Theory and Practice of Online Learning

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FOREWORD

Dominique Abrioux

During the last ten years, the Internet and the Wide World Web have fundamentally altered the practice of distance teaching and learning. Nowhere is this fact more evident than in the transformation undergone by single-mode distance universities as they seek to apply the benefits of emerging information communication technology (ICT) infrastructure to their core business, with a view to improving the quality and cost-effectiveness of the learning experience afforded their students.

By the mid 1990s, Canada's Open University®, Athabasca University, was ripe for change.[1] Not only was the technological world that had hitherto enabled distance education undergoing radical and rapid change, but so too was the University's political environment, as debt reduction and elimination became the rallying cries of provincial public policy. Moreover, Athabasca University, Alberta's fourth public university, had under-performed during the ten previous years, as evidenced by the fact that in 1994-1995 it suffered from the highest government grant per full-load-equivalent student, the highest tuition fee level amongst the province's public universities, and a dismally low graduation rate. Concerned with this state of affairs, the Government of Alberta announced that it would reduce Athabasca University's base budget by 31 per cent over three years (ten per cent more than the reduction applied to the other universities), and that it expected significant increases in enrolment and cost effectiveness.

Today, this institution has risen to the challenge and serves some 30,000 students per year (a threefold increase over 1995), has more than tripled its graduation rate, commands the lowest tuition fees and per full-load-equivalent student base grant in the province, and, most importantly, enjoys the highest ratings among sister institutions in the biannual, provincially administered learner satisfaction surveys of university graduates.

Several complementary factors have combined to bring about this dramatic change in Athabasca University's institutional performance, but none is more important than the move towards the online delivery of its programs and courses. The direction had been prepared for in the early 1990s as Athabasca University

[1] A complete case study of Athabasca University is available at the Web site below. Retrieved January 19, 2004, from http://www.unesco.org/iiep/virtualuniversity/index.html

[2] (1996, January). Strategic University Plan (pp. 5-6). Retrieved January 19, 2004, from http://www.athabascau.ca/html/info/sup/sup.htm

developed and then launched (1994) its first two Masters level programs (Master of Business Administration and Master of Distance Education), both online degrees and global innovations.

The Strategic University Plan of 1996-1999 assigned primary importance to embracing the electronic environment through:

- the transition from predominantly print-based curricula presented in electronic format, print format or both, depending on the appropriateness of the medium
- the dramatic expansion of computer-mediated communication systems to facilitate the electronic distribution of course materials produced in-house
- e-mail correspondence between students and staff (including mailing of assignments)
- computer-conferencing among students and between students and academic staff
- the provision of library, registry, and other student support services
- access to electronic data bases
- electronic formative and summative evaluation
- the exploitation of distributed learning systems (e.g., the World Wide Web)
- the provision of assistance to students learning to use systems[2]

This book, authored principally by current and past staff members integral to the implementation of this strategic vision, presents individual practitioners' views of the principal pedagogical and course management opportunities and challenges raised by the move to an online environment. Although grounded in a discussion of online learning theory (itself presented and developed by academics who are engaged daily in developing and delivering electronic courses), it does not seek to be either a complete guide to online course development and delivery, or an all-inclusive account of how they are practiced at Athabasca University. Rather, each chapter synthesizes, from a practitioner view, one component piece of a complex system.

One of the main advantages of digital content is the ease with which it can be adapted and customized. Nowhere is this more true than in its application to online education in general, and at Athabasca University in particular, where three complementary values characterize the organization's different approaches to how work is organized and how learning paths for students are facilitated: customization, openness, and flexibility.

Consequently, and notwithstanding the inevitable standardization around such key issues as quality control, copyright, materials production, library, and non-academic support services (all of which are discussed in this book), considerable variation in operational and educational course development and delivery models is evident across the University's different academic centers. Just as the University supports several learning management systems (see Chapter 4), so too are there various, recognized approaches within Athabasca University to the management and administration of teaching and learning processes. As such, the models and cases presented in this study should be considered as examples of what has worked well given one organization's particular culture, not as prescriptive descriptions of the only way of engaging in effective online education.

There is, however, one common trait that both defines Athabasca University's flexible undergraduate learning model and informs most of this book's content. At the undergraduate level, all five hundred plus courses are delivered in individualized distance learning mode: students start on the first day of any month, progress at their own pace, and submit assignments and sit examinations at times determined by themselves. This flexibility presents tremendous advantages to adult learners who generally also face the demands of both employment and family responsibilities, but it poses particular challenges when administering, designing, or delivering distance education courses. While most of the online advances outlined in this book will often have parallel applications in cohort-based e-classes, the distinction between individualized and group-based distance education is one that the reader is advised to keep in mind.

In keeping with its mission as an open university, Athabasca University is delighted to provide this book under an open source license, thereby removing financial barriers to its accessibility. As its President, I take pride in what our collective staff has accomplished and recognize the particular contribution that this book's authors are making to the global extension of our mission.

INTRODUCTION

Terry Anderson & Fathi Elloumi

The Online Learning Series is a collection of works by practitioners and scholars actively working in the field of distance education. The text has been written at a time when the field is undergoing fundamental change. Although not an old discipline by academic standards, distance education practice and theory has evolved through five generations in its 150 years of existence (Taylor, 2001). For most of this time, distance education was an individual pursuit defined by infrequent postal communication between student and teacher. The last half of the twentieth century witnessed rapid developments and the emergence of three additional generations, one supported by the mass media of television and radio, another by the synchronous tools of video and audio teleconferencing, and yet another based on computer conferencing. The first part of the twenty-first century has produced the first visions of a fifth generation—based on autonomous agents and intelligent, database-assisted learning—that we refer to as the educational Semantic Web. Note that each of these generations has followed more quickly upon its predecessor than the previous ones. Moreover, none of these generations has completely displaced previous ones, so that we are left with diverse yet viable systems of distance education that use all five generations in combination. Thus, the field can accurately be described as complex, diverse, and rapidly evolving.

However, acknowledging complexity does not excuse inaction. Distance educators, students, administrators, and parents are daily forced to make choices regarding the pedagogical, economic, systemic, and political characteristics of the distance education systems within which they participate. To provide information, knowledge, and, we hope, a measure of wisdom, the authors of this text have shared their expertise, their vision, their concerns, and their solutions to distance education practice in these disruptive times. Each chapter is written as a jumping-off point for further reflection, for discussion, and, most importantly, for action. Never in the history of life on our planet has the need for informed and wisdom-filled action been greater than it is today. We are convinced that education—in its many forms—is the most hopeful antidote to the errors of greed, of ignorance, and of life-threatening aggression that menace our civilization and our planet.

Distance education is a discipline that subsumes the knowledge and practice of pedagogy, of psychology and sociology, of economics and business, of production and technology. We attempt to address each of these perspectives through the words of those trained to view their work through a particular disciplinary lens. Thus, each of the chapters represents the specialized expertise of individual authors who address that component piece of the whole with which they have a unique familiarity. This expertise is defined by a disciplinary background, a set of formal training skills, and a practice within a component of the distance education system. It is hardly surprising, then, that some of the chapters are more academic than others, reflecting the author's primary role as scholar, while others are grounded in the more practical application focus of their authors.

In sum, the book is neither an academic tome, nor a prescriptive "how to" guide. Like a university itself, the book represents a blending of scholarship and of research, practical attention to the details of teaching and of provision for learning opportunity, dissemination of research results, and mindful attention to the economics of the business of education.

In many ways the chapters represent the best of what makes for a university community. The word "university" comes from the Latin *universitas* (totality or wholeness), which itself contains two simpler roots, *unus* (one or singular) and *versere* (to turn). Thus, a university reflects a singleness or sense of all encompassing wholeness, implying a study of all that is relevant and an acceptance of all types of pursuit of knowledge. The word also retains the sense of evolution and growth implied by the action embedded in the verb "to turn." As we enter the twenty-first century, the world is in the midst of a great turning as we adopt and adapt to the technological capabilities that allow information and communication to be distributed anywhere/anytime.

The ubiquity and multiplicity of human and agent communication, coupled with tremendous increases in information production and retrieval, are the most compelling characteristics of the Net-based culture and economy in which we now function. The famous quote from Oracle Corporation, "The Net changes everything," applies directly to the formal provision of education. Institutions that formerly relied on students gathering in campus-based classrooms are suddenly able (and many seem eager) to offer their programming on the Internet. Similarly, institutions accustomed to large-scale distance delivery via print or television are now being asked to provide more flexible, interactive, and responsive Net-based alternatives. Each of the chapters in the book reflects the often disruptive effect of the Net on particular components of a distance education system.

Open Source Licensing

This book is written by authors from a single university—Athabasca University—which has branded itself "Canada's Open University." As an open university, we are pleased to be the first such institution to provide a text such as this one as an open and free gift to others. The book is published under a Creative Commons license (see http://creativecommons.org) to allow for free use by all, yet the copyright is retained by the University (see the copyright page for license details). This open-source license format was chosen for a number of reasons. First, it is true to the original spirit of the university, and especially of an open university. We believe that knowledge is meant to be shared, and further, that such sharing does not diminish its value to its creator. Thomas Jefferson eloquently expressed these ideas in 1813 when he wrote

> He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation. (1854, pp. 180-181)

As you will see from the quotations and references that augment the text in most chapters, we have learned much from the works of others, and thus feel bound to return this gift of knowledge to the wider community.

Second, we believe that education is one of the few sustainable means to equip humans around the globe with the skills and resources to confront the challenges of ignorance, poverty, war, and environmental degradation. Distance education is perhaps the most powerful means of extending this resource and making it accessible to all. Thus, we contribute to the elimination of human suffering by making as freely available as we can the knowledge that we have gained developing distance education alternatives.

Third, the Creative Commons license provides our book as a form of "gift culture." Gift giving has been a component of many cultures; witness, for example, the famed Potlatch ceremonies of Canadian West Coast First Nations peoples. More recently, gift giving has been a major motivation of hackers developing many of the most widely used products on the Internet (Raymond, 2001). Distributing this text as an open source gift serves many of the same functions gift giving has done through millennia. The gift weaves bonds within our community and empowers those who benefit from it to create new knowledge that they can then share with others and with ourselves. Interestingly, new recent research on neuro-economics is showing that freely giving and sharing is a behavior that has had important survival functions for humans groups since earliest times (Grimes, 2003). David Bollier (2002) argues that gift cultures are surprisingly resilient and effective at creating and distributing goods, while protecting both long-term capacity for sustained production and growing cultural assets. Bollier also decries the private plunder of our common wealth, and discusses the obligation that those employed in the public sector have to ensure that the results of publicly funded efforts are not exploited for personal gain.

Open source gifts also provide those from wealthy countries with some small way to redress many economic inequalities and to share more equitably the gifts we receive from our planet home. We hope especially that this text will be incorporated into the syllabi of the growing number of programs of distance education study that are being offered by both campus and distance education universities throughout the world. In the words of Sir John Daniel, former Vice Chancellor of the Open University of the United Kingdom, sharing offers a viable means to "increase the quality and quantity of electronic courseware as materials are refined, versioned and adapted to academics around the world and made freely available in these new formats" (2001 p. viii). We believe that the free sharing of course content is a powerful tool to encourage the growth of public education institutions. We also think that such sharing will not result in a net value loss for the delivering institution. Rather, its reputation will be enhanced and its saleable services will increase in value.

Fourth, providing this book as open source frees us from potentially acrimonious debates over ownership, return for value, and distribution of any profit. Educational books rarely make large profits for their authors, and most of us have personally witnessed the old aphorism that "acrimony in academic arguments runs so high because the stakes are so low." Open source licensing allows us to go beyond financial arguments that are likely to have little consequence in any case.

Finally, we hope that open sourcing this book will allow it be more widely distributed and read. Through this dissemination, the ideas proposed will be exposed to critical dialogue and reflection. We hope that much of this commentary will make its way back to the authors or flow into the discussion forums associated with the text's Web site. Through review within the community of practice, ideas are honed, developed, and sometimes even refuted. Such discourse not only improves the field as a whole, but also directly benefits our work at Athabasca University, and thus handsomely repays our efforts.

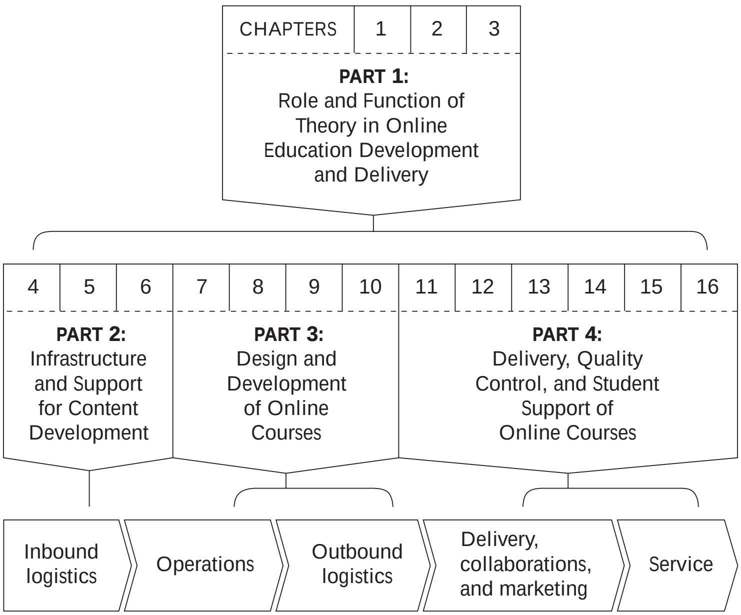
In summary, we license the use of this book to all—not so much with a sense of naïve idealism, but with a realism that has been developed through our life work—to increase access to and opportunity for all to quality learning opportunities.

