developing the process, criteria and tools. For example, participants in this study mentioned the issue of controlling the quality of content in an OTCL. Should the cases and stories be examples of best practices or just everyday teaching? Based on CBR, everyday teaching can be qualified as a case as long as it teaches a lesson to professors. However, some participants in a related study (Barab et al., 2001) seemed to only value best practice cases. They mentioned that they would not spend their time reviewing someone's poor teaching. Furthermore, the copyright issue is another related concern. Proper regulations and process should be followed to address this concern.

The development of a content indexing and retrieval engine is the third area that needs to be investigated. This is one of the key tasks involved in developing case libraries (Kolodner, 1993). This study confirms the importance of developing an indexing vocabulary that can be shared by developers and users. How can one capture the important indexing dimensions and values and at the same time address the issue of different terminology used by the user and the developer? This has been a major concern in all related projects reviewed in chapter two. Moreover, this issue has been shared by those in the broader community interested in developing educational systems. Ontological engineering of instructional design (Bourdeau & Mizoguchi, 2002; Breuker

& Bredeweg, 1999; Mizoguchi & Bourdeau, 2000; Woukeu et al., 2003) may be a potential methodology to address this issue. This approach emphasizes modeling and capturing the domain knowledge so that it provides a common language for people and systems to communicate and share. Taking this approach in developing the indexing vocabulary may have the potential of incorporating an OTCL with other educational systems to provide an integrated working and learning environment to faculty (Ma & Harmon, 2004). Such environments capture faculty knowledge, provide them with performance support, and give them access to learning opportunities.

The fourth issue concerns the optimal user interface for an OTCL. The findings of this study emphasize the importance of enhancing faculty's perceived usability of this tool. The design of the user interface is crucial in achieving this goal. In addition, one of the design guidelines suggests that appropriate user interface may add to users' perception that an OTCL supports the sharing of online teaching experience. Research may be conducted to identify the best strategies for designing the user interface that augment these perceptions.

The fifth issue requires identifying strategies for promoting community building and managing the tool. There are two concerns associated with this issue. The first problem relates to the motivation for the user to contribute to the case library. What factors encourage or discourage faculty contribution to the case library? How can one develop a social dynamic that encourages user contribution? These are problems that researchers are still wrestling with in the literature. For example, in a study of online communities (Barab et al., 2001), teachers reported that they were uncomfortable criticizing others' teaching because they were used to working in isolation rather than in a

community. Likewise, Vaughan (2004) found that the biggest challenge to supporting a faculty learning community was getting faculty to participate in the online discussions. The second problem relates to the control and management of user contributions in the community. As suggested by several participants, user contributions may be monitored and decisions should be made with regard to how much control the moderator should have in the community.

The next issue is faculty's ability to reason with cases. Dr. Campbell cautioned during the interview that a potential problem with an OTCL is that some professors might take the extreme experiences of other faculty and apply to their situations without discretion. Some researchers in CBR (Kolodner, Owensby et al., 2003; Owensby & Kolodner, 2002) argued that case application is a complex metacognitive skill that many people do not have, and scaffolding is needed to help them acquire the skills. How competent are online instructors in applying cases in the case library to help them with their own teaching? What kind of scaffolding should be provided to them? These issues may need to be explored in future studies.

The final research area involves the effectiveness of the case library. How does the case library impact faculty online teaching? Has the model developed out of this study accurately described how faculty members use the case library?

After an OTCL is implemented, researchers may start to explore the possibilities of integrating the latest technologies to further improve the usability of an OTCL. A next generation prototype may be built. The content access features identified in this study, including browsing, keyword search, and multiple criteria search are limited to those commonly used on the Web. These technologies are appropriate for users who have a

general need to look for information; for those who have an urgent need for specific information, these technologies may not be very effective (Kendall & Kendall, 1999; Levy, 2004). Instead, technologies such as a personal search agent (Kendall & Kendall, 1999; Levy, 2004) that has knowledge of the users' need and can gather and "push" the appropriate content in a timely manner without users' request would be more appropriate for the online instructors. This would be an interesting area to explore in the future.

Conclusions

The purposes of this study are twofold: (a) to explore faculty perceptions of a case library so that the findings may help researchers and faculty development personnel to make informed decision with regard to the adoption of a case library as a online teaching resource, and (b) to generate design knowledge to enlighten the development of case libraries in the similar context. Four research questions guide the study. These questions examine faculty overall perceptions of an OTCL, as well as their perceptions of the tasks, content types, and features supported by an OTCL.

I followed three development and research phases in the study: conceptualization, development, and research. I developed conceptual models in the conceptualization phase, built them into a prototype in the development phase, and evaluated the prototype in the research phase. Qualitative methods guided data gathering and analysis. The data collection process consists of three stages: initial interviews, contextual interviews, and final interviews. These interviews occurred in one session that ranged from an hour and forty minutes to two hours and ten minutes. A purposeful sampling technique resulted in seven faculty participants. I consulted the analysis methods of Miles and Huberman (1994), as well as LeCompte and Schensul (1999a) to analyze the data.

This study suggests that in general faculty participants had positive perceptions of an OTCL. They reported that they learned to teach from trial and error and from experienced colleagues. They perceived that an OTCL would support this type of learning by providing a virtual space where professors could share online teaching experiences. This perception has positively impacted their perceived decision to use an OTCL. However, their decision would also be influenced by their perceived usefulness and usability of the tool. For an OTCL to be useful, it should provide a gate-way of relevant content to help faculty complete various tasks in online teaching. For it to be usable, a variety of language issues as well as information presentation and organization issues should be resolved to enable the user to complete online teaching related tasks with completeness, accuracy and speed.

This study provides the initial evidence to support the use of an OTCL as an online teaching resource and lists many challenges involved in developing and implementing this solution. It presents a set of high-level design guidelines and a methodology on how to develop such a tool. It also proposes a series of future research issues related to the development of an OTCL. In addition, it contributes to the body of literature in several overlapping areas of theories and research.

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Appendixes

APPENDIX A

USER SCENARIOS

Scenario 1

Background: You are teaching or expect to teach an online course. You had limited experience with online teaching in the past. You feel you need to learn more about online teaching pedagogy. How are other professors in your field teaching online courses similar to yours? Use the tool to find out how other instructors teach similar courses.

Step 1: Navigate to the screen where you can search for or browse a course similar to the one you are teaching. You may want to search by keyword or by multiple criteria. You may also want to just browse the cases based on one criteria at a time.

Step 2: Now that you are on the appropriate screen for entering criteria to find a similar course, use the following to determine your search criteria:

Suppose you are a professor from College of Education. You are teaching a graduate class on how to use the learning theories in designing course activities. You want students to learn by solving course design problems in groups. You are interested in learning how other professors are teaching similar courses online.

Step 3: Once the system provides you with a list of similar cases, view the details of the most relevant case.

Step 4: Once you have an idea of the case, you want to get more details and learn about how the course exactly look like and what course materials have been used. Navigate to the screen to view the case materials.

Step 5: After reading the descriptions and reviewing the course materials, you wonder what issues the professor has encountered and how he/she has resolved it. Navigate to the screen to view a list of lessons learned.

Step 6: While reading the list of lessons learned, you become interested in a specific lesson learned. Navigate to the screen where you can view the details of the lesson learned.

Step 7: After reading the details of the lesson, you want to learn more about this topic. Navigate to the appropriate screen to read more on the topic.

Step 8: While reviewing this case, you have a comment or a related experience you want to contribute. Navigate to the screen where you can contribute your thoughts and experience.

Scenario 2

Background: One thing that really bothers you about online teaching is that students are not willing to participant in the discussion board. When they do participate, many of the postings are superficial, such as “I agree with you” and “I like your comments.” What can you do to have more meaningful discussions on the discussion board? Use the tool to find the answer in the Online Teaching Case Library.

Step 1: Navigate to the screen where you can search for or browse a topic that helps answer your question.

Step 2: Enter the appropriate search criteria or choose an appropriate topic.

Step 3: Once the system provides you with a list of topics, view the details of the most relevant topic.

Step 4: After reading the stories associated with the topic, you wonder about the background of this story. Navigate to the appropriate screen to view the background.

Step 5: While reviewing this topic, you have a comment or a related experience you want to contribute. Navigate to the screen where you can contribute your thoughts and experience.

APPENDIX B

OBJECT ACTION TABLES

Table B1

Scenario 1

Object/Sub-Object	Attributes	User Actions	GUI Objects
Case Search	Subject area Types of learning Student level (Graduate vs. Undergraduate) Teaching strategy	Enter case search criteria Navigate	Drop down menu Check boxes Left navigation bar Submit button
Case Browse	Subject area Types of learning Student level (Graduate vs. Undergraduate) Teaching strategy	Enter case browse criteria Navigate	Drop down menu First level navigation bar Submit button
Keyword Search	Keyword Types of search (Search for Case or Search for Topic)	Enter keywords Select the type of search	Text box Drop down menu Submit button
Case Search/Browse Result	Case number Case similarity Subject area Student level Case summary	Select case Navigate	First level navigation bar Hyperlink Text

Table B1 (Continued)

Scenario 1

Object/Sub-Object	Attributes	User Actions	GUI Objects
Case Description	College/School Instructor Online Teaching Experience Student Level Case Background Types of Learning Class Activities Course Outcome	View content Navigate	First level navigation bar Second level navigation bar
Case Materials	Course Website URL	Navigate	Hyperlink First level navigation bar Second level navigation bar
Lessons Learned	Lessons	View content Navigate	Hyperlink First level navigation bar Second level navigation bar
Lesson	Problem Solution Outcome More on the topic	View content Navigate	Hyperlink First level navigation bar Second level navigation bar

Table B2

Scenario 2

Object/Sub-Object	Attributes	User Actions	GUI Objects
Common Topics	Topic names	View content Navigate	Hyperlink First level navigation bar
Subtopics	Topic names	View content Navigate	Hyperlink First level navigation bar
Keyword Search	Keyword Types of search (Search for Case or Search for Topic)	Enter keywords Select the type of search	Text box Drop down menu Submit button
Keyword Search Result	Topic number Topic similarity Topic name	Select topic Navigate	First level navigation bar Hyperlink Text
Topic	Theoretical Perspectives Stories	View content Navigate	Hyperlink First level navigation bar Second level navigation bar Text

APPENDIX C

SAMPLE LETTER FOR PARTICIPANT SCREENING

Dear (Participant Name),

It is great that you are willing to participate in my study. Thank you very much! I am planning to gather the data as soon as possible. I wonder whether you will have time next week. If not, what is the best time for you in the next few weeks?