Book Organization and Introduction to the Chapters

In the following pages, we briefly review the main themes covered in this book and its chapters. We used the *value chain of online learning framework* to help organize our themes and chapters. The value chain framework is an approach for breaking down the sequence (chain) of an organization's functions into the strategically relevant activities through which utility is added to its offerings and services. The components of an online learning organization's value chain are depicted in the following figure.

Inbound logistics involves preparations for course development, including curriculum planning and related activities. Operations involve the actual process of course development, including writing, multimedia creation, editing, formatting, graphic design, printing, and Web publishing. Outbound logistics concerns the packaging and storage of courses, and the process of mailing, e-mailing, or otherwise delivering the material to the students. The delivery, collaborations, and marketing value chain involves a series of value adding activities, such as student registration through a Web portal; course delivery; the preparation of brochures, advertising materials, and the university calendar; developing a branding strategy for the online learning offerings; and establishing strategic partnerships and alliances. The service value chain provides online support (technical and academic) to learners, including counseling, tutoring, marking of assignments and examinations, delivery and invigilation of examinations, and maintenance of student records. It also includes learner self-service through Web sites and Web portals. For a more detailed discussion of the online learning value chain, refer to Chapter 3 in this volume.

Using a value chain perspective to understand how we have organized the themes in this book will help the reader focus on the strategic activities of the online learning institution. Part 1 provides a foundation to educational theory for online learning, to prepare the ground for discussing the different components of the online learning value chain in Parts 2-4. Part 2 deals with inbound logistics, Part 3 with production and with aspects of outbound logistics, and Part 4 with delivery, marketing, and service to learners. The following figure illustrates the organization of this volume.



"Part 1: Role and Function of Theory in Online Education Development and Delivery" provides the theoretical foundations for this volume. Chapter 1 presents the foundation of education theory for online learning. It opens the debate by discussing the contributions of behaviorist, cognitivist, and constructivist theories to the design of online materials, noting that behaviorist strategies can be used to teach the facts (what), cognitivist strategies the principles and processes (how), and constructivist strategies the real-life and personal applications and contextual learning. The chapter mentions a shift toward constructive learning, in which learners are given the opportunity to construct their own meaning from the information presented during online sessions. Learning objects will be used to promote flexibility and reuse of online materials to meet the needs of individual learners, and online learning materials will be created in such a way that they can be redesigned for different learners and different contexts. Finally, online learning will become increasingly diverse to allow it to respond to diverse learning cultures, styles, and motivations.

Chapter 2 presents a general assessment of how people learn. It assesses the unique characteristics of the Web to enhance these generalized learning contexts, and discusses the six forms of interaction and their critical role in engaging and supporting both learners and teachers. The author presents a model of online learning, a first step toward a theory in which the two predominant forms of online learning—collaborative and independent study—are considered, along with a brief discussion of the advantages and disadvantages of each. Finally, the chapter discusses the emerging tools of the Semantic Web, and the way they will affect future developments of the theory and practice of online learning.

Chapter 3 discusses the value chain framework in online learning. It presents the online learning value chain components; highlights its strategic power; presents the methodology for constructing, analyzing, and using a value chain in an online learning institution; and portrays the online distance teaching value system and market map.

"Part 2: Infrastructure and Support for Content Development" covers aspects of the inbound logistics value chain. Chapter 4 discusses the various factors that must be considered in developing the infrastructure for online learning, including planning, structural and organizational issues, the components of a system and the interfaces among them, and various related issues, such as human resources, decision making, and training. The author explains why any designed online learning infrastructure must also be able to evolve and work in a context of constant and accelerating change to accommodate changing student needs, technologies, and curricula.

Chapter 5 examines some available and potential technologies and features used in online instruction. Rather than continue to focus on how technology has helped or can help the instructor, teacher, or tutor, this chapter concludes with a look at how technologies—existing and emerging—can aid the first generation of online learners.

Chapter 6 discusses some attributes of media and of the modes of teaching presentation and learning performance they support, in relation to some influential learning models. It also clarifies some of the implications in the choice of any specific delivery or presentation medium. The author notes that the decision to adopt online technology is always complex and can be risky, especially if the adopting organization lacks structural, cultural, or financial prerequisites, and concludes that, while education has a responsibility to keep pace with technological change, educational institutions can reduce the costs and uncertainties of invention by following the technological lead of the corporate sector. Chapters 4 through 6 thus present three perspectives on the inbound logistics value chain for online learning, and open discussions about opportunities and challenges in selecting, developing, and adapting infrastructure and support for content development.

"Part 3: Design and Development of Online Courses" is concerned with the two following segments of the organization's online learning value chain: operations and outbound logistics. Four chapters are organized to shed light on these processes. Chapter 10 describes the role of instructional design, multimedia development, and editing in the design and development process by describing a professional role that has been developed to accommodate all these functions—that of the Multimedia Instructional Design Editor (MIDE). Mainly, this role is concerned with facilitating communication between the author and the learner, and between the author and the technical staff who create the multimedia tools and instructional technology used in course delivery. The MIDE brings together elements and participants in the value chain, and adds value to the course development process by enhancing the ability of other participants to produce effective online learning experiences. One of the MIDE's most important contributions to the course design and development value chain is quality control. The quality control function has become more critical as courses have come to contain multimedia components and have begun to move into the online learning environment.

Chapter 9 deals with another aspect of design, development and quality control in online courses: copyright. Copyright, in Canada and throughout the modern technological world, is described as being in a state of flux. Advances in information and communication technologies are stressing existing copyright Acts, and forcing changes to them. As they embrace new electronic technologies, online educators are in a position to lead advances in copyright law, and to help ensure that the rights of both users and creators are respected, and that the intellectual property ownership issues that are emerging in the electronic world are widely understood and respected.

Chapters 7 and 8 discuss the process of developing effective instructional materials. Chapter 7 presents the role of instructional media developers in the course development process. These professionals are involved from the beginning, to consult with and advise course team members on development-related topics as they arise. The author presents pedagogical standards designed to help all those involved in online instructional development to ensure that their efforts are rewarded, ultimately, with satisfied learners. Chapter 8 describes several experiences in developing knowledge of team dynamics and communications, and accomplishing team project work, in an online environment. In describing aspects of teaching and applying team dynamics online, the authors highlight the unique values and capabilities of an online learning environment.

"Part 4: Delivery, Quality Control, and Student Support of Online Courses" is concerned with the last two parts of the organization's online learning value chain: delivery and service. Chapter 11 focuses on the role of the teacher or tutor in an online learning context. It uses a theoretical model that views the creation of an effective online educational community as involving three critical components: cognitive presence, social presence, and teaching presence. The chapter provides suggestions and guidelines for max-imizing the effectiveness of the teaching function in online learning.

Chapter 12 presents the call center concept for course delivery and student support in online courses. In distance education in particular, the call center can be an effective communication tool, enabling the institution to provide and improve service to students in many areas, including instruction. This chapter describes how the call center concept is used at Athabasca University and how it has proven to be effective in three areas: increasing student service and retention, allowing for direct marketing, and enhancing management information and learner feedback.

Chapter 13 presents a system that supports asynchronous discussion for online learners (the ASKS system). This system is designed to allow students in both paced and unpaced online learning environments to participate in grouped assessment activities. It also permits instructors to assess individual contributions quickly, and to provide tailored, automated feedback to students. The ASKS system addresses some of the problems associated with group participation in any online environment, such as immediate and relevant feedback for students, evaluation, and instructor workload.

Chapter 14 discusses the library support needed by online learners. It examines how libraries are responding to the challenges and opportunities of delivering core services to online learners. This chapter portrays some of the library practices and technologies now being applied in the construction of virtual libraries. The authors stress the importance of providing support within a collaborative environment, which considers human factors, such as communication and interaction. Chapter 15 continues this discussion by stressing the importance of setting up a supportive learning environment for online learners, and provides some practical advice. Underlying this advice is a philosophy that encourages an environment that aims to develop the learner's independence, while ensuring that supports are readily available when needed. Student supports that are flexible, clear, and continually available are described, and best practices outlined.

Chapter 16 provides a discussion of the contexts of quality assurance activities in higher education in general, and of the competing paradigms highlighted by online learning. The author notes that the greatest challenge for trying to define quality is that quality remains a relative experience, realized in large part through an individual's level of expectation. On the basis of this insight, the chapter goes on to examine quality standards that have been proposed for the delivery of online instruction in four jurisdictions: Australia, the United Kingdom, Canada, and the United States.

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PART 1

Role and Function of Theory in Online Education Development and Delivery

CHAPTER 1

FOUNDATIONS OF EDUCATIONAL THEORY FOR ONLINE LEARNING

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Introduction

There is ongoing debate about whether it is the use of a particular delivery technology or the design of the instruction that improves learning (Clark, 2001; Kozma, 2001). It has long been recognized that specialized delivery technologies can provide efficient and timely access to learning materials; however, Clark (1983) has claimed that technologies are merely vehicles that deliver instruction, but do not themselves influence student achievement. As Clark notes, meta-analysis studies on media research have shown that students gain significant learning benefits when learning from audio-visual or computer media, as opposed to conventional instruction; however, the same studies suggest that the reason for those benefits is not the medium of instruction, but the instructional strategies built into the learning materials. Similarly, Schramm (1977) suggested that learning is influenced more by the content and instructional strategy in the learning materials than by the type of technology used to deliver instruction.

According to Bonk and Reynolds (1997), to promote higher-order thinking on the Web, online learning must create challenging activities that enable learners to link new information to old, acquire meaningful knowledge, and use their metacognitive abilities; hence, it is the instructional strategy and not the technology that influences the quality of learning. Kozma (2001) argues that the particular attributes of the computer are needed to bring real-life models and simulations to the learner; thus, the medium does influence learning. However, it is not the computer per se that makes students learn, but the design of the real-life models and simulations, and the students' interaction with those models and simulations. The computer is merely the vehicle that provides the processing capability and delivers the instruction to learners (Clark, 2001). Kozma is correct in his claim, but learners will not learn from the simulations if the simulations are not developed using sound design principles.

Online learning allows for flexibility of access, from anywhere and usually at anytime—essentially, it allows participants to collapse time and space (Cole, 2000)—however, the learning materials must be designed properly to engage the learner and promote learning. According to Rossett (2002), online learning has many promises, but it takes commitment and resources, and it must be done right. “Doing it right” means that online learning materials must be designed properly, with the learners and learning in focus, and that adequate support must be provided. Ring and Mathieux (2002) suggest that online learning should have high authenticity (i.e., students should learn in the context of the workplace), high interactivity, and high collaboration. This paper discusses the foundation of educational theory for the design of effective online learning materials, and suggests a model for developing online instruction based on appropriate educational theory.

Different terminologies have been used for online learning, a fact that makes it difficult to develop a generic definition. Terms that are commonly used include e-learning, Internet learning, distributed learning, networked learning, tele-learning, virtual learning, computer-assisted learning, Web-based learning, and distance learning. All of these terms imply that the learner is at a distance from the tutor or instructor, that the learner uses some form of technology (usually a computer) to access the learning materials, that the learner uses technology to interact with the tutor or instructor and other learners, and that some form of support is provided to learners. This paper will use the term “online learning” throughout. There are many definitions of online learning in the literature, definitions that reflect the diversity of practice and associated technologies. Carliner (1999) defines online learning as educational material that is presented on a computer. Khan (1997) defines online instruction as an innovative approach for delivering instruction to a remote audience, using the Web as the medium. However, online learning involves more than just the presentation and delivery of the materials using the Web: the learner and the learning process should be the focus of online learning. As a result, the author defines online learning as

> the use of the Internet to access learning materials; to interact with the content, instructor, and other learners; and to obtain support during the learning process, in order to acquire knowledge, to construct personal meaning, and to grow from the learning experience.

Benefits of Online Learning

Increasingly, organizations are adopting online learning as the main delivery method to train employees (Simmons, 2002). At the same time, educational institutions are moving toward the use of the Internet for delivery, both on campus and at a distance. However, for organizations and institutions to make this often expensive move, there must be a perception that using online learning provides major benefits. Some of the benefits for learners and instructors are outlined below. For learners, online learning knows no time zones, and location and distance are not an issue. In asynchronous online learning, students can access the online materials at anytime, while synchronous online learning allows for real time interaction between students and the instructor. Learners can use the Internet to access up-to-date and relevant learning materials, and can communicate with experts in the field in which they are studying. Situated learning is facilitated, since learners can complete online courses while working on the job or in their own space, and can contextualize the learning.

For the instructor, tutoring can be done at anytime and from anywhere. Online materials can be updated, and learners are able to see the changes at once. When learners are able to access materials on the Internet, it is easier for instructors to direct them to appropriate information based on their needs. If designed properly, online learning systems can be used to determine learners' needs and current level of expertise, and to assign appropriate materials for learners to select from to achieve the desired learning outcomes.