I will appreciate it if you can take a couple of minutes to answer the following questions:

1. How long have you taught online? In this study, online teaching is defined as teaching that involves class interactions using Internet communication software such as emails, discussion boards, and chat rooms. It refers to teaching and learning that is totally online or hybrid (with both face-to-face meetings and virtual sessions).

2. How many online course sessions have you taught in total? (Note: A course can be taught many times. Please count every course session.).

3. How many different online courses have you taught in total? (Note: Please do not count repeated course sessions.).

4. How familiar are you with the use of case studies in teaching? (Please choose from one of the following.)
A. Very familiar B. Familiar C. Heard about it but not familiar
D. Never heard about it

5. How often have you used case studies in teaching? (Please choose from one of the following.)
A. Very often B. Sometimes C. Occasionally
D. Never

Sincerely,

Yuxin Ma

APPENDIX D

DATA GATHERING PROTOCOL

Introduction

Thank you for taking your time to participate in this study!

You will review a prototype of a tool developed to assist faculty with online teaching. There are two goals I want to achieve with this study: 1) how instructors think about this tool; 2) what instructors need from this tool.

I will first ask you some questions about your online teaching experience, review a couple of flowcharts with you to get your feedback, go through some scenarios together with the use of a prototype, and then ask you some final questions.

The study will take about two hours of your time.

Initial Interview

Interview Guide:

1. Tell me about your online teaching experiences. In this study, online teaching is defined as teaching that involves class interactions using Internet communication software such as emails, discussion boards, and chat rooms. It refers to teaching and learning that is totally online or hybrid (with both face-to-face meetings and virtual sessions).
    - Overview
    - Challenges (non-technical, related to teaching and learning)
2. How have you learned to teach *online*?
    - If you have never taught online, how will you figure out how to teach online if you are required to do so?
3. What kinds of resources do you use to help with your online teaching?
    - Normally use
    - Wish to have
    - Related to content and teaching techniques
4. What do you think about having access to online teaching cases which show you how other professors are teaching online and what lessons they have learned?
    - Things like, things dislike
    - Usefulness
    - How would you use them?

Contextual Interview

Step 1: Introduce the conceptual models and obtain initial feedback

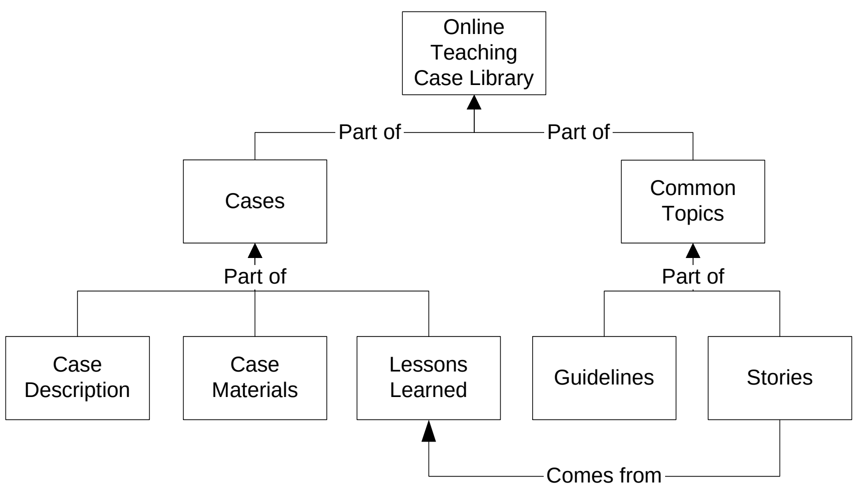
This tool is called Online Teaching Case Library. It stores faculty members' online teaching cases. A case represents experience and lessons learned associated with a course. The case library can serve as a support tool that provides just-in-time assistance to professors with regard to online teaching pedagogy. For example, if a faculty member needs pedagogical assistance on how to facilitate a chat session, he or she can conduct a search in the case library to see what strategies other faculty members have adopted in facilitating a chat session in their classrooms, what has worked and what lessons they have learned. Related guidelines and principles on facilitating a discussion board can also be presented.

Introduce the types of tasks, content and features provided in the Online Teaching Case Library using the three conceptual models: task model, content model and feature model.

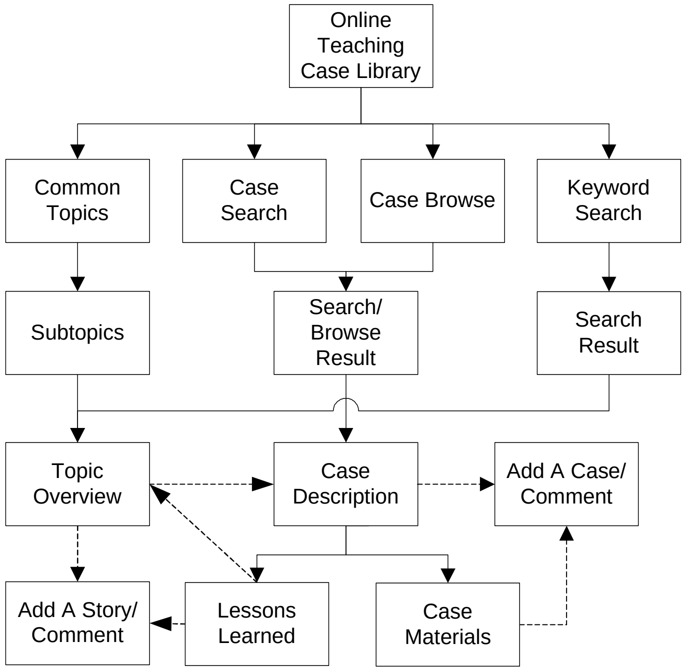
Tasks:

- Orientation and issue discovery
- Issue exploration and solution generation

Content Model:



Conceptual Model of Features:



Ask the following question after the introduction of the models: What do you think about the tool described in the introduction?

- Things like, things dislike
- What is missing?
- How would you use them?

Step 2: Scenario review, prototype exploration, and prototype walkthrough

Put each scenario on a piece of paper. Give the participant one scenario at a time.

Explain that the prototype is based on a few specific problem situations and the subject matter may not match theirs.

Scenario 1
You are teaching or expect to teach an online course. You feel you need to learn more about online teaching pedagogy. How are other professors in your field teaching online courses similar to yours?

Task: Find out how other professors teach similar subject matter in the online environment so that you can borrow ideas and learn from them.

Scenario Review

- What do you think about this scenario?

  - How common is the scenario?
- Tell me about a similar experience you have had or expect to have.

Prototype Exploration

- Introduce the prototype:
  - A mock-up of some ideas
  - Used as a communication tool
  - Feel free to criticize
- Ask the participant to explore the prototype using the situation they have described.
  - Find out how other professors teach similar subject matter in the online environment so that you can borrow ideas and learn from them.
- Ask him/her questions for every step.
  - What is your next step?
  - Why do you do this?
  - What do you expect to see?
  - What do you think about this?
  - What is missing?
  - How would you use this?
  - How often would you use this?
  - Find the appropriate screen for him/her if s/he does not go to the right page. However, ask them how they think about the types of content provided.

Prototype Walkthrough

- Walk the participant through the features that he/she has not seen. Ask for their opinion.
  - What do you think about this feature?
  - How would you use this feature?
  - How often would you use this feature?

Scenario 2

One thing that really bothers you about online teaching is that students are not willing to participant in the discussion board. When they do participate, many of the postings are superficial, such as “I agree with you” and “I like your comments.” What can you do to help your students to have more meaningful discussions on the discussion board?

Task: Find the answer to this question in the Online Teaching Case Library.

Scenario Review

- What do you think about this scenario?
  - How common is the scenario?
- Tell me about a similar experience you have had or expect to have.

Prototype Exploration

- Ask the participant to explore the prototype using the situation they have described.
    - Find the answer in the Online Teaching Case Library.
- Ask him/her questions for every step.
    - What is your next step?
    - Why do you do this?
    - What do you expect to see?
    - What do you think about this?
    - How would you use this?
    - How often would you use this?
    - Find the appropriate screen for him/her if s/he go to the right page. However, ask them how they think about the types of content provided.

Prototype Walkthrough

- Walk the participant through the features that he/she has not seen. Ask their opinion about them.
    - What do you think about this feature?
    - How would you use this feature?
    - How often would you use this feature?

Final Interview

Interview Guide

1. Now that you had some interactions with a prototype of the Online Teaching Case Library, what do you think about it?
    - Strengths and weakness
    - Things like, things dislike
    - Most useful components, lest useful components
    - Most useful features, lest useful features
    - Things (components or features) that should be changed
    - Things that are missing
2. How would you use the tool?
3. How often would you use the tool?
4. What do you think about the scenarios you have completed?
    - What is missing?
5. What do you think about the types of resources provided in the case library? What other types of resources do you need? (Common topics, case description, lessons learned)

Ask the following demographic information if it has not been collected.

1. What college do you work?
2. What department?
3. Rank? Professor, associate professors, assistant professor, adjunct professor or instructor?
4. Age group?

5. In what year did you receive your terminal degree?
6. How many years have you been teaching at this university?
7. What is the total number of years you have been teaching?
8. What types of students do you teach? Graduate or undergraduate?