Designing Online Learning Materials

The goal of any instructional system is to promote learning. Therefore, before any learning materials are developed, educators must, tacitly or explicitly, know the principles of learning and how students learn. This is especially true for online learning, where the instructor and the learner are separated. The development of effective online learning materials should be based on proven and sound learning theories. As we discussed above, the delivery medium is not the determining factor in the quality of learning; rather, the design of the course determines the effectiveness of the learning (Rovai, 2002).

There are many schools of thought on learning, and no one school is used exclusively to design online learning materials. As there is no single learning theory to follow, one can use a combination of theories to develop online learning materials. In addition, as research progresses, new theories are evolving that should be used in developing online materials. The online developer must know the different approaches to learning in order to select the most appropriate instructional strategies. Learning strategies should be selected to motivate learners, facilitate deep processing, build the whole person, cater for individual differences, promote meaningful learning, encourage interaction, provide feedback, facilitate contextual learning, and provide support during the learning process. The remaining sections of this paper will present the different schools of thought on learning, and will suggest how they can be used to develop effective online materials.

Schools of Learning

Early computer learning systems were designed based on a behaviorist approach to learning. The behaviorist school of thought, influenced by Thorndike (1913), Pavlov (1927), and Skinner (1974), postulates that learning is a change in observable behavior caused by external stimuli in the environment (Skinner, 1974).

Behaviorists claim that it is the observable behavior that indicates whether or not the learner has learned something, and not what is going on in the learner's head. In response, some educators claimed that not all learning is observable and that there is more to learning than a change in behavior. As a result, there was a shift away from behaviorist to cognitive learning theories.

Cognitive psychology claims that learning involves the use of memory, motivation, and thinking, and that reflection plays an important part in learning. They see learning as an internal process, and contend that the amount learned depends on the processing capacity of the learner, the amount of effort expended during the learning process, the depth of the processing (Craik & Lockhart, 1972; Craik & Tulving, 1975), and the learner's existing knowledge structure (Ausubel, 1974).

Recently, there has been a move to constructivism. Constructivist theorists claim that learners interpret information and the world according to their personal reality, and that they learn by observation, processing, and interpretation, and then personalize the information into personal knowledge (Cooper, 1993; Wilson, 1997). Learners learn best when they can contextualize what they learn for immediate application and to acquire personal meaning.

When the behaviorist, cognitivist, and constructivist schools of thought are analyzed closely, many overlaps in the ideas and principles become apparent. The design of online learning materials can include principles from all three. According to Ertmer and Newby (1993), the three schools of thought can in fact be used as a taxonomy for learning. Behaviorists' strategies can be used to teach the "what" (facts), cognitive strategies can be used to teach the "how" (processes and principles), and constructivist strategies can be used to teach the "why" (higher level thinking that promotes personal meaning and situated and contextual learning). Janicki and Liegle (2001) analyzed different instructional design models to identify the components that support quality design of Web-based instruction. Components were identified from each of the behaviorist, cognitivist, and constructivist schools of learning.

Behaviorist School of Learning

The behaviorist school sees the mind as a "black box," in the sense that a response to a stimulus can be observed quantitatively, totally ignoring the effect of thought processes occurring in the mind. The school, therefore, looks at overt behaviors that can be observed and measured as indicators of learning (Good & Brophy, 1990).

Implications for Online Learning

1. Learners should be told the explicit outcomes of the learning so that they can set expectations and can judge for themselves whether or not they have achieved the outcome of the online lesson.

2. Learners must be tested to determine whether or not they have achieved the learning outcome. Online testing or other forms of testing and assessment should be integrated into the learning sequence to check the learner's achievement level and to provide appropriate feedback.

3. Learning materials must be sequenced appropriately to promote learning. The sequencing could take the form of simple to complex, known to unknown, and knowledge to application.

4. Learners must be provided with feedback so that they can monitor how they are doing and take corrective action if required.

Cognitivist School of Learning Part 1: Memory

Cognitivists see learning as an internal process that involves memory, thinking, reflection, abstraction, motivation, and metacognition. Cognitive psychology looks at learning from an information processing point of view, where the learner uses different types of memory during learning (Figure 1-1). Sensations are received through the senses into the sensory store before processing occurs. The information persists in the sensory store for less than one second (Kalat, 2002); if it is not transferred to working memory immediately, it is lost.

Online instruction must use strategies to allow learners to attend to the learning materials so that they can be transferred from the senses to the sensory store and then to working memory. The amount of information transferred to working memory depends on the amount of attention that was paid to the incoming information, and on whether cognitive structures are in place to make sense of the information. So, designers must check to see if the appropriate existing cognitive structure is present to enable the learner to process the information. If the relevant cognitive structure is not present, pre-instructional strategies, such as advance organizers, should be included as part of the learning process (Ausubel, 1960).

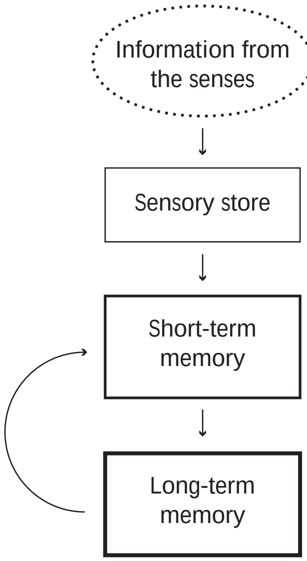

Figure 1-1. Types of memory.

The duration in working memory is approximately 20 seconds, and if information in working memory is not processed efficiently, it is not transferred to long-term memory for storage (Kalat, 2002).

Online learning strategies must present the materials and use strategies to enable students to process the materials efficiently. Since working memory has limited capacity, information should be organized or chunked in pieces of appropriate size to facilitate processing. According to Miller (1956), because humans have limited short-term memory capacity, information should be grouped into meaningful sequences. He suggests that information should be chunked into five to nine (i.e., 7 ± 2) meaningful units to compensate for the limited capacity of short-term memory.

After the information is processed in working memory, it is stored in long-term memory. The amount transferred to long-term memory is determined by the quality and depth of processing in working memory. The deeper the processing, the more associations the acquired new information forms in memory. Information transferred from short-term memory to long-term memory is either assimilated or accommodated in long-term memory. During assimilation, the information is changed to fit into existing cognitive structures. Accommodation occurs when an existing cognitive structure is changed to incorporate the new information.

Cognitive psychology postulates that information is stored in long-term memory in the form of nodes which connect to form relationships; that is, in networks. Information maps that show the major concepts in a topic and the relationships between those concepts should be included in the online learning materials. According to Stoyanova and Kommers (2002), information map generation requires critical reflection and is a method for externalizing the cognitive structure of learners. To facilitate deeper processing, learners should be encouraged to generate their own information maps.

Implications for Online Learning

1. Strategies should be used to allow learners to perceive and attend to the information so that it can be transferred to working memory. Learners use their sensory systems to register the information in the form of sensations. Strategies to facilitate maximum sensation should be used. Examples include the proper location of the information on the screen, the attributes of the screen (color, graphics, size of text, etc.), the pacing of the information, and the mode of delivery (audio, visuals, animations, video). Learners must receive the information in the form of sensations before perception and processing can occur; however, they must not be overloaded with sensations, which could be counterproductive to the learning process. Non-essential sensations should be avoided to allow learners to attend to the important information. Strategies to promote perception and attention for online learning include those listed below.

- Important information should be placed in the center of the screen for reading, and learners must be able to read from left to right.
- Information critical for learning should be highlighted to focus learners' attention. For example, in an online lesson, headings should be used to organize the details, and formatted to allow learners to attend to and process the information they contain.
- Learners should be told why they should take the lesson, so that they can attend to the information throughout the lesson.
- The difficulty level of the material must match the cognitive level of the learner, so that the learner can both attend to and relate to the material. Links to both simpler and more complicated materials can be used to accommodate learners at different knowledge levels.

2. Strategies should be used to allow learners to retrieve existing information from long-term memory to help make sense of the new information. Learners must construct a memory link between the new information and some related information already stored in long-term memory. Strategies to facilitate the use of existing schema are listed below.

- Use advance organizers to activate an existing cognitive structure or to provide the information to incorporate the details of the lesson (Ausubel, 1960). A comparative advance organizer can be used to recall prior knowledge to help in processing, and an expository advance organizer can be used to help incorporate the details of the lesson (Ally, 1980). Mayer (1979) conducted a meta-analysis of advance organizer studies, and found that these strategies are effective when students are learning from text that is presented in an unfamiliar form. Since most courses contain materials that are new to learners, advance organizers should be used to provide the framework for learning.
- Provide conceptual models that learners can use to retrieve existing mental models or to store the structure they will need to use to learn the details of the lesson.
- Use pre-instructional questions to set expectations and to activate the learners' existing knowledge structure. Questions presented before the lesson facilitate the recall of existing

knowledge, and so help learners learn the materials and motivate them to find additional resources to achieve the lesson outcome.

- Use prerequisite test questions to activate the prerequisite knowledge structure required for learning the new materials. With the flexibility of online learning, students with diverse backgrounds and knowledge can choose the most appropriate path to review previous or prerequisite learning before new information is presented.

3. Information should be chunked to prevent overload during processing in working memory (Miller, 1956). Online learning materials should present between five and nine items on a screen to facilitate efficient processing in working memory. If there are many items in a lesson, the items should be organized in the form of information maps to show their organization. A generalized information map is provided as an overview for the online lesson, and can be linear, hierarchical, or spider-shaped, as illustrated in Figures 1-2 to 1-4 (Holley et al., 1979; Smith & Ragan, 1999). As the lesson progresses, each item in the generalized information map is presented and broken down into sub-items. At the end of the lesson, the generalized map is shown again, but with the relationships among the items illustrated.

   To facilitate deep processing, learners should be asked to generate the information maps during the learning process or as a summary activity after the lesson (Bonk & Reynolds, 1997). In addition to facilitating deep processing, information maps can provide the "big picture" to learners, to help them comprehend the details of a lesson. Online learning can capitalize on the processing and visual capabilities of the computer to present information maps to learners or to ask learners to generate information maps using mapmaking software.

4. Other strategies that promote deep processing should be used to help transfer information to long-term storage. Strategies that require learners to apply, analyze, synthesize, and evaluate promote higher-level learning, which makes the transfer to long-term memory more effective. Online strategies to allow learners to apply the information in real life should also be included, to contextualize the learning and to facilitate deep processing.

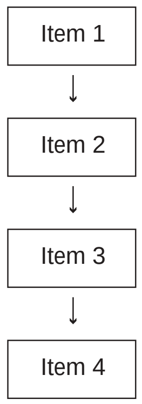

Figure 1-2. Linear information map.

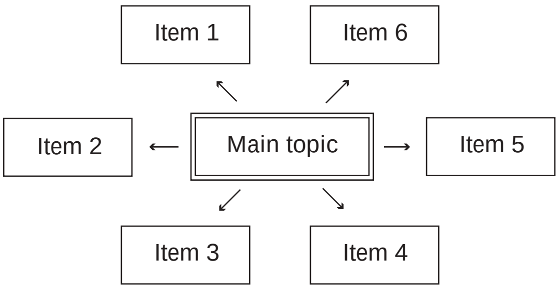

Figure 1-3. Spider-shaped information map.

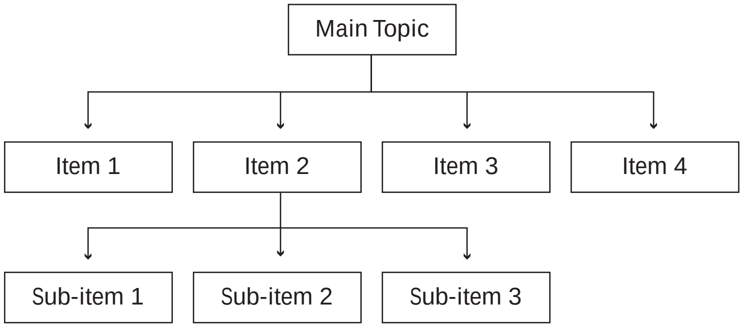

Figure 1-4. Hierarchical information map.

Cognitive School of Learning Part 2: Individual Differences

The cognitive school recognizes the importance of individual differences, and of including a variety of learning strategies in online instruction to accommodate those differences. *Learning style* refers to how a learner perceives, interacts with, and responds to the learning environment; it is a measure of individual differences. Different learning style instruments are used to determine students' learning styles. The Kolb Learning Style Inventory (LSI) (Kolb, 1984) looks at how learners perceive and process information, whereas the Myers-Briggs Type Indicator (Myers, 1978) uses dichotomous scales to measure extroversion versus introversion, sensing versus intuition, thinking versus feeling, and judging versus perception. In the following discussion, we consider the Kolb Learning Style Inventory.

Kolb (1984) suggests that two components make up our learning experience: perceiving and processing. Perceiving refers to the way learners sense and absorb the information around them, from concrete experience to reflective observation. Concrete experience relates to students' desire to learn things that have personal meaning in life. During reflective observation, students like to take the time to think about and reflect on the learning materials. The second component, processing, is related to how learners understand and process the information that is absorbed after perceiving. Processing ranges from abstract conceptualization to active experimentation. Learners who have a preference for abstract conceptualization like to learn facts and figures, and to research new information on different topics. Learners who have a preference for active experimentation prefer to apply what they learn to real-life situations and to go beyond what was presented. They like to try things and learn from their experience. Online learning can cater for individual differences by determining the learner's preference and providing appropriate learning activities based on the learner's style.

Cognitive style refers to a learner's preferred way of processing information; that is, the person's typical mode of thinking, remembering, or problem solving. Thus, cognitive style is another individual difference indicator. Cognitive style is considered to be a personality dimension that influences attitudes, values, and social interaction. One of the dimensions of cognitive style that has implications for online learning is the distinction between *field-dependent* and *field-independent* personalities (Witkin et al., 1977). Field-independent personalities approach the environment in an analytical manner; for example, they are able to distinguish figures as discrete from their backgrounds. Field-dependent individuals experience events in a more global, less differentiated way. Field-dependent individuals have a greater social orientation compared with field-independent personalities. Field-independent individuals are likely to learn more effectively under conditions of intrinsic motivation (e.g., self-study), and are influenced less by social reinforcement.

Implications for Online Learning Continued

5. Online learning materials should include activities for the different learning styles, so that learners can select appropriate activities based on their preferred style. *Concrete-experience learners* prefer specific examples in which they can be involved, and they relate to peers and not to people in authority. They like group work and peer feedback, and they see the instructor as coach or helper. These learners prefer support methods that allow them to interact with peers and obtain coaching from the instructor. *Reflective-observation learners* like to observe carefully before taking any action. They prefer that all the information be available for learning, and see the instructor as the expert. They tend to avoid interaction with others. *Abstract-conceptualization learners* like to work more with things and symbols and less with people. They like to work with theory and to conduct systematic analyses. *Active-experimentation learners* prefer to learn by doing practical projects and through group discussions. They prefer active learning methods and interacting with peers for feedback and information. They tend to establish their own criteria for evaluating situations.

6. In addition to activities, adequate supports should be provided for students with different learning styles. Ally and Fahy (2002) found that students with different learning styles have different preferences for support. For example, assimilators prefer high instructor presence, while accommodators prefer low instructor presence.

7. Information should be presented in different modes to accommodate individual differences in processing and to facilitate transfer to long-term memory. Where possible, textual, verbal, and visual information should be presented to encourage encoding. According to dual-coding theory (Paivio, 1986), information received in different modes (textual and visual) will be processed better than that presented in a single mode (textual only). Dual-coded information is processed in different parts of the brain, resulting in more encoding.

8. Learners should be motivated to learn. It does not matter how effective the online materials are, if learners are not motivated, they will not learn. The issue is whether to use *intrinsic motivation* (driven from within the learner) or *extrinsic motivation* (instructor and performance driven). Designers of online learning materials should use intrinsic motivation strategies (Malone, 1981); however, extrinsic motivation should also be used since some learners are motivated by externally driven methods. Keller proposed a model (ARCS—*a*ttention, *r*elevance, *c*onfidence, *s*atisfaction) for motivating learners during learning (Keller, 1983; Keller & Suzuki, 1988).

   Attention: Capture the learners' attention at the start of the lesson and maintain it throughout the lesson. The online learning materials must include an activity at the start of the learning session to connect with the learners.

   Relevance: Inform learners of the importance of the lesson and how taking the lesson could benefit them. Strategies could include describing how learners will benefit from taking the lesson, and how they can use what they learn in real-life situations. This strategy helps to contextualize the learning and make it more meaningful, thereby maintaining interest throughout the learning session.

   Confidence: Use strategies such as designing for success and informing learners of the lesson expectations. Design for success by sequencing from simple to complex, or known to unknown, and use a competency-based approach where learners are given the opportunity to use different strategies to complete the lesson. Inform learners of the lesson outcome and provide ongoing encouragement to complete the lesson.

Satisfaction: Provide feedback on performance and allow learners to apply what they learn in real-life situations. Learners like to know how they are doing, and they like to contextualize what they are learning by applying the information in real life.

9. Encourage learners to use their metacognitive skills to help in the learning process (Meyer, 1998, Sternberg, 1998). *Metacognition* is a learner's ability to be aware of his or her cognitive capabilities and use these capabilities to learn. When learning online, learners should be given the opportunity to reflect on what they are learning, collaborate with other learners, and to check their progress. Self-check questions and exercises with feedback throughout a lesson are good strategies to allow learners to check how they are doing, so that they can use their metacognitive skills to adjust their learning approach if necessary.

10. Online strategies that facilitate the transfer of learning should be used to encourage application in different and real-life situations. Simulation of the real situation, using real-life cases, should be part of the lesson. Also, learners should be given the opportunity to complete assignments and projects that use real-life applications and information. Transfer to real-life situations could assist the learners to develop personal meaning and contextualize the information.

Cognitive psychology suggests that learners receive and process information to be transferred into long-term memory for storage. The amount of information processed depends on the amount that is perceived, and the amount stored in long-term memory depends on the quality of the processing in working memory. Effective online lessons must use techniques to allow learners to sense and perceive the information, and must include strategies to facilitate high-level processing for transfer of information to long-term memory. After learners acquire the information, they create personal knowledge to make the materials meaningful. The constructivist school of learning, which is discussed below, suggests that learners construct personal knowledge from the learning experience.

Constructivist School of Learning

Constructivists see learners as being active rather than passive. Knowledge is not received from the outside or from someone else; rather, it is the individual learner's interpretation and processing of what is received through the senses that creates knowledge. The learner is the center of the learning, with the instructor playing an advising and facilitating role. Learners should be allowed to construct knowledge rather than being given knowledge through instruction (Duffy & Cunningham, 1996). A major emphasis of constructivists is situated learning, which sees learning as contextual. Learning activities that allow learners to contextualize the information should be used in online instruction. If the information has to be applied in many contexts, then learning strategies that promote multi-contextual learning should be used to make sure that learners can indeed apply the information broadly. Learning is moving away from one-way instruction to construction and discovery of knowledge (Tapscott, 1998).

In his transformation theory, Mezirow (1991) uses both constructivism and cognitivism to explain how people learn. He sees learning as "the process of using a prior interpretation to construe a new or revised interpretation of the meaning of one's experience in order to guide future action" (p. 12). Transformative learning involves "reflectively transforming the beliefs, attitudes, opinions, and emotional reactions that constitute our meaning schemes or transforming our meaning perspectives" (p. 223). Mezirow claimed that learning involves five interacting contexts: the frame of reference or meaning perspective in which the learning is embedded, the conditions of communication, the line of action (process) in which the learning occurs, the self-image of the learner, and the situation encountered during the learning process (p. 13).

Implications for Online Learning

1. Learning should be an active process. Keeping learners active doing meaningful activities results in high-level processing, which facilitates the creation of personalized meaning. Asking

learners to apply the information in a practical situation is an active process, and facilitates personal interpretation and relevance.

2. Learners should construct their own knowledge rather than accepting that given by the instructor. Knowledge construction is facilitated by good interactive online instruction, since the students have to take the initiative to learn and to interact with other students and the instructor, and because the learning agenda is controlled by the student (Murphy & Cifuentes, 2001). In the online environment, students experience the information at first-hand, rather than receiving filtered information from an instructor whose style or background may differ from theirs. In a traditional lecture, the instructor contextualizes and personalizes the information to meet their own needs, which may not be appropriate for all learners. In online instruction, learners experience the information first-hand, which gives them the opportunity to contextualize and personalize the information themselves.

3. Collaborative and cooperative learning should be encouraged to facilitate constructivist learning (Hooper & Hannafin, 1991; Johnson & Johnson, 1996; Palloff & Pratt, 1999). Working with other learners gives learners real-life experience of working in a group, and allows them to use their metacognitive skills. Learners will also be able to use the strengths of other learners, and to learn from others. When assigning learners for group work, membership should be based on the expertise level and learning style of individual group members, so that individual team members can benefit from one another's strengths.

4. Learners should be given control of the learning process. There should be a form of guided discovery where learners are allowed to make decision on learning goals, but with some guidance from the instructor.

5. Learners should be given time and opportunity to reflect. When learning online, students need the time to reflect and internalize the information. Embedded questions on the content can be used throughout the lesson to encourage learners to reflect on and process the information in a relevant and meaningful

manner; or learners can be asked to generate a learning journal during the learning process to encourage reflection and processing.

6. Learning should be made meaningful for learners. The learning materials should include examples that relate to students, so that they can make sense of the information. Assignments and projects should allow learners to choose meaningful activities to help them apply and personalize the information.

7. Learning should be interactive to promote higher-level learning and social presence, and to help develop personal meaning. According to Heinich et al. (2002), learning is the development of new knowledge, skills, and attitudes as the learner interacts with information and the environment. Interaction is also critical to creating a sense of presence and a sense of community for online learners, and to promoting transformational learning (Murphy & Cifuentes, 2001). Learners receive the learning materials through the technology, process the information, and then personalize and contextualize the information. In the transformation process, learners interact with the content, with other learners, and with the instructors to test and confirm ideas and to apply what they learn. Garrison (1999) claimed that it is the design of the educational experience that includes the transactional nature of the relationship between instructor, learners, and content that is of significance to the learning experience.

Different kinds of interaction will promote learning at different levels. Figure 1-5 shows interactive strategies to promote higher level learning (Berge, 1999; Gilbert & Moore, 1998; Schwier & Misanchuk, 1993). Hirumi (2002) proposed a framework of interaction in online learning that consists of three levels. Level one is learner-self interaction, which occurs within the learner to help the learner monitor and regulate their own learning. Level two interaction is learner-human and learner-non-human interactions, where the learner interacts with human and non-human resources. Level three is learner-instruction interaction, which consists of activities to achieve a learning outcome. This paper will go one step further and propose interactions that go from lower-level to higher-level interactions based on behaviorist, cognitivist, and constructivist schools of learning.

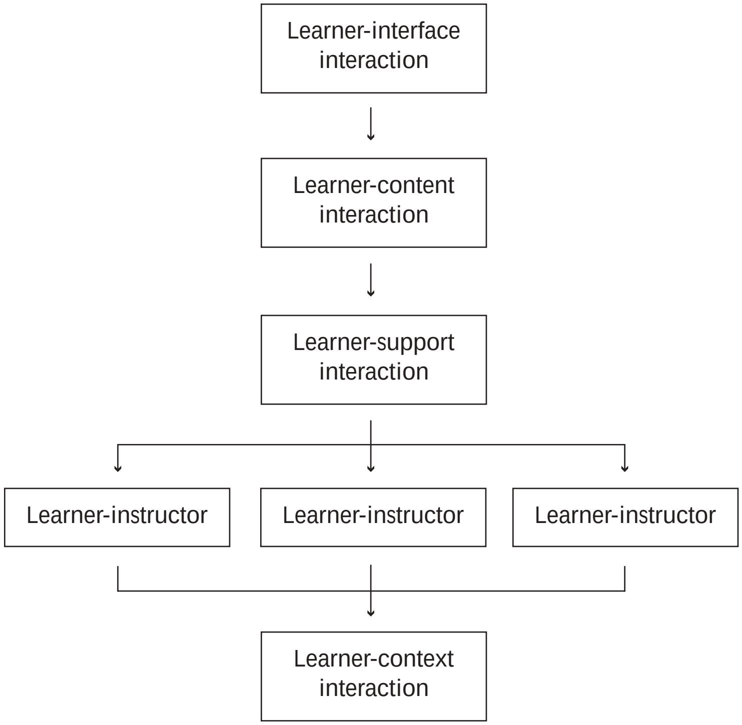

Figure 1-5. Levels of interaction in online learning.

At the lowest level of interaction, there must be learner-interface interaction to allow the learner to access and sense the information. The interface is where learners use the senses to register the information in sensory storage. In online learning, the interface is with the computer to access the content and to interact with others. Once learners access the online materials, there must be learner-content interaction to process the information. Learners navigate through the content to access the components of the lesson, which could take the form of pre-learning, learning, and post-learning activities. These activities could access reusable learning objects from a repository (McGreal, 2002; Wiley, 2002), or they could use content that has been custom created by the designer or instructor. Students should be given the ability to choose their own sequence of learning, or should be given one or more suggested sequences. As online learners interact with the content, they should be encouraged to apply, assess, analyze, synthesize, evaluate, and reflect on what they learn (Berge, 2002). It is during the learner-content interaction that learners process the information to transform it from short-term to long-term memory. The higher the level of processing, the more associations are made in long-term memory, which results in higher-level learning.

As learners work through the content, they will find the need for learner support, which could take the form of learner-to-learner, learner-to-instructor, instructor-to-learner, and learner-to-expert interactions (Moore, 1989; Rourke et al., 2001; Thiessen, 2001). There should be strategies to promote learner-context interaction to allow learners to apply what they learn in real life so that they can contextualize the information. Learner-context interaction allows learners to develop personal knowledge and construct personal meaning from the information.