APPENDIX E

DATA GATHERING MATERIALS CHECKLIST

Equipment:
- Tapes, tape recorder, and battery
- Camcorder and Mini-DV tapes
- Tripod
- Laptop

Documents:
- Data Gathering Protocol
- Models and Scenarios
- Consent Form
- Notepad for notes

Equipment checking:
- Check scan converter
- Voice recorder
- Check camcorder

APPENDIX F

CONSENT FORM

Georgia State University
Department of Middle/Secondary Education and Instructional Technology

Informed Consent Form

Title:	A Case Library as a Faculty Online Teaching Support Tool: Formative Evaluation of a Prototype
Principal Investigator:	Yuxin Ma

Introduction
You have been asked to volunteer for a research study. You will evaluate a prototype of a system developed to assist faculty in online teaching. The research will study how faculty members think about this tool. It will also identify how a prototype of the tool meets their needs.

Your participation will last around two hours. About 15 faculty members will participate in the study.

Procedure
The primary research procedure requires you to evaluate a prototype of the system. Before the evaluation, you will be interviewed. The researcher will gather some background information about you. You will have an opportunity to practice thinking aloud. During your evaluation of the system, you will be given a list of tasks to perform. You will be asked to think-aloud while performing the tasks. A video camera will record how you carry out the tasks. After the evaluation, you will be interviewed again. The researcher will ask for your perceptions of the tool. You will interact with one researcher throughout the study. The research procedure will be performed in an office in College of Education at Georgia State University. The procedure will be performed one time with you. It will last about two hours.

Risks
There is no major risk for you in the study. You will be observed and video-taped when you complete tasks on the computer and think aloud. It may cause some anxiety or frustration to you. Interviews about your background and your experience with the prototype may cause some anxiety too. However, the harm from the study is no greater

than that in routine exams. To reduce your discomfort, the researcher will assure you that the goal of the study is to improve the system. It is not to judge your ability in using the system.

Benefits

This research will study a beginning effort in developing a tool to assist faculty with online teaching. The findings of the research will be used to improve the tool in the future. As a result of the study, you and other faculty members can be better supported in the future.

Voluntary Participation and Withdrawal

Participation in research is voluntary. You have the right to refuse to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time. You may skip questions or discontinue participation at any time. Whatever you decide, you will not lose any benefits to which you are otherwise entitled.

Confidentiality

We will keep your records private to the extent allowed by law. We will use a record number rather than your name on study records where we can. Your name, image and other facts that might point to you will not appear when we present this study or publish its results. The findings will be summarized and reported in group form. You will not be identified personally.

Contact Persons

Call Ms. Yuxin Ma at 404-828-6028, or her advisor, Dr. Steve Harmon at 404-651-2349 if you have questions about this study. If you have questions or concerns about your rights as a participant in this research study, you may contact the Institutional Review Board (IRB) which oversees the protection of human research participants. Shannon D. Herbert can be reached at 404-651-4689.

We will give you a copy of this consent form to keep.

If you are willing to volunteer for this research, please sign below.

Subject	Date
Principal Investigator	Date

Date Consent Form was approved by GSU IRB: 12/16/2003
Date Consent Form no longer will be in effect: 12/16/2004

APPENDIX G

SAMPLE PAGE OF INTERVIEW TRANSCRIPT

Note: P stands for the participant; M refers to me, the interviewer.

P: So I will probably do a case search

M: Why do you want to do that?

P: To see what other types of things other people have done.

M: OK. Among all those other features, why did you pick this one?

P: Well. Since it is not necessarily the online teaching topic that I am concerned with at this point. I want more a big picture of what's going on, and this looks much more specific (she pointed to the description about common topics on the homepage.)

M: OK. Alright. Ok, then go ahead.

P: (She clicked on the link Case Search on the homepage.) Good. OK. Can I click both of these to see what they do? Browse the cases…(she clicked on the link Browse Cases.)

M: Oh yeah. Why do you want to click…?

P: I want to browse the cases. And I think that is really helpful that they are categorized. I was kind of afraid that you will have a huge long laundry list of cases even though I know you don't have one …Subject area makes a lot sense. Learner types as well, learning objectives. You know I will be curious to click and see what learning objectives are? (She clicked on the link Learning Objective Types.)

M: OK.

P: So what do you want your students to learn? (Read from the screen) Oh wow! That's kind of cool. (She clicked on the dropdown box to show the choices for learning objective types.) You have a dropdown. Neat! That's helpful to me. Because this has been a field to type in something, I may be looking for something that doesn't exist on here. At least this gives you some idea of what the possibilities are. So that's really helpful to me, actually. Wanna go back for just a minute. (She clicked on the Back button to go back the page Browse Cases.)

APPENDIX H

CONTACT SUMMARY SHEET

Participant ID:
Date:

1. Overall perceptions of the tool

2. Perceptions of tasks

3. Perceptions of content

4. Perceptions of features

5. What overall themes or issues have emerged so far?

APPENDIX I

START LIST CODES

Code	Definitions
	Background
TEACHEXPERIEN	Online teaching experience
LEARHTEACH	Learn to teach
	Tasks
ORIENT	Orientation
MATREVIEW	Materials review
ISSUEDISCOV	Issue discovery
SPECIFPROB	Specific problem solving
	Content
CASE	Case
CASEDESCR	Case Description
CASEMAT	Case Materials
LESSON	Lessons Learned
TOPIC	Common Topic
GUIDLINE	Guidelines
STORY	Stories
	Features
TOPICBROWSE	Common topic browse
CASESEARCH	Case search
CASEBROWSE	Case browse
KEYSEARCHTOP	Keyword search (topic)
KEYSEARCHCASE	Keyword search (case)
CASESEARCHRES	Case search results
KEYSEARCHRES	Keyword search results
CASETOTOPIC	Case to topic
TOPICTOCASE	Topic to case
ADDSTORY	Add story
ADDCOMMENT	Add comment
	Overall Perceptions
USEFULNESS	Usefulness
LIKE	Like
DISLIKE	Dislike

APPENDIX J

STRUCTURE OF THE ANALYSIS DATABASE

Table J1

Code Table

Field Name	Data Type
CodeID (Primary key)	AutoNumber
CodeName	Text
CodeCategoryID	Number

Table J2

Participant Table

Field Name	Data Type
ParticipantID (Primary key)	AutoNumber
Pseudonym	Text
AcademicUnit	Text
Gender	Text
Age	Text
Rank	Text
HighestDegreeEarned	Text
YearsTeaching	Text
YearsTeachingAtCurrentUniv	Text

Table J3

Script Table

Field Name	Data Type
ScriptID (Primary key)	AutoNumber
Script	Memo
ParticipantID	Number

Table J4

AssignCode Table

Field Name	Data Type
AssignCodeID (Primary key)	AutoNumber
CodeID	Number
ScriptID	Number

Table J5

CodeCategory Table

Field Name	Data Type
CodeCategoryID (Primary key)	AutoNumber
CategoryName	Number

APPENDIX K

FINAL CODES

Code	Framing Question
Background	
OnlineTeachExperience	1
CaseUse	1
TerminalDegree	1
TeachExperience	1
HowToUseCase	1
OnlineLearnTeach	1
AttitudeTowardTechnology	1
TrialError	1
Challenge	1
PeopleAsResource	1
Role	1
ReasonsForCaseLibrary	
Apprenticeship	1
DialogSharing	1
MultiplePerspectives	1
Timely	1
UsefulnessAudience	1
UsefulnessHow	1
Applicability	1
OneStopShop	1
Relevance	1

Tasks	
ExplorePossibilities	2
DiscoverProblems	2
ProblemSolve	2
TechnicalImplementation	2
AddCase	2
AddStoryComment	2
TaskCaseConnection	2
TaskTopicConnection	2
TaskStage	2
TaskPreference	2
TaskExperience	2
Case	
CaseBackgroundImportance	3
CaseBackgroundSetup	3
StudentLearning	3
LearningOutcome	3
ClassOutcome	3
TeachingStrategy	3
LessonLearnedImportance	3
LessonLearnedSetup	3
Topic	
TheoryPractice	3
TopicComponents	3
OtherContentType	
AddStoryCommentContent	3
TechnicalImplementation	3

Effectiveness	4
ContentAccess	
PersonalPreference	4
FeaturePurpose	4
MultipleAccess	4
CaseBrowse	4
CaseKeywordSearch	4
CaseSearch	4
CaseSearchResult	4
TopicBrowse	4
TopicKeywordSearch	4
TopicKeywordSearchResult	4
TopicSearch	4
TechnicalImplementation	4
AddStoryCommentFeature	4
InterConnect	4
CaseToTopic	4
TopicToCase	4
SummaryToSpecifics	4
ExternalLink	4
Language	
VocabularyGeneralComments	4
CaseDefinition	4
CaseConfusion	4
CaseTopicConfusion	4
VocabularyKeyword	4
IndexCompleteness	4
IndexDiscrepancyInMeaning	4
ValueCompleteness	4
ValueDifferentTerminology	4

ValueDiscrepancyInMeaning	4
ValueGeneralOrSpecific	4
TopicDiscrepancyInMeaning	4
OtherDiscrepancyInMeaning	4
Efficiency	4
Heading	4
Concise	4
ImportantInfoLocation	4
TopicOrganization	4
StoryOrganization	4
FutureIssues	4
Judgment	4
Moderator	4
Scope	4

APPENDIX L

SAMPLE PAGES FROM REFLECTIVE JOURNAL

11/20/04
I just started to code my data. It seems that the start list code is far from enough. I kept coming up with new code that I used to code the data, but I am not sure where it fits into my analysis plan. My common sense tells me that I should not lose any of my ideas, so the temporary solution is to use a different color for codes that are not on the start list.

11/24/04
Someone's posting on ITForum reminds me of my thoughts about the use of stories in teaching and learning. Discussion forum is a perfect place for storytelling. This is confirmed by my data. Some of my participants said that they would be more interested in posting stories and comments if it is like an email list where there is ongoing dialog. Posting on a Webpage seems to be less appealing. One interesting topic related to the use of storytelling is that based on my experience of the baby discussion board. Since people who post messages usually have difficult problems. So after I read the postings, my outlook of pregnancy and babysitting was pretty pessimistic. I made wrong decisions because of my reading of the postings. For example, Maggie cried almost every night during the first several weeks. I decided that she is colic based on my readings of the postings. It turned out that she was hungry. Because of the problems posted on the discussion board, I was very stressed. It turned out that Maggie is easier than I have expected. This experience makes me wonder about how we can best use stories to help with problem solving. How do we scaffold problem solving with the use of stories? How do you use critical thinking in the use of storytelling?

12/06/04
I started my data analysis again today. I don't know whether I should spend more time reading others' dissertations or it would be better to go ahead to start working on my own analysis. I decided that readings will be more meaningful after I get into my data analysis process. When I run into problems, I can find out answers in the book. Right now, I will just depend on my previous reading of data analysis and my analytical skills in general. I coded the transcript of my first interview and soon found that my start list of codes is not adequate. I am adding more codes when I go through my transcripts. One advantage of coding the transcript is for me to break down the information I have gathered so that it will help me when I put the information back together again.

When I am coding the transcript for the first participant, I found that I am not exactly following the data analysis prescribed by Miles and Huberman. While most of my codes in this pass are descriptive in nature, I also come up with some inferential codes such as

vocabulary because different understanding of the words in the prototype has become a very significant issue. I heard that again and again in my interviews.

I am starting to see problems with my coding. One of my codes is applicability. This can be too broad. It can relate to things like easy access to content, getting rid of irrelevant information, get details about assignments, activities and assessment.

12/07/04
I was reading the transcript of the second participant. She is very concerned of the quality of the library if people are allowed to put in their experience. Then, if you do have a person to control the quality, there is the issue of discretion. Even if the postings are valid, people may not use critical thinking or case-based reasoning when it comes to case application. So there are three issues: appropriateness of postings, moderator, postings with enough elaboration to support critical thinking and case reuse.

12/08/04
During the interviews, I found that my participants keep talking about their technical challenges even when I asked them to focus on issues related to teaching and learning. Maybe it's because when faculty need help with online teaching, they would not first think about whether this is technical issues, WebCT issues, content issues, or issues related to general pedagogy. They have a problem and they look for answers. It would be a pain for them to first identify the types of problems that they have and they go to different resources to find the answer. They need what the second participant called "one stop shop".

12/10/04
I was very frustrated with my 5th participant, because I felt I did not get relevant data from her during the interview. Now I'm transcribing the data, I thought it was not bad. She did have some interesting perceptions on things. The reason I was frustrated is probably because the little accident we had at the beginning of the session when she knocked over my camcorder and then she was discouraged when she did not find the Spanish course in the prototype. When I played back the recording, I could still feel the stress and tension during the first part of the interview.

Analyzing the interviews helped me realize the importance of providing information on class activities. That's exactly what Kolodner's project has done. I did not appreciate during my literature review. I guess that's why the quality of developmental and qualitative research largely depends on the researcher, who is an instrument of research.

12/12/04
When I was reading the transcript for the last participant, I noticed that he was not very consistent in his responses. Maybe a good analysis would be to compare their responses before and after the interventions.

APPENDIX M

SCREEN CAPTURE: CASE BROWSE

APPENDIX N

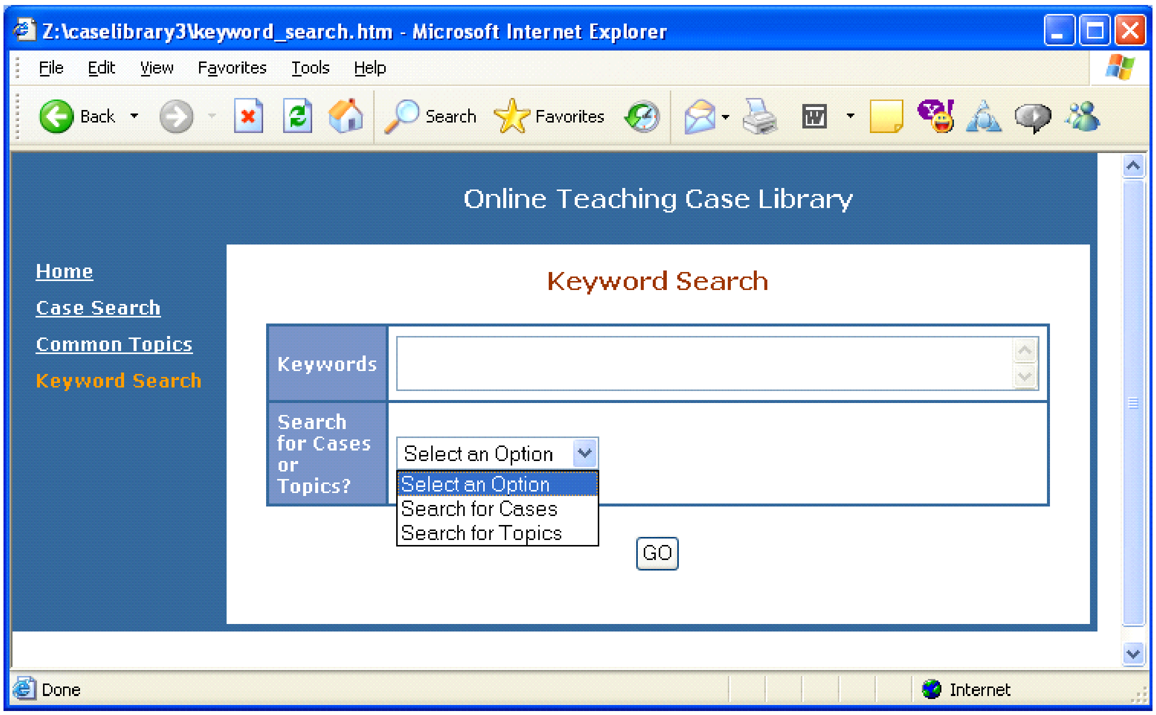
CASE INDEXING VOCABULARY

Dimensions	Values
Subject Areas	Business
	Education
	Fine and Applied Arts
	Health and Medical
	Law
	Policy Studies
	Science
	Social Science
Learning Outcomes	Information Recall
	Information comprehension as demonstrated in presentation
	Generate rules, procedures and principles
	Solve text-book problems
	Make decisions
	Diagnose and generate solution
	Use tactic to meet strategy
	Analyze systems to generate problems and solutions
	Design product, system, process, or course
	Address dilemma (issue-based) problems
Student Types	Graduate
	Undergraduate

Dimensions	Values
Teaching Strategies	Problem-solving
	Lecture/presentation
	Simulation/gaming/role play
	Demonstration/modeling
	Drill and practice
	Discussion, seminar
	Group learning