Conclusion

This paper concludes by proposing a model, based on educational theory, that shows important learning components that should be used when designing online materials. Neither placing information on the Web nor linking to other digital resources on the Web constitutes online instruction. Online instruction occurs when learners use the Web to go through the sequence of instruction, to complete the learning activities, and to achieve learning outcomes and objectives (Ally, 2002; Ritchie & Hoffman, 1997). A variety of learning activities should be used to accommodate the different learning styles. Learners will choose the appropriate strategy to meet their learning needs. Refer to Figure 1-6 for key components that should be considered when designing online learning materials.

Learner Preparation

A variety of pre-learning activities can be used to prepare learners for the details of the lesson, and to get them connected and motivated to learn the online lesson. A rationale should be provided to inform learners of the importance of taking the online lesson and to show how it will benefit them. A concept map is provided to establish the existing cognitive structure, to incorporate the details of the online lesson, and to activate learners' existing structures to help them learn the details in the lesson. The lesson concept map also gives learners the "big picture."

Learners should be informed of the learning outcomes of the lesson, so that they know what is expected of them and will be able to gauge when they have achieved the lesson outcomes. An advance organizer should be provided to establish a structure to organize the details in the online lesson or to bridge what learners already know and what they need to know.

Learners must be told the prerequisite requirements so that they can check whether they are ready for the lesson. Providing the prerequisites to learners also activates the required cognitive structure to help them learn the materials. A self-assessment should be provided at the start of the lesson to allow learners to check whether they already have the knowledge and skills taught in the online lesson. If learners think they have the knowledge and skills, they should be allowed to take the lesson final test. The self-assessment also helps learners to organize the lesson materials and to recognize the important materials in the lesson. Once learners are prepared for the details of the lesson, they can go on to complete the online learning activities to learn the details of the lesson.

Learner Activities

Online learners should be provided with a variety of learning activities to achieve the lesson learning outcome and to accommodate learners' individual needs. Examples of learning activities include reading textual materials, listening to audio materials, or viewing visuals or video materials. Learners can conduct research on the Internet and link to online information and libraries to acquire further information. The preparation of a learning journal will allow learners to reflect on what they learn and provide personal meaning to the information. Appropriate application exercises should be embedded throughout the online lesson to establish the relevance of the materials. Practice activities, with feedback, should be included to allow learners to monitor how they are performing, so that they can adjust their learning method if necessary. A summary should be provided, or learners should be required to generate a lesson summary, to promote higher-level processing and to bring closure to the lesson.

Learner Interaction

As learners complete the learning activities, they will be involved with a variety of interactions. Learners need to interact with the interface to access the online materials. The interface should not overload learners, and should make it as easy as possible for learners to sense the information for transfer to sensory store and then into short-term memory for processing. Learners must interact with the content to acquire the information needed to form the knowledge base. There should be interaction between the learner and other learners, between the learner and the instructor, and between the learner and experts to collaborate, participate in shared cognition, form social networks, and establish social presence. Learners should be able to interact within their context to personalize information and construct their own meaning.

Learner Transfer

Opportunities should be provided for learners to transfer what they learn to real-life applications, so that they can be creative and go beyond what was presented in the online lesson.

Looking Ahead

Behaviorist, cognitivist, and constructivist theories have contributed in different ways to the design of online materials, and they will continue to be used to develop learning materials for online learning. Behaviorist strategies can be used to teach the facts (what); cognitivist strategies to teach the principles and processes (how); and constructivist strategies to teach the real-life and personal applications and contextual learning. There is a shift toward constructive learning, in which learners are given the opportunity to construct their own meaning from the information presented during the online sessions. The use of learning objects to

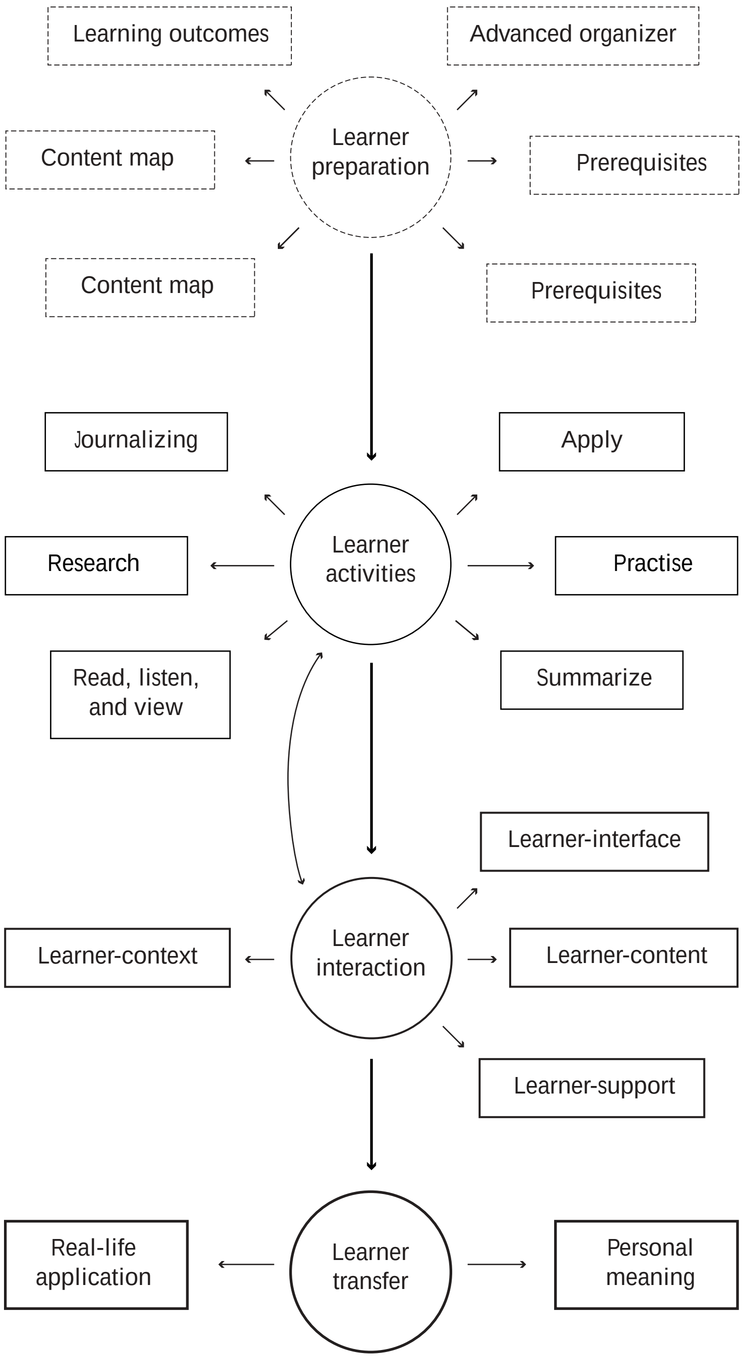

Figure 1-6. Components of effective online learning.

promote flexibility and reuse of online materials to meet the needs of individual learners will become more common in the future. Online learning materials will be designed in small coherent segments, so that they can be redesigned for different learners and different contexts. Finally, online learning will be increasingly diverse to respond to different learning cultures, styles, and motivations.

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C H A P T E R 2

TOWARD A THEORY OF ONLINE LEARNING

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It is the theory which decides what we can observe.
~ Albert Einstein (1879-1955)

There is nothing more practical than a good theory.
~ Leonid Ilyich Brezhnev (1906-1982)

Introduction

Theory has both been celebrated and condemned in educational practice and research. Many proponents have argued that theory allows—even forces—us to see the "big picture" and makes it possible for us to view our practice and our research from a broader perspective than that envisioned from the murky trenches of our practice. This broader perspective helps us to make connections with the work of others, facilitates coherent frameworks and deeper understanding of our actions, and perhaps most importantly allows us to transfer the experience gained in one context to new experiences and contexts. Critics of theory (Wilson, 1999) have argued that too strict an adherence to any particular theoretical viewpoint often filters our perceptions and blinds us to important lessons of reality. The intent of this chapter is to look at learning theory generally, and then focus on those attributes of the online learning context that allow us to develop deeper and more useful theories of online learning

Wilson (1997) has described three functions of a good educational theory. First, it helps us to envision new worlds. Few of us need help envisioning new worlds in the midst of the hype and exuberance of online learning proponents that flood the popular press, but we do need theory to help us envision how education can best take advantage of the enhanced communication, information retrieval, and management capability provided by the Net. It is all too easy to consider new innovations in a "horseless carriage" manner, and to attempt to develop new actions based on old adaptations to obsolete contexts.

Second, a good theory helps us to make things. We need theories of online learning that help us to invest our time and limited resources most effectively. There are many opportunities, but always a critical shortage of resources, a situation which demands that we maximize the efficiency of our development and delivery efforts. This book contains a number of chapters with particular recommendations and suggestions for online course development and teaching. It is hoped that this chapter provides a theoretical "big picture" that will help make sense of these specific recommendations.

Third, Wilson argues that a good theory keeps us honest. Good theory builds upon what is already known, and helps us to interpret and plan for the unknown. It also forces us to look beyond day-to-day contingencies and to ensure that our knowledge and practice of online learning is robust, considered, and ever expanding.

This chapter begins with a general assessment of how people learn that is based on Bransford, Brown, and Cocking's (1999) work. It then assesses the unique characteristics of the Web that enable it to enhance these generalized learning contexts; that is, the Web's "affordances." The chapter next discusses the six forms of interaction and their critical role in engaging and supporting both learners and teachers. It then presents a model of e-learning, a first step toward a theory in which the two predominant forms of e-learning—the collaborative and independent study modes—are presented, with a brief discussion of the advantages and disadvantages of each. The chapter ends with a discussion of the emerging tools of the "Semantic Web" and the way they will affect future developments of the theory and practice of online learning

Attributes of Learning

As many theorists have argued (Garrison & Shale, 1990), and as practitioners experience for themselves, online learning is a subset of learning in general; thus, we can expect issues relevant to how adults learn generally to be relevant to how they learn in an online context. In an insightful book on the "new science of learning," Bransford, Brown, and Cocking (1999) provide evidence that effective learning environments are framed within the convergence of four overlapping lenses. They argue that effective learning is learner centered, knowledge centered, assessment centered, and community centered. Discussing each of these lenses helps us to define learning in a general sense, before we apply this analytical framework to the unique characteristics of online learning.

Learner Centered

A learner-centered context is not one in which the whims and peculiarities of each individual learner are uniquely catered to. In fact, we must be careful to recognize that learner-centered contexts must also meet the needs of the teacher, of the institution, of the larger society that provides support for the student and the institution, and often of a group or class of students. For this reason, I have argued elsewhere (Anderson, in press) that this attribute might more accurately be labeled "learning centered," than "learner centered."

Learner-centered learning, according to Bransford et al., includes awareness of the unique cognitive structures and understandings that the learners bring to the learning context. Thus, a teacher makes efforts to gain an understanding of students' pre-existing knowledge, including any misconceptions that the learner starts with in their construction of new knowledge. Further, the learning environment respects and accommodates the particular cultural attributes, especially the language and particular forms of expression, that the learner uses to interpret and build knowledge. Learner-centered activities make extensive use of diagnostic tools and activities, so that these pre-existing knowledge structures are made visible to both the teacher and the student.

Online learning can present challenges to educators, because the tools and opportunities for discovering students' preconceptions and cultural perspectives are often limited by bandwidth constraints that limit the view of body language and paralinguistic clues. Some researchers have argued that these restrictions negatively affect the efficacy of communication (Short, Williams, & Christie, 1976). Others have argued that the unique characteristics that define online learning (most commonly asynchronous text-based interaction) can actually lead to enhanced or hyper communications (Walther, 1996).

We have found evidence of significant social presence in computer conferencing contexts (Rourke, Anderson, Archer, & Garrison, 2002; Rourke & Anderson, 2002). Nonetheless, it is fair to say that the challenges of assessing student preconditions and cultural prerequisites are often more difficult in an online learning context, because teachers are less able to interact transparently with students—especially in the critical early stages of the formation of a learning community. It is for this reason that experienced online learning teachers make time at the commencement of their learning interactions to provide incentive and opportunity for students to share their understandings, their culture, and unique aspects of themselves. This sharing can be done formally, through electronically administered surveys and questionnaires, but is often accomplished more effectively by virtual icebreakers, and by the provision of an opportunity for students to introduce themselves and to express any issues or concerns to the teacher and the class.

The online learning environment is also a unique cultural context in itself. Benedikt (1992) has argued that cyberspace "has a geography, a physics, a nature and a rule of human law" (p. 123). Many students will be new to this context, but increasingly, students will come to online learning with preconceptions gathered from both formal and informal experience in virtual environments. They will exercise their mastery of communication norms and tools, some of which will not be appropriate to an educational online context. Researchers have attempted to quantify this proficiency and comfort with online environments through the use of survey instruments that measure a learner's internet efficacy (Eastin & LaRose, 2000). They have argued that it is not Internet skill alone that determines competency; rather, a strong sense of Internet efficacy allows users to adapt effectively to the requirements of working in this environment. Thus, the effective online learning teacher is constantly probing for learner comfort and competence with the intervening technology, and providing safe environments for them to increase their sense of Internet efficacy. Learner-centered online-learning contexts thus are sensitive to the cultural overlay acquired in offline contexts, and the ways in which it interacts with the Web's affordances.