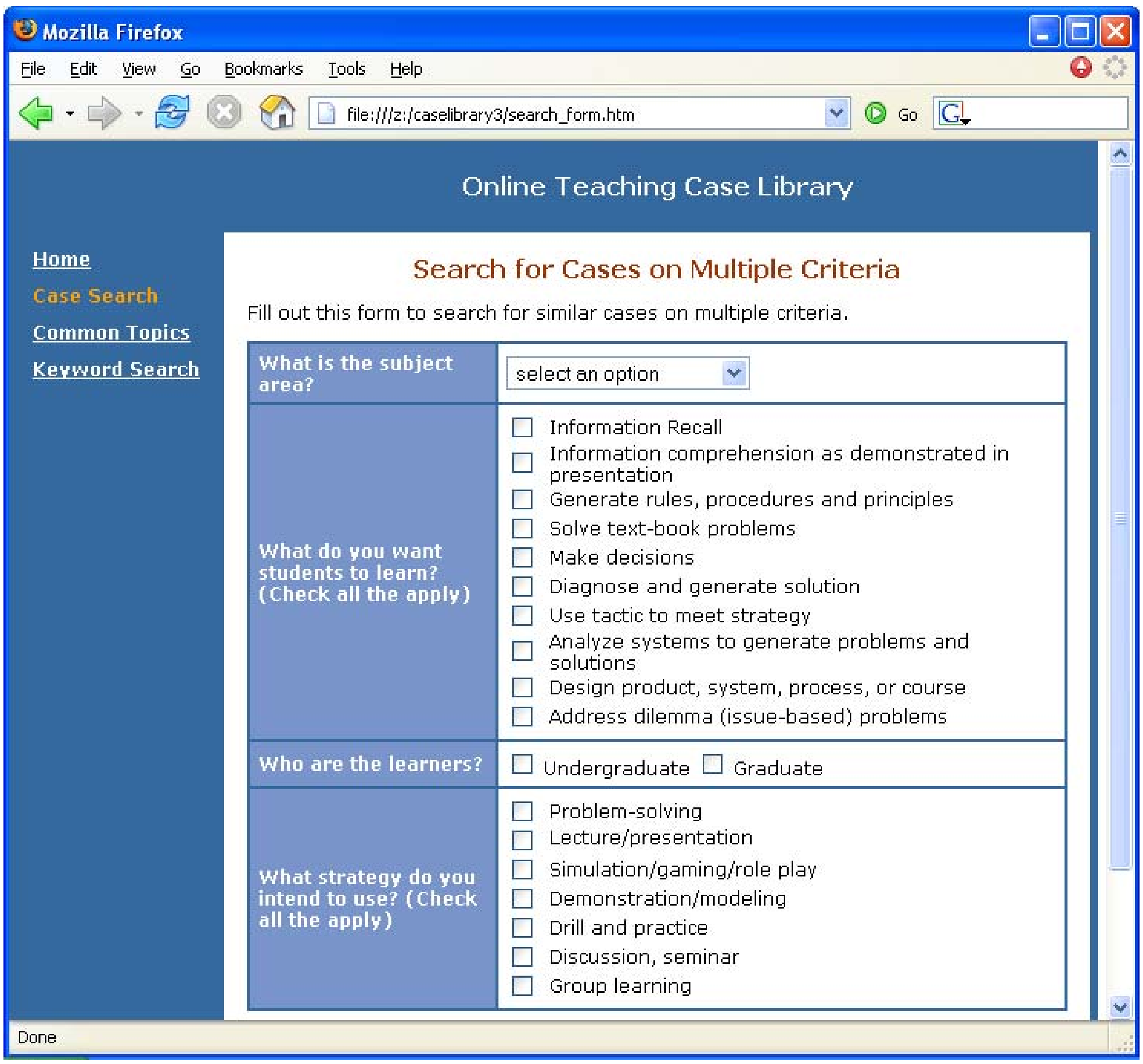
APPENDIX O

SCREEN CAPTURE: KEYWORD SEARCH FOR CASES OR TOPICS



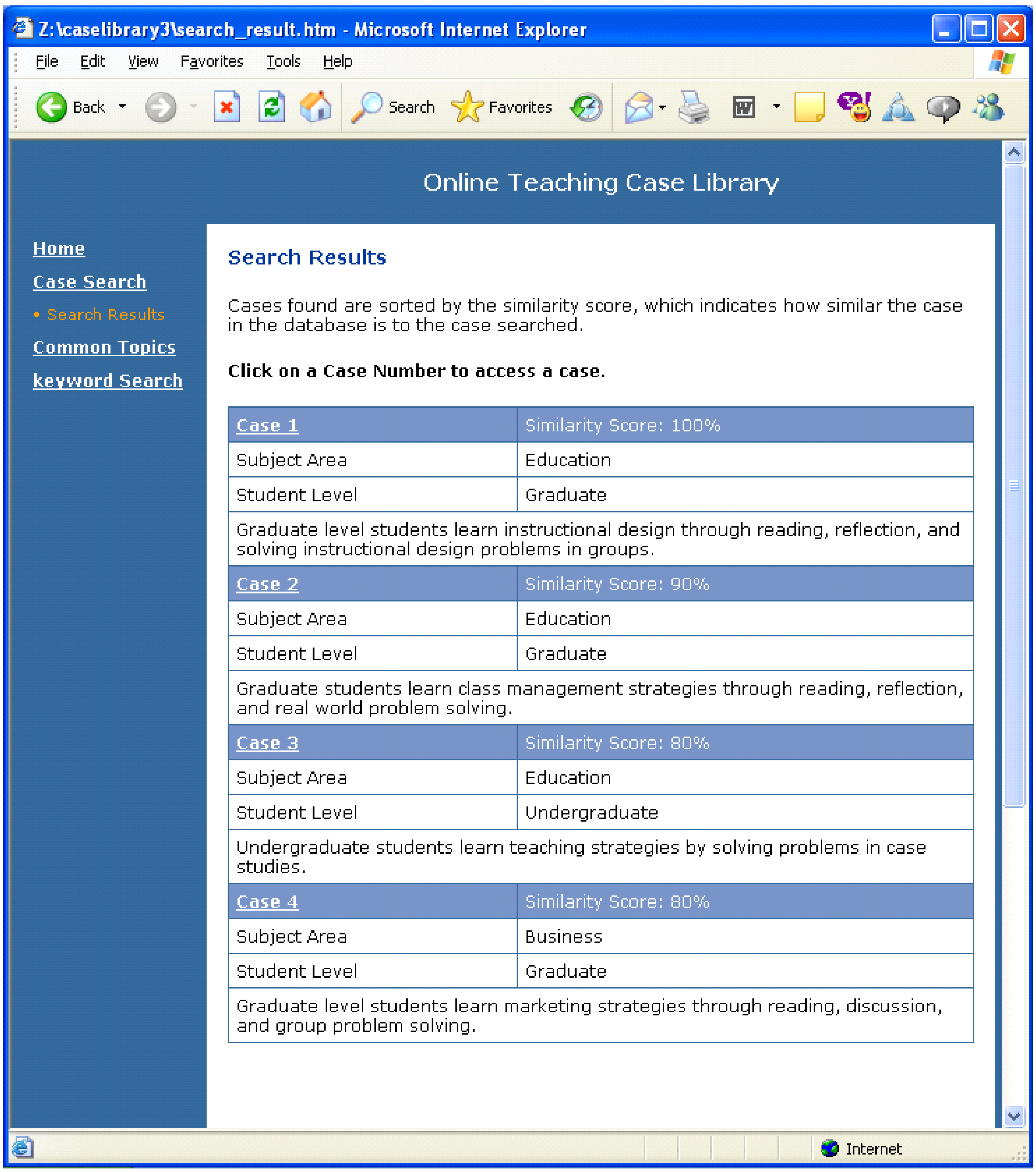
APPENDIX P

SCREEN CAPTURE: CASE SEARCH



APPENDIX Q

SCREEN CAPTURE: CASE SEARCH RESULTS



Z:\caselibrary3\search_result.htm - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites

Online Teaching Case Library

Home

Case Search

• Search Results

Common Topics

keyword Search

Search Results

Cases found are sorted by the similarity score, which indicates how similar the case in the database is to the case searched.

Click on a Case Number to access a case.

Case 1	Similarity Score: 100%
Subject Area	Education
Student Level	Graduate
Graduate level students learn instructional design through reading, reflection, and solving instructional design problems in groups.	
Case 2	Similarity Score: 90%
Subject Area	Education
Student Level	Graduate
Graduate students learn class management strategies through reading, reflection, and real world problem solving.	
Case 3	Similarity Score: 80%
Subject Area	Education
Student Level	Undergraduate
Undergraduate students learn teaching strategies by solving problems in case studies.	
Case 4	Similarity Score: 80%
Subject Area	Business
Student Level	Graduate
Graduate level students learn marketing strategies through reading, discussion, and group problem solving.	

Internet

APPENDIX R

SCREEN CAPTURE: TOPIC BROWSE

Figure R1

Topic browse screen one

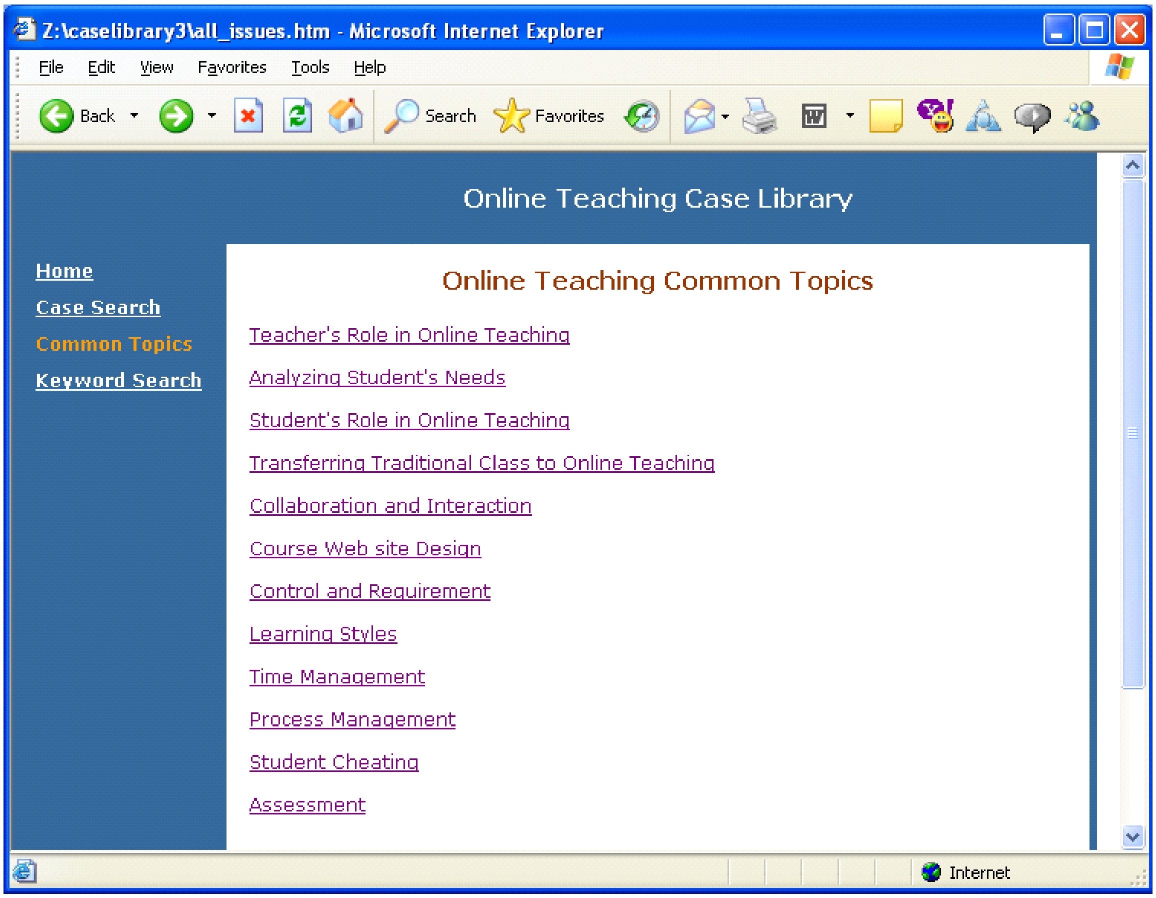
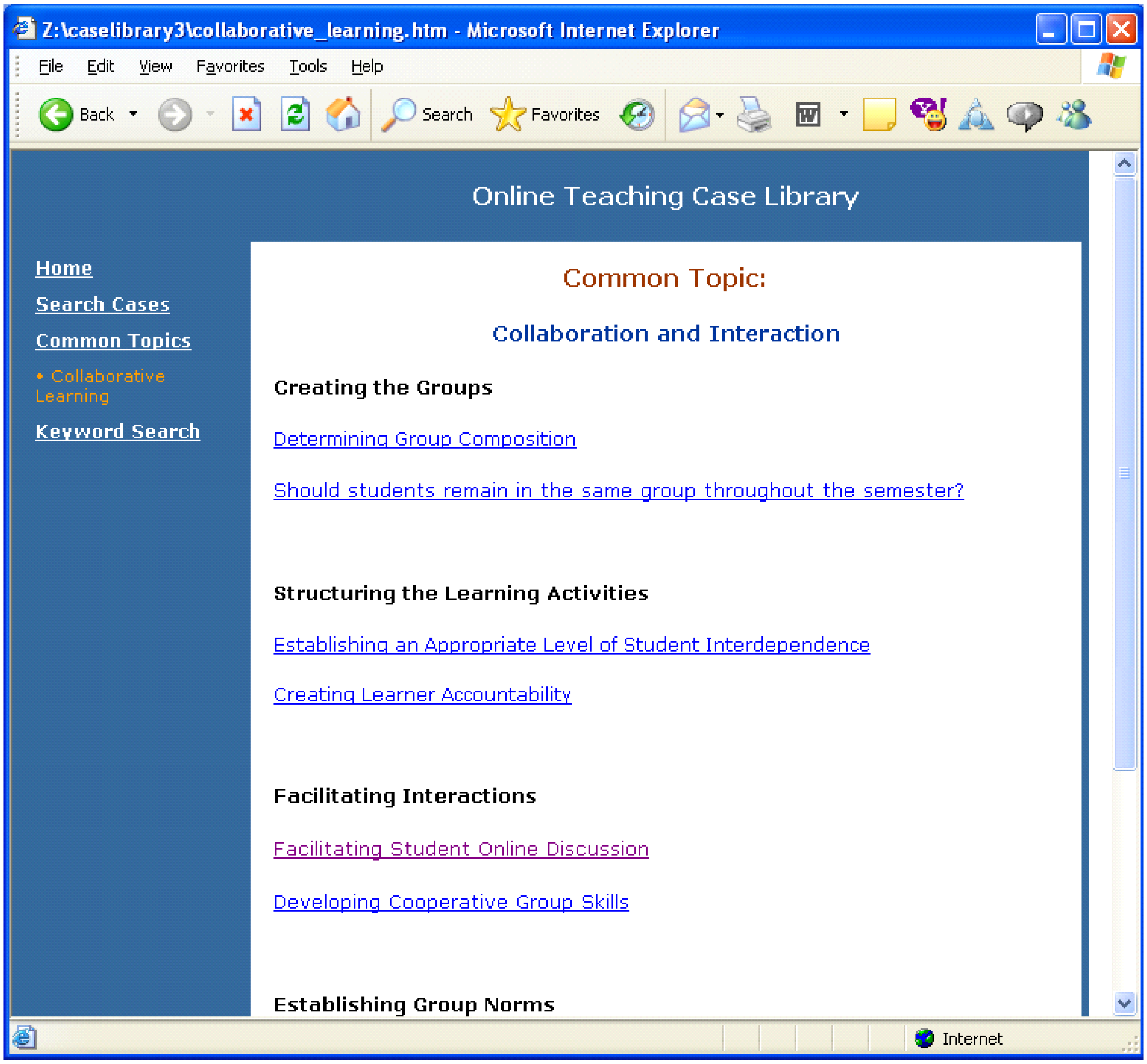


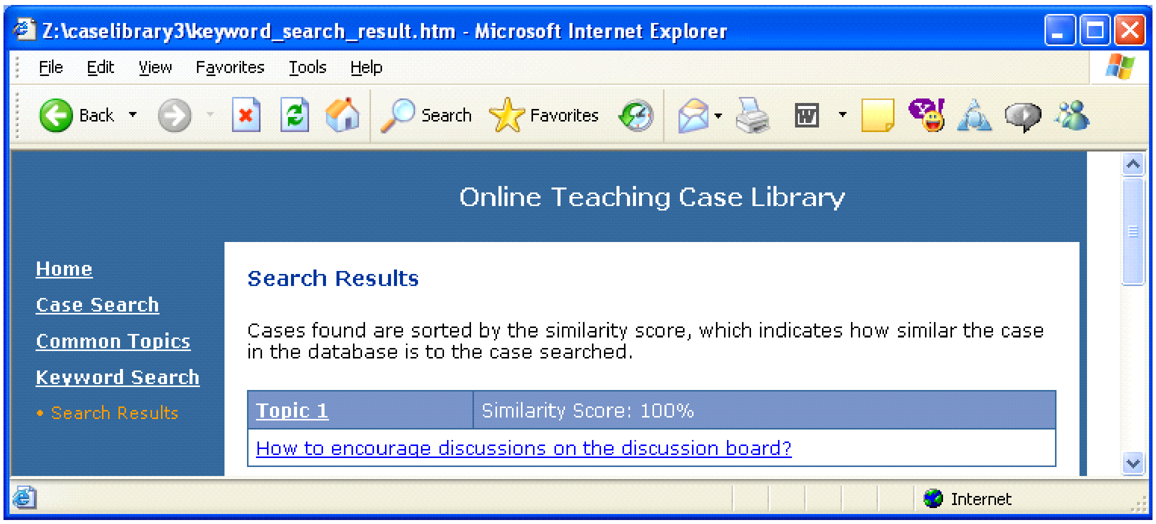
Figure R2

Topic browse screen two



APPENDIX S

SCREEN CAPTURE: TOPIC SEARCH RESULTS



APPENDIX T

SCREEN CAPTURE: ADD STORIES/COMMENTS

Figure T1

Add a story to a topic

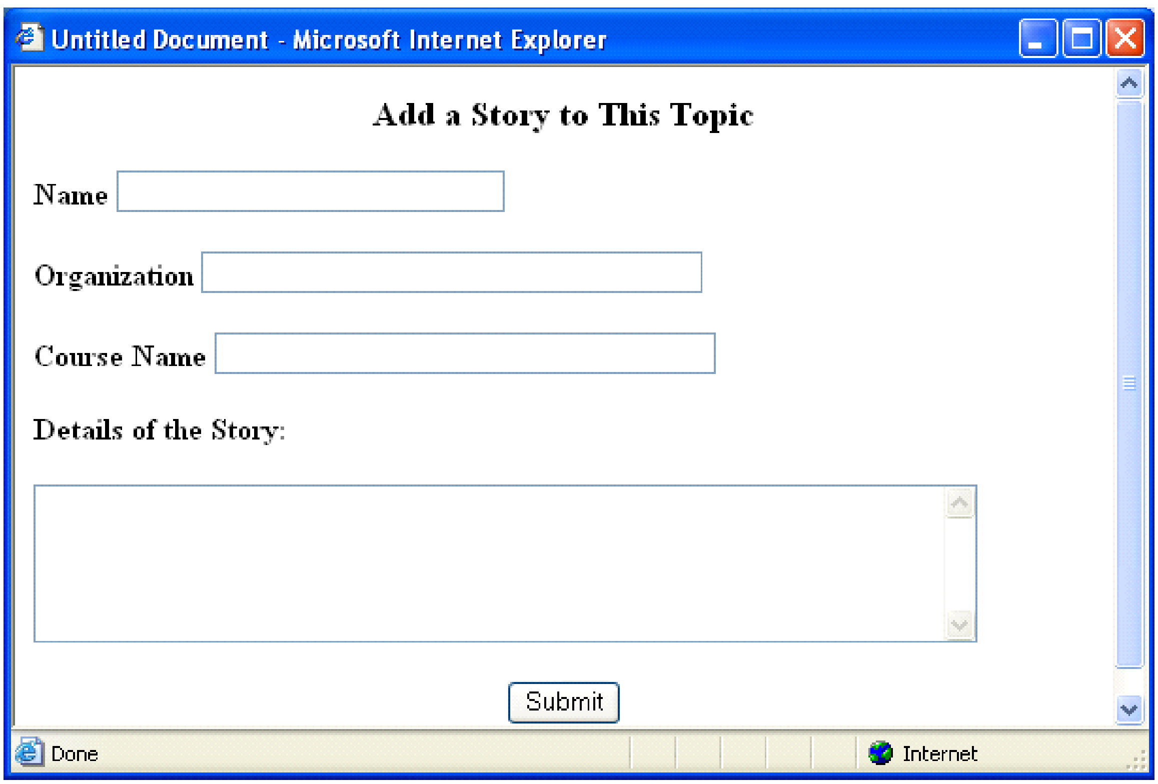
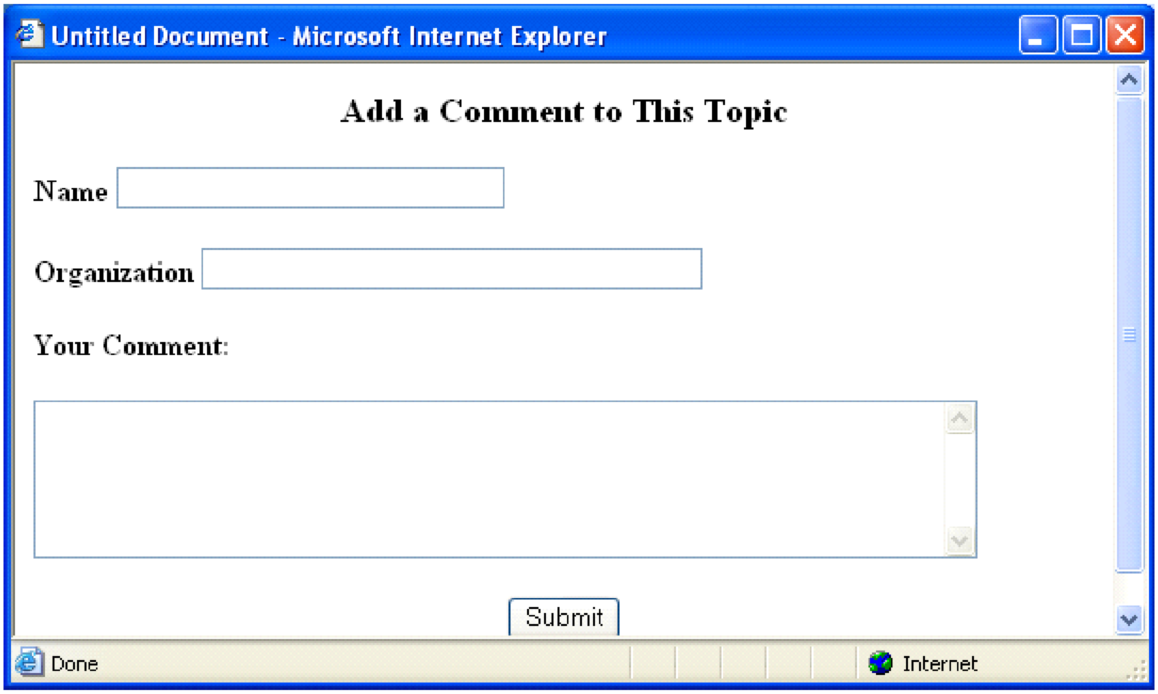