Knowledge Centered

Effective learning does not happen in a content vacuum. McPeck (1990) and other theorists of critical thinking have argued that teaching generalized thinking skills and techniques is useless outside of a particular knowledge domain in which they can be grounded. Similarly, Bransford et al. argue that effective learning is both defined and bounded by the epistemology, language, and context of disciplinary thought. Each discipline or field of study contains a world view that provides often unique ways of understanding and talking about knowledge. Students need opportunities to experience this discourse, as well as the knowledge structures that undergraduate teaching affords. They also need opportunities to reflect upon their own thinking: automacy is a useful and necessary skill for expert thinking, but without reflective capacity, it greatly limits one's ability to transfer knowledge to an unfamiliar context or to develop new knowledge structures.

In comparison to campus-based learning, online learning neither advantages nor disadvantages knowledge-centered learning. As I discuss below, the Net provides expanded opportunities for students to plunge ever deeper into knowledge resources, thus affording a near limitless means for students to grow their knowledge, to find their own way around the knowledge of the discipline, and to benefit from its expression in thousands of formats and contexts. However, this provision of resources can be overwhelming, and the skillful e-teacher needs to provide the "big picture" scaffolding on which students can grow their own knowledge and discipline-centered discoveries.

Assessment Centered

The third perspective on learning environments presented by Bransford et al. is the necessity for effective learning environments to be assessment centered. In making this assertion, they do not give unqualified support for summative assessments (especially those supposedly used for national or provincial accountability), but rather look to formative evaluation that serves to motivate, inform, and provide feedback to both learners and teachers.

Quality online learning provides many opportunities for assessment: not only opportunities that involve the teacher, but also ones that exploit the influence and expertise of peers, others that use simple and complex machine algorithms to assess student production, and, perhaps most importantly, those that encourage learners to assess their own learning reflectively. Understanding what is most usefully rather than what is most easily assessed is a challenge for the designers of online learning. Developments in cognitive learning theories and their application to assessment design are helping us to devise assessments that are aligned with the subject content, and that assess cognitive processes as well as end results. For example, Baxter, Elder, and Glaser (1996) found that competent students should be able to provide coherent explanations, generate plans for problem solution, implement solution strategies, and monitor and adjust their activities. I am continually disappointed when reviewing assessments that my own children are subjected to in school and at university to note the very high percentage of recall questions and the lack of assessment strategies that effectively measure the four sets of competencies identified by Baxter et al.

Can we do any better in online learning? The diminution of opportunities for immediate interaction between learners and teachers might reduce opportunities for process assessment; however, the enhanced communications capacity of online learning and the focus of most adult online learning in the real world of work provide opportunities to create assessment activities that are project and workplace based, that are constructed collaboratively, that benefit from peer review, and that are infused with both the opportunity and the requirement for self-assessment.

A danger of assessment-centered learning systems is the potential increase in the workload demanded of busy online learning teachers. Strategies that are designed to provide formative and summative assessment with minimal direct impact on teacher workload are urgently needed. There is a growing list of tools that provide such assessment without increased teacher participation, including

- the use of online computer-marked assessments that extend beyond quizzes to simulation exercises, virtual labs, and other automated assessments of active student learning;

- collaborative learning environments that students create to document and assess their own learning in virtual groups;
- mechanisms, such as online automated tutors, that support and scaffold students' evaluation of their own work and that of their peers;
- student agents who facilitate and monitor peer activities to allow students to assess and aid each other informally;
- the use of sophisticated software tools, such as latent semantic analysis (LSA) or neural networks, to machine-score even complicated materials, such as students' essays.

Thus, the challenge of online learning is to provide high quantity and quality of assessment while maintaining student interest and commitment. These goals are often best achieved through the development of a learning community, to which we turn next.

Community Centered

The community-centered lens allows us to include the critical social component of learning in our online learning designs. Here we find Vygotsky's (1978) popular concepts of social cognition to be relevant as we consider how students can work together in an online learning context to create new knowledge collaboratively. These ideas have been expanded in Lipman's (1991) community of inquiry and Wenger's (2001) ideas of community of practice to show how members of a learning community both support and challenge each other, leading to effective and relevant knowledge construction. Wilson (2001) has described participants in online communities as having a shared sense of belonging, trust, expectation of learning, and commitment to participate and to contribute to the community.

Although there are many online learning researchers who celebrate the capacity to create learning communities at a distance (Harasim, Hiltz, Teles, & Turoff, 1995), there are also those who note problems associated with lack of attention and participation (Mason & Hart, 1997), economic restraints (Annand, 1999), and an in-built resistance among many faculty and institutions to the threatening competition from virtual learning environments (Jaffee, 1998). Ethnographic studies of the Net (Hine, 2000) illustrate how the lack of "placedness" and the complications of anonymity attenuate different components of community when the community is located in virtual space. In short, it may be more challenging than we think to create and sustain these communities, and the differences—linked to a lack of placedness and synchronicity, that is, mutual presence in time and place—may be more fundamental than the mere absence of body language and social presence.

I have been struck by the wide variation in the expectations of learners about participation in a community of learners. Traditionally, distance education has attracted students who value the freedom from constraints of time and place that is provided by independent modes of distance education. Contrary to popular belief, the major motivation for enrollment in distance education is not physical access, but rather, temporal freedom to move through a course of studies at a pace of the student's choice. Participation in a community of learners almost inevitably places constraints on this independence, even when the pressure of synchronous connection is eliminated by use of asynchronous communications tools. The demands of a learning-centered context might at times force us to modify the prescriptive participation in communities of learning, even though we might have evidence that such participation will further advance knowledge creation and attention. The flexibility of virtual communities allows more universal participation, but a single environment that responds to all students does not exist; thus, the need for variations that accommodate the diverse needs of learners and teachers at different stages of their life cycles.

These potential barriers argue for a theory of online learning that accommodates, but does not prescribe, any particular boundaries of time and place, and that allows for appropriate substitution of independent and community-centered learning. To this requirement, we add the need for a theory of e-learning that is learning centered, provides a wide variety of authentic assessment opportunities, and is grounded in existing knowledge contexts.

Affordances of the Net

Effective educational theory must address the affordances and the limitations of the context for which it is designed (Norman, 1999).

The World Wide Web is a multifaceted technology that provides a large set of communication and information management tools that can be harnessed for effective education provision. It also suffers from a set of constraints that are briefly outlined in this section.

Online learning, as a subset of all distance education, has always been concerned with providing access to educational experience that is at least more flexible in time and in space than campus-based education. Access to the Web is now nearly ubiquitous in developed countries. The *Wall Street Journal* of February 4, 2002, reported that 54% of U.S. adults use the Web on a regular basis, and 90% of 15-17 years olds are regular Web users. This high percentage of users would probably include well over 90% of those citizens interested in taking a formal education course. Access to the Web is primarily through home or workplace machines, but placements in public libraries and Internet cafes and connections through personal wireless devices are such that access poses no problems for the vast majority of citizens of developed countries. I have also been surprised by the availability of access in developing countries, as exemplified by free use of the Net in McDonald's restaurants in Sao Paulo, Brazil, and the numerous Internet cafés, in most Chinese cities. Access is still problematic for those with a variety of physical handicaps; however, in comparison with books or video media, the Web provides much greater quality and quantity of access to nearly all citizens, with or without physical disabilities.

Access is increasing, not only to technology, but also to an ever-growing body of content. The number of scholarly journals (see http://www.e-journals.org), educational objects (see http://www.merlot.org/Home.po), educational discussion lists (see http://www.kovacs.com/directory), courses (see http://courses.telecampus.edu/subjects/index.cfm), and general references to millions of pages of commercial, educational, and cultural content (see http://www.google.com) is large and increasing at an exponential rate. Thus, online learning theory must acknowledge the change from an era of shortage and restrictions in content to one in which content resources are so large that filtering and reducing choice is as important as providing sufficient content.

The Web is quickly changing from a context defined by text-based content and interactions to one in which all forms of media are supported. Much of the early work on the instructional use of the Internet (Harasim, 1989; Feenberg, 1989) assumed that asynchronous text-based interaction defined the medium. Techniques were developed to maximize interaction using this relatively lean medium. We are now entering an era where streaming video, video and audio conferencing, and virtual worlds are readily available for educational use. Thus, online learning theory needs to help educators to decide which of the many technological options is best suited for their application.

The Web's in-built capacity for hyperlinking has been compared to the way in which human knowledge is stored in mental schema and to the subsequent development of mental structures (Jonassen, 1992). Further, the capacity for students to create their own learning paths through content that is formatted with hypertext links is congruent with constructivist instructional design theory that stresses individual discovery and construction of knowledge (Jonassen, 1991).

Finally, the growing ease with which content can be updated and revised (both manually and through use of autonomous agent technology) is making online learning content much more responsive and potentially more current than content developed for other media. The explosion of Web "blogs" (Notess, 2002) and user-friendly course-content management systems, built into Web delivery systems such as WebCT or Blackboard, is creating an environment in which teachers and learners can very create and update their course content without the aid of programmers or designers. Naturally, this ease of creation and revision leads to potential for error and less-than-professional-standard output; however, educators who are anxious to retain control of their educational content and context welcome this openness and freedom.

Education is not only about access to content, however. The greatest affordance of the Web for educational use is the profound and multifaceted increase in communication and interaction capability that it provides. The next section discusses this affordance in greater detail.

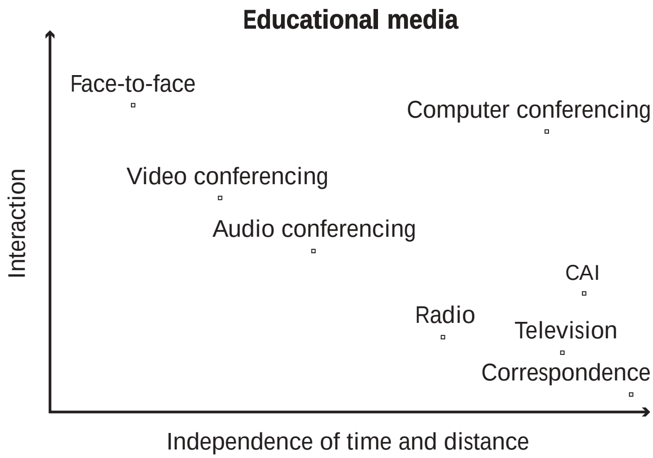
Defining and Valuing Interaction in Online Learning

Communication technologies are used in education to enhance interaction between all participants in the educational transaction. However, although interaction has long been a defining and critical component of the educational process and context, it is surprisingly difficult to find a clear and precise definition of this concept in the education literature. In popular culture, the use of the term to describe everything from toasters to video games to holiday resorts further confuses precise definition. I have discussed the varying definitions of interaction at length in an earlier paper (Anderson, 2003), and so I will here simply accept Wagner's (1994) definition of interaction as "reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another" (p. 8).

Interaction (or interactivity) serves a variety of functions in the educational transaction. Sims (1999) has listed these functions as allowing for learner control, facilitating program adaptation based on learner input, allowing various forms of participation and communication, and acting as an aid to meaningful learning. In addition, interactivity is fundamental to creation of the learning communities espoused by Lipman (1991), Wenger (2001), and other influential educational theorists who focus on the critical role of community in learning. Finally, the value of another person's perspective, usually gained through interaction, is a key learning component in constructivist learning theories (Jonassen, 1991), and in inducing mindfulness in learners (Langer, 1989)

Interaction has always been valued in distance education, even in its most traditional, independent study format. Holmberg (1989) argued for the superiority of individualized interaction between student and tutor when supported by written postal correspondence or by real-time telephone tutoring. Holmberg also introduced us to the idea of simulated interaction that defines the writing style appropriate for independent study models of distance education, programming that he referred to as "guided didactic interaction." Garrison and Shale (1990) defined all forms of education (including that delivered at a distance) as essentially

Figure 2-1. Attributes of educational media.



interactions between content, students, and teachers. Laurillard (1997) constructed a conversational model of learning in which interaction between students and teachers plays the critical role.

As long ago as 1916, John Dewey referred to interaction as the defining component of the educational process that occurs when the student transforms the inert information passed to them from another, and constructs it into knowledge with personal application and value (Dewey, 1916). Bates (1991) argued that interactivity should be the primary criterion for selecting media for educational delivery. Thus, there is a long history of study and recognition of the critical role of interaction in supporting, and even defining, education.

The Web affords interaction in many modalities. In Figure 2-1, we see the common forms of media used in distance education charted against their capacity to support independence (of time and place) and their capacity to support interaction. It can be seen that, generally, the higher and richer the form of communication, the more restrictions it places on independence.