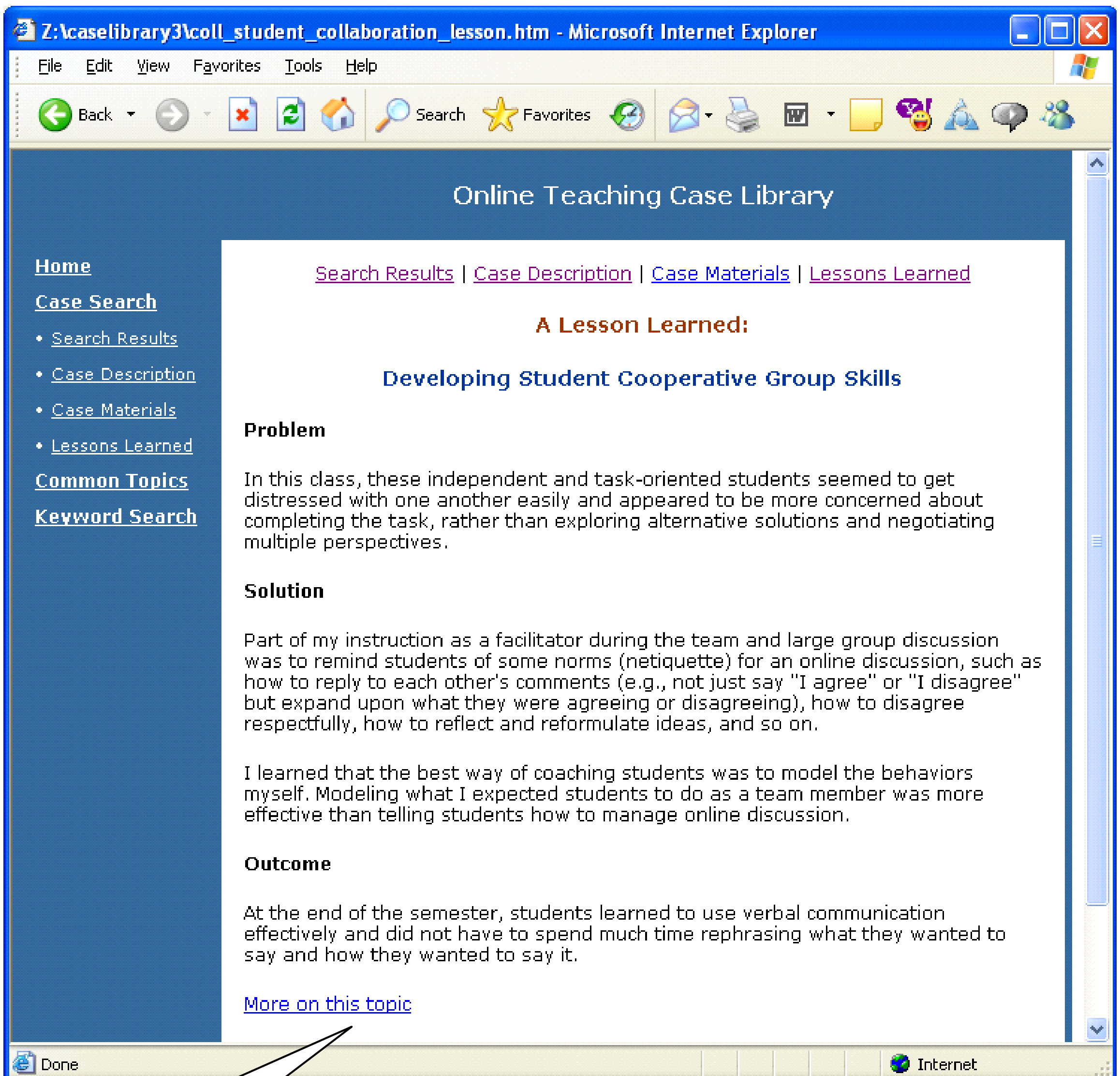
Figure T2

Add a comment to a topic



APPENDIX U

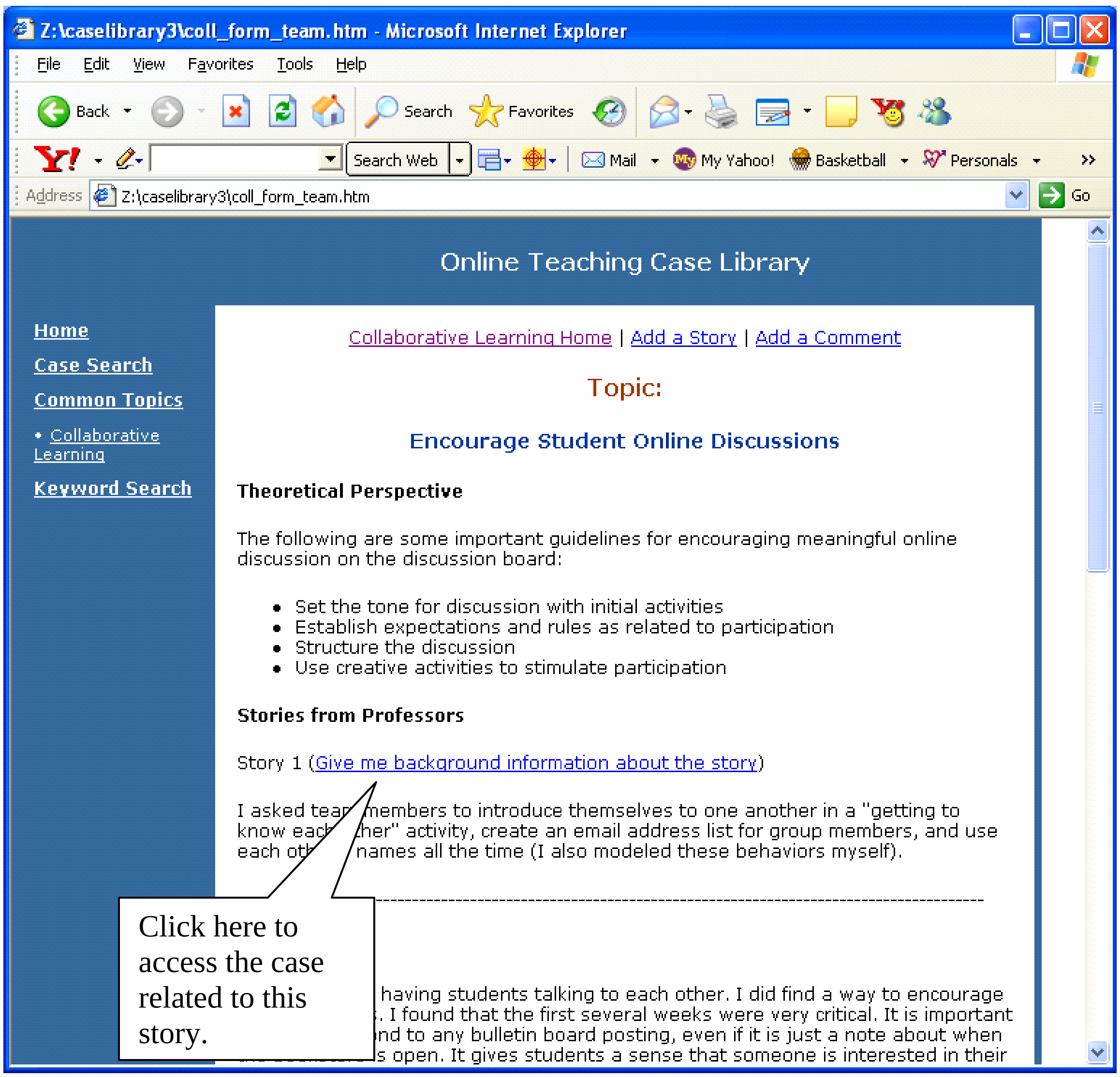
SCREEN CAPTURE: LINK FROM CASES TO TOPICS



Click here to access related topics.

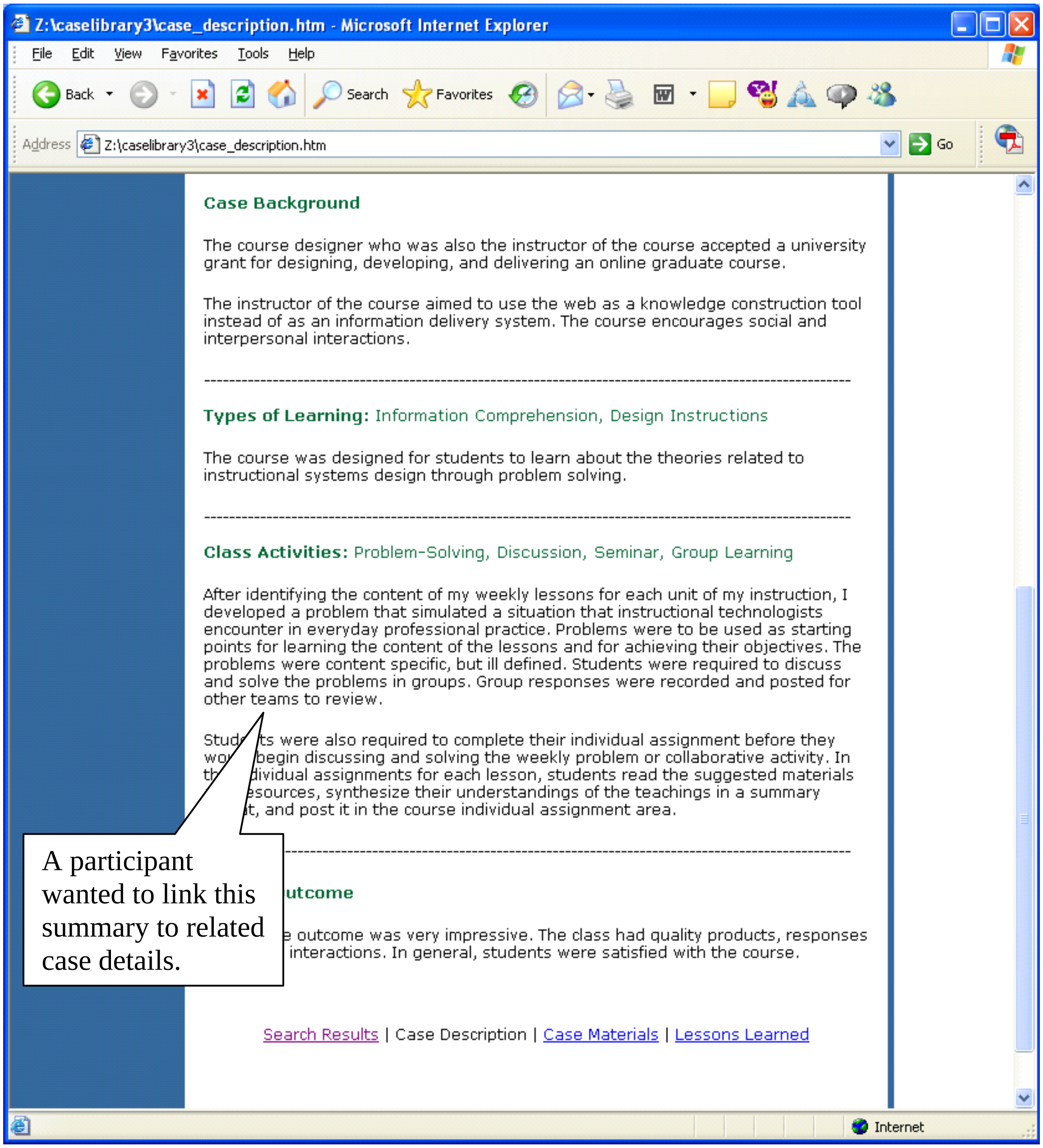
APPENDIX V

SCREEN CAPTURE: LINK FROM TOPICS TO CASES



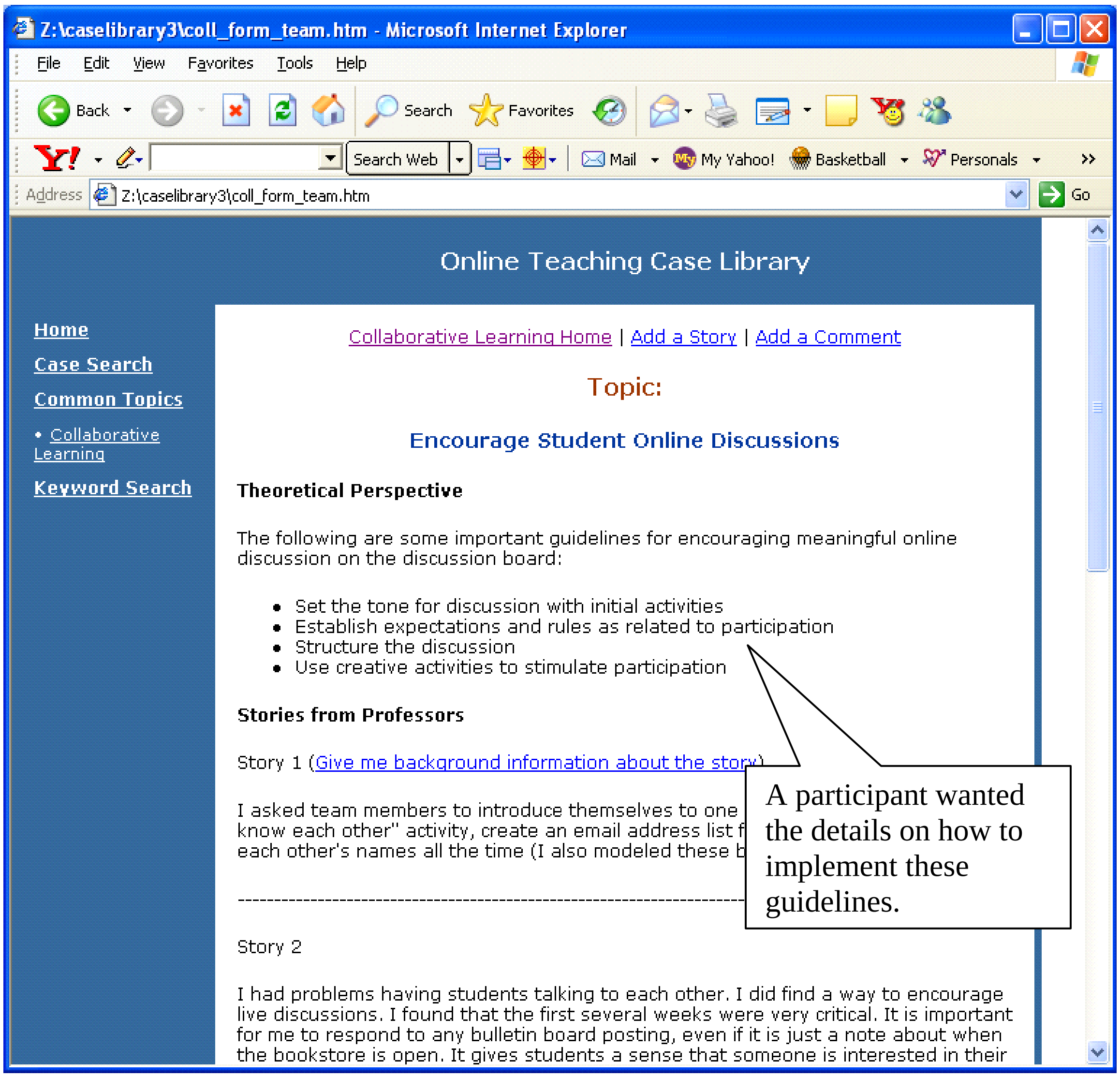
APPENDIX W

SCREEN CAPTURE: LINK FROM CASE SUMMARY TO DETAILS



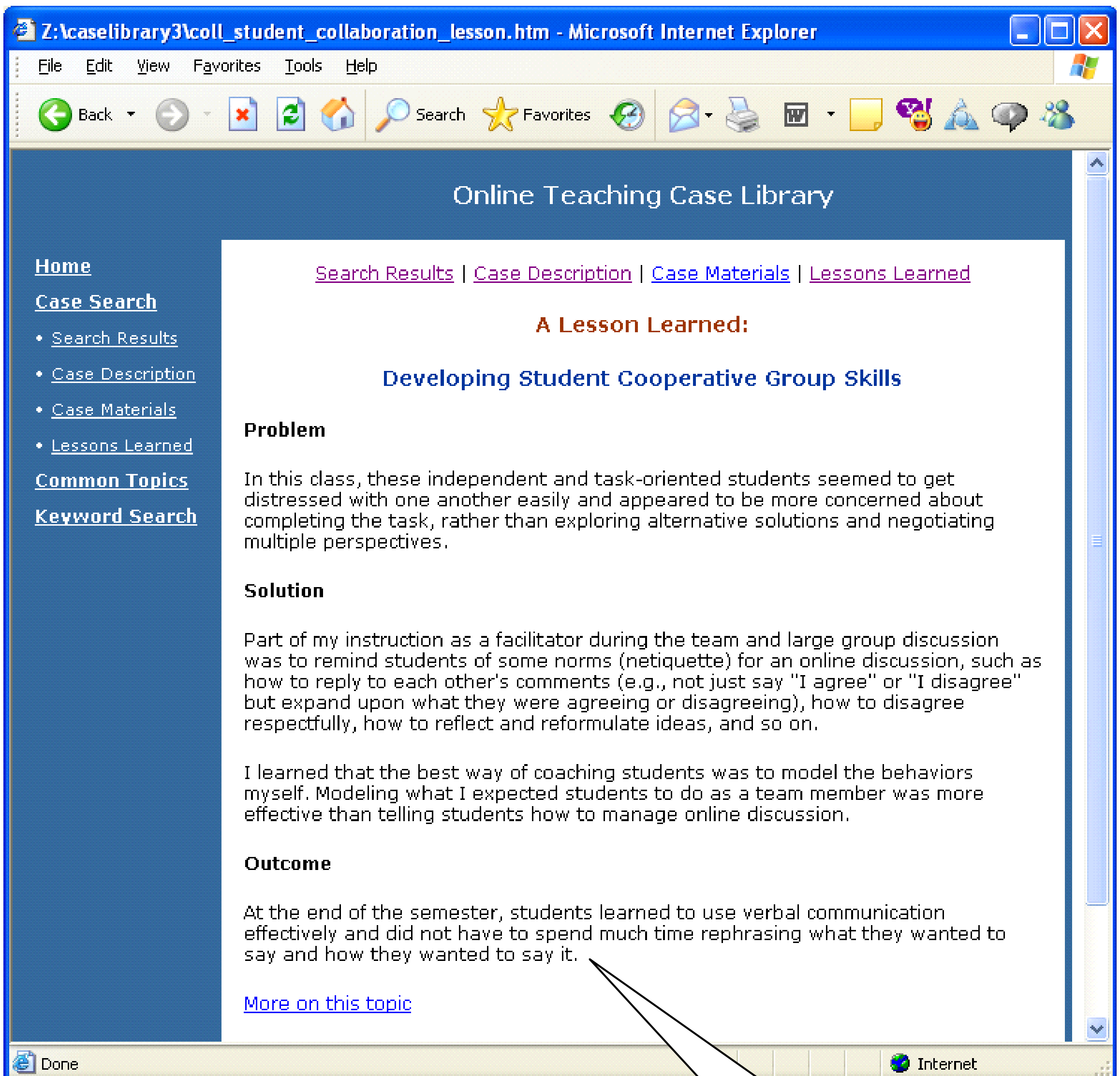
APPENDIX X

SCREEN CAPTURE: LINK FROM A TOPIC TO CASE DETAILS



APPENDIX Y

SCREEN CAPTURE: LINK FROM LESSONS LEARNED
TO RELATED CASE DETAILS



A participant wanted
to have more details
on this lesson learned.