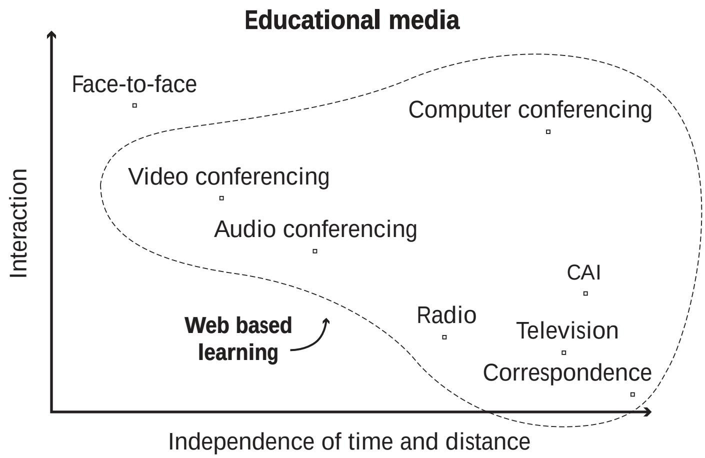
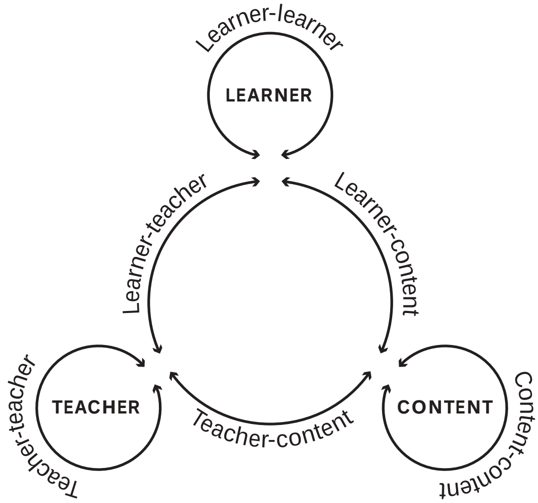


Figure 2-2. Educational media subsumed by the Web.

Figure 2-2 shows the capability of the Web to support these modalities. As can be seen, all forms of mediated educational interaction are now supported, assuming one adds the use of the Web to enhance classroom-based education. Thus, the capacity for the Web to support online learning in general is usually too large a domain for meaningful discussion until one specifies the particular modality of interaction in use.

Interaction can also be delineated in terms of the actors participating in it. Michael Moore first discussed the three most common forms of interaction in distance education: student-student, student-teacher, and student-content (Moore, 1989). This list was expanded by Anderson and Garrison (1998) to include teacher-teacher, teacher-content, and content-content interaction. I have been developing an equivalency theorem describing the capacity to substitute one form of interaction for another, based on cost and accessibility factors (Anderson, 2002; Anderson, 2003). Figure 2-3 illustrates these six types of educational interaction, and each is described briefly below.

Figure 2-3.
Educational interactions.



Student-student Interaction

Traditionally, student-student interaction has been downplayed as a requirement of distance education as a result of constraints on the availability of technology and an earlier bias among distance-education theorists toward individualized learning (Holmberg, 1989). Modern constructivist theorists stress the value of peer-to-peer interaction in investigating and developing multiple perspectives. Work on collaborative learning illustrates potential gains in cognitive learning tasks, as well as increases in completion rates and the acquisition of critical social skills in education (Slavin, 1995). Work by Damon (1984) and others related to peer tutoring illustrates the benefits to both the tutor and the tutee that can result from a variety of forms of "reciprocal" teaching. Finally, peer interaction is critical to the development of communities of learning (Wenger, McDermott, & Snyder, 2002) that allow learners to develop interpersonal skills, and to investigate tacit knowledge shared by community members as well as a formal curriculum of studies.

Student-teacher Interaction

Student-teacher interaction is supported in online learning in a large number of varieties and formats that include asynchronous and synchronous communication using text, audio, and video. The facility of such communications leads many new teachers to be overwhelmed by the quantity of student communications and by the rise in students' expectations for immediate responses.

Student-content Interaction

Student-content interaction has always been a major component of formal education, even in the form of library study or the reading of textbooks in face-to-face instruction. The Web supports these more passive forms of student-content interaction, and also provides a host of new opportunities, including immersion in microenvironments, exercises in virtual labs, online computer-assisted tutorials, and the development of interactive content that responds to student behavior and attributes (often referred to as "student models"). Eklund (1995) lists some potential advantages of such approaches, noting that they allow instructors to

- provide an on line or intelligent help facility, if a user is modeled and their path is traced through the information space;
- use an adaptive interface based on several stereotypical user classes to modify the environment to suit individual users; and
- provide adaptive advice, and model the learner's use of the environment (including navigational use, answers to questions, and help requested) to make intelligent suggestions about a preferred individualized path through the knowledge base.

To these advantages must be added the capacity for immediate feedback, not only for formal learning guidance, but also for just-in-time learning assistance through job aids and other performance support tools.

Teacher-teacher Interaction

Teacher-teacher interaction creates the opportunity for professional development and support that sustains teachers through communities of like-minded colleagues. These interactions also encourage teachers to take advantage of knowledge growth and discovery in their own subject and within the scholarly community of teachers.

Teacher-content Interaction

Teacher-content interaction focuses on the creation of content and learning activities by teachers. It allows teachers continuously to monitor and update the content resources and activities that they create for student learning.

Content-content Interaction

Content-content interaction is a newly developing mode of educational interaction in which content is programmed to interact with other automated information sources, so as to refresh itself constantly, and to acquire new capabilities. For example, a weather tutorial might take its data from current meteorological servers, creating a learning context that is up-to-date and relevant to the learner's context. Content-content interaction is also necessary to provide a means of asserting control of rights and facilitating tracking of the use of content by diverse groups of learners and teachers.

A Model of E-learning

A first step in theory building often consists of the construction of a model in which the major variables are displayed and the relationships among the variables are schematized. Figure 2-4 provides a model that illustrates the two major modes of online learning.

The model illustrates the two major human actors, learners and teachers, and their interactions with each other and with content.

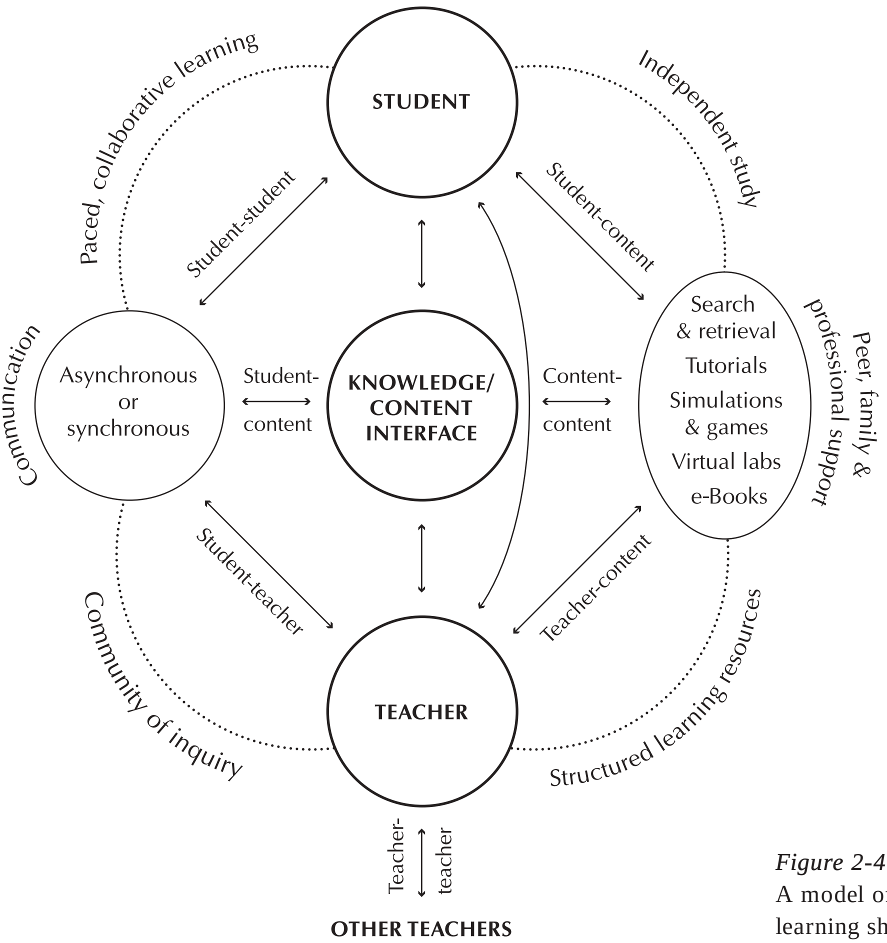


Figure 2-4.
A model of online learning showing types of interaction.

Learners can of course interact directly with content that they find in multiple formats, and especially on the Web; however, many choose to have their learning sequenced, directed, and evaluated with the assistance of a teacher. This interaction can take place within a community of inquiry, using a variety of Net-based synchronous and asynchronous activities (video, audio, computer conferencing, chats, or virtual world interaction). These environments are particularly rich, and allow for the learning of social skills, the collaborative learning of content, and the development of personal relationships among participants. However, the community binds learners in time, forcing regular sessions or at least group-paced learning. Community models are also, generally, more expensive, as they suffer from an inability to scale to large numbers of learners. The second model of learning (on the right) illustrates the structured learning tools associated with independent learning. Common tools used in this mode include computer-assisted tutorials, drills, and simulations. Virtual labs, in which students complete simulations of lab experiments, and sophisticated search and retrieval tools are also becoming common instruments for individual learning. Printed texts (now often distributed and read online) have long been used to convey teacher interpretations and insights in independent study. However, it should also be emphasized that, although engaged in independent study, the student is not alone. Often colleagues in the work place, peers located locally (or distributed, perhaps across the Net), and family members have been shown to be significant sources of support and assistance to independent study learners (Potter, 1998).

Using the online model, then, requires that teachers and designers make crucial decisions at various points. A key decision factor is based on the nature of the learning that is prescribed. Marc Prensky (2000) argues that different learning outcomes are best learned through particular types of learning activities. Prensky asks not, "How do students learn?" but more specifically, "How do they learn what?"

Prensky (2000, p. 156) postulates that, in general, we all learn:

- behaviors through imitation, feedback, and practice;
- creativity through playing;
- facts through association, drill, memory, and questions;
- judgment through reviewing cases, asking questions, making choices, and receiving feedback and coaching;
- language through imitation, practice, and immersion;
- observation through viewing examples and receiving feedback;
- procedures through imitation and practice;
- processes through system analysis, deconstruction, and practice;

- systems through discovering principles and undertaking graduated tasks;
- reasoning through puzzles, problems, and examples;
- skills (physical or mental) through imitation, feedback, continuous practice, and increasing challenge;
- speeches or performance roles through memorization, practice, and coaching;
- theories through logic, explanation, and questioning.

Prensky also argues that there are forms and styles of games that can be used, online or offline, to facilitate the learning of each of these skills.

I would argue that each of these activities can be accomplished through e-learning, using some combination of online community activities and computer-supported independent-study activities. By tracing the interactions expected and provided for learners through the model, one can plan for and ensure that an appropriate mix of student, teacher, and content interaction is designed for each learning outcome.

Online Learning and the Semantic Web

We are entering an era in which the Web is changing from a medium to display content, to one in which content is endowed with semantic meaning (Berners-Lee, 1999). If the format and structure of content is described in formalized and machine-readable languages, then it can be searched and acted upon, not only by humans but also by computer programs commonly known as autonomous agents. This new capacity has been most prominently championed by the original designer of the Web, Tim Berners-Lee, and is named by him the "Semantic Web."

The Semantic Web will be populated by a variety of autonomous agents—small computer programs designed to navigate the Web, searching for particular information and then acting on that information in support of their assigned task. In education, student agents will be used for intelligent searching of relevant content, and as secretaries for booking and arranging for collaborative meetings, for reminding students of deadlines, and for negotiating with the agents of other students for assistance, collaboration, or socialization. Teacher agents will be used to provide remedial tuition, and to assist with record keeping, with monitoring student progress, and even with marking and responding to student communications. Content itself can be augmented with agents that control rights to its use, automatically update it, and track the means by which the content is used by students (Thaiupathump, Bourne, & Campbell, 1999; Shaw, Johnson, & Ganeshan, 1999).

The Semantic Web also supports the reuse and adaptation of content by supporting the construction, distribution, and dissemination of digitized content that is formatted and formally described (Wiley, 2000; Downes, 2000). The recent emergence of educational modeling languages (Koper, 2001) allows educators to describe, in a language accessible on the Web, not only the content but also the activities and context or environment of learning experiences. Together these capabilities afforded by the Semantic Web allow us to envision an e-learning environment that is rich with student-student, student-content, and student-teacher interactions that are affordable, reusable, and facilitated by active agents (see Figure 2-5, below).

Toward a Theory of Online Learning

The Web offers a host of very powerful affordances to educators. Existing and older education provisions have been defined by the techniques and tools designed to overcome the limitations and exploit the capacities of earlier media. For example, the earliest universities were constructed around medieval libraries that afforded access to rare hand-written books and manuscripts. Early forms of distance education were constructed using text and the delayed forms of asynchronous communications afforded by mail services. Campus-based education systems are constructed around physical buildings that afford meeting and lecture spaces for teachers and groups of students. The Web provides nearly ubiquitous access to quantities of content that are many orders of magnitude larger than those provided in any other medium.

From our earlier discussion, we see that the Web affords a vast potential for education delivery that generally subsumes almost all the modes and means of education delivery previously used, with

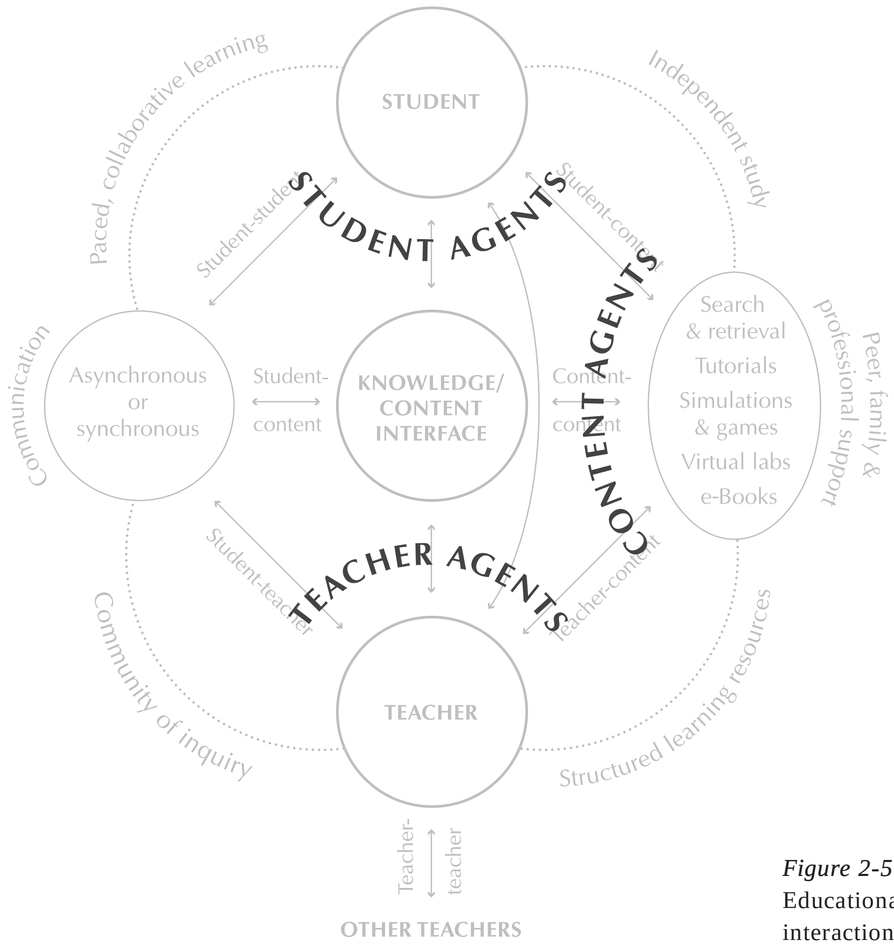


Figure 2-5. Educational interactions on the Semantic Web.

perhaps the exception of the rich face-to-face interaction of the classroom. We have also seen that the most critical component of formal education consists of interaction between and among multiple actors, humans and agents included.

Thus, I conclude this chapter with an overview of a theory of online learning interaction that suggests that the various forms of student interaction can be substituted for each other, depending on costs, content, learning objectives, convenience, technology, and available time. The substitutions do not result in decreases in the quality of the learning that results. More formally:

> Sufficient levels of deep and meaningful learning can be developed, as long as one of the three forms of interaction (student-teacher; student-student; student-content) is at very high levels. The other two may be offered at minimal levels or even eliminated without degrading the educational experience. (Anderson, 2002)

The challenge for teachers and course developers working in an online learning context is to construct a learning environment that is simultaneously learning centered, content centered, community centered, and assessment centered. There is no single, right medium of online learning, nor a formulaic specification that dictates the kind of interaction most conducive to learning in all domains with all learners. Rather, teachers must learn to develop their skills so that they can respond to student and curriculum needs by developing a set of online learning activities that are adaptable to diverse student needs. Table 2-1 illustrates how the affordances of these emerging technologies can be directed so as to create the environment that is most supportive of "how people learn."

Table 2-1. Affordances of the network environment and the attributes of "How people learn."

"How people learn" framework (Bransford et al.)	**Affordances of the current Web**	**Affordances of the Semantic Web**
Learner centered	Capacity to support individualized and community centered learning activities	Content that changes in response to individualized and group learner models
Knowledge centered	Direct access to vast libraries of content and learning activities organized from a variety of discipline perspectives	Agents for selecting, personalizing, and reusing content
Community centered	Asynchronous and synchronous; collaborative and individual interactions in many formats	Agents for translating, reformatting, time shifting, monitoring, and summarizing community interactions
Assessment centered	Multiple time- and place-shifted opportunities for formative and summative assessment by self, peers, and teachers	Agents for assessing, critiquing, and providing "just in time feedback"

Conclusion

This discussion highlights the wide and diverse forms of teaching and learning that can be supported on the Web today, and the realization that the educational Semantic Web will further enhance the possibilities and affordances of the Web, making it premature to define a particular theory of online learning. However, we can expect that online learning, like all forms of quality learning, will be knowledge, community, assessment, and learner centered. Online learning will enhance the critical function of interaction in education in multiple formats and styles among all the participants. These interactions will be supported by autonomous agents working on behalf of all participants. The task of the online course designer and teacher is to choose, adapt, and perfect (through feedback, assessment, and reflection) educational activities that maximize the affordances of the Web. In doing so, they create learning-, knowledge-, assessment-, and community-centered educational experiences that result in high levels of learning by all participants. Integration of the new tools and affordances of the Semantic Web further enhances the quality, accessibility, and affordability of online learning experiences.

Our challenge as theory builders and online practitioners is to delineate which modes, methods, activities, and actors are most effective, in terms of cost and learning, in creating and distributing quality e-learning programs. The creation of a model is often the first step toward the development of a theory. The model presented illustrates most of the key variables that interact to create online educational experiences and contexts. The next step is to theorize and measure the direction and magnitude of the effect of each of these variables on relevant outcome variables, including learning, cost, completion, and satisfaction. The models presented in this chapter and other chapters in this book do not yet constitute a theory of online learning, but it is hoped that they will help us to deepen our understanding of this complex educational context and lead us to hypotheses, predictions, and most importantly improvements in our professional practice. It is hoped that the model and discussion in this and other chapters in this book lead us toward a theory of online learning.

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CHAPTER 3

VALUE CHAIN ANALYSIS: A STRATEGIC APPROACH TO ONLINE LEARNING

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> Only by integrating the Internet into overall strategy will this powerful new technology become an equally powerful force for competitive advantage. (Porter, 2001, p. 78)

Introduction

Distance education uses mediated information and instruction, encompassing all available technologies and a variety of other forms of instruction at a distance, to deliver knowledge and skills to the learner. Online education is an extension of the traditional form of distance education. Typically it involves

> the use of the Internet to access learning materials; to interact with the content, instructor, and other learners; and to obtain support during the learning process, in order to acquire knowledge, to construct personal meaning, and to grow from the learning experience. (Ally, 2004, p. 5)

Online education includes mechanisms to facilitate the development of and access to a variety of learning services; an underpinning technological platform; means to help potential learners select and enrol in learning experiences; and supporting administrative processes. Strategic planning questions about the use of information and communication technologies (ICTs) in education must work in a context of constant and accelerating change that demands flexibility in the design of the online learning institution's structure and course and program offerings. The use of technology must be embedded within a wider strategy for teaching, learning, and service that is responsive to the challenges of technological change (Bates, 1999).

Many adult education and training providers are running to get on the online learning bandwagon. Several global groups of institutions are collaborating to promote distance education, including British International Studies Association, Central and East European International Studies Association, European Association of International Education, U.S. International Studies Association, U.S. Information Agency, IDP Education Australia, European Universities Continuing Education Network, and Global Wireless Education Consortium (Alley, 2001; Woudstra & Adria, 2003). They are busy transforming existing courses and creating new ones for online delivery. The participation of single institutions and groups of institutions has resulted in increased opportunities for online learning all over the world. Institutions are trying new delivery and support strategies, and looking at competency-based credentialing systems and performance-based learning.

On the other hand, several institutions have recently pulled out of online distance education. NYU Online, a three-year-old venture of New York University, folded as a result of economic conditions (Carnevale, 2000), a plight shared by UMUC (University of Maryland University College) Online, and Temple University's Virtual Temple (Carlson & Carnevale, 2001). The economic conditions referred to have to do with heavy competition from other more successful institutions, such as the University of Phoenix (http://www.phoenix.edu), and enrollments that were significantly lower than predicted.

There are many reasons why online distance education institutions have failed, including high cost of technology, poor decisions, competition, and the absence of appropriate (or any) business strategies, especially market assessment of consumer demand. Many of these institutions rushed to offer any conceivable course, and attempted to replicate the classroom experience online (Kilmurray, 2003); most failed to deliver real value that could earn a sustainable and profitable return from learners. By failing to follow appropriate business strategies, many online learning institutions reduced the likelihood that they could gain any competitive advantage. They failed to capitalize on the Internet’s capacity to support convenience, service, high quality learning, customization, richness, and other features of value to learners.

Various authors have argued for the special role of the University, and for the need for it to operate outside of the economic forces that define activity in the commercial sector (see, e.g., Gilbert, 2001; Pister, 1999; Scott, 1998). There may be strong arguments for public support for the University to allow it, to a limited degree, to sit outside of the competitive marketplace. However, in the neoliberal climate of the day, the emergence of for-profit university corporations and the need to ensure value in order to gain and retain public support, compels university administrators and faculty to examine the means by which value is created and retained by their institution. Thus, this chapter focuses on the online university (public, private, or for-profit), and attempts to enhance our understanding of the ways in which market forces can be understood and manipulated so as to enhance the efficiency and effectiveness—and thus the viability—of a university in a networked economy. This chapter emphasizes the role of strategy for online learning institution, and uses the value chain framework for discussing the particular management challenges, skills, and practices associated with online learning.

The first section defines the theoretical framework for value chain analysis, and highlights its strategic power. The second section presents the online distance teaching value system and market map. The third section discusses the methodology for constructing and using a value chain in an online learning institution. The final section discusses the application of the value chain framework to understanding developments at a particular distance and online learning institution—Athabasca University. It also considers limitations to and problems posed by value chain analysis.

Gaining a Competitive Advantage

The value chain framework is an approach for breaking down the sequence (chain) of business functions into the strategically relevant activities through which utility is added to products and services. Value chain analysis is undertaken in order to understand the behavior of costs and the sources of differentiation (Shank & Govindarajan, 1993). In education, *differentiation* is achieved by creating a perception among targeted learners that the course, the program, or the university's offerings as a whole are unique in some important way, usually by being of higher quality. The appeal of differentiation is strong for higher education institutions, for which image and the perception of quality are important. This perception allows the institution to charge higher tuition fees, and so to outperform the competition in revenues without reducing costs significantly.

Porter (1980) argued that a business can develop a sustainable competitive advantage based on cost, differentiation, or both, as shown in Figure 3-1.

Figure 3-1. Developing competitive advantage.

		Relative cost position	
		INFERIOR	SUPERIOR
Relative differentiation position	SUPERIOR	Differentiation advantage	Differentiation and cost advantage
	INFERIOR	Stuck-in-the-middle	Low cost advantage

Source: Shank and Govindarajan (1993, p. 49).

To survive in today's highly competitive business environment, any organization must achieve, at least temporarily, a competitive advantage. A low cost/price strategy focuses on providing goods or services at a lower cost than the competition, or superior goods or services at an equal cost. In education, it might be accomplished by limiting programs and courses offerings, by reducing the complexity of the course design and production process, or by limiting service or learner support. This strategy requires as well a tight cost-control system, benefiting from economies of scale in production, and experience curve effects.

For example, at the University of Phoenix online (UOP), managers determined that faculty, facilities, and support staff accounted for a large portion of their costs. They targeted these three components to make a dramatic reduction in their cost structure. Almost all faculty members at UOP teach part time and hold other full-time jobs. According to Jackson (2000, p. 34), faculty are paid U.S. $900-U.S. $1200 to teach a course, and are expected to focus almost exclusively on teaching rather than on other responsibilities that are common in most universities (student advising, course creation, university management, research, and community service). UOP estimates that faculty must spend 100 hours on their first course, less as they become more proficient (referring to the learning curve benefits). Faculty at the University of Phoenix are not provided with offices, thus reducing the investment in buildings and the cost of operating them. UOP seems to realize costs savings by marginalizing academics and reducing their pay and advantages. On the other hand, there are few support services for students, and the library is accessible only via the World Wide Web, thus reducing dramatically the cost of housing books and paying for professional support staff. UOP is an accredited university (since 1978, by the North Central Association of Colleges and Schools). Courses and instructors are constantly measured for both learning and student (customer) satisfaction. Perhaps most critically, UOP has eliminated the role of research—except as it affects online education—from the traditional role of the University. UOP receives no government subsidies, has consistently returned profits to its shareholder owners, and charges competitive tuition rates. UOP uses a business approach rather than an academic approach to education, and is one of the few profitable for-profit universities in the U.S. (Jackson, 2000).

The second strategy for gaining competitive advantage is differentiation. The primary focus of this strategy is to create a unique position in the market through provision of goods or services that are valued for their uniqueness or fit to the needs of a particular group of buyers. A differentiating strategy also requires ongoing cost control efforts within a strategic management emphasis geared towards differentiating offerings. For example, the course package by itself could not provide competitive differentiated advantage, as it is fairly easy for other institutions to duplicate it, either by buying it directly from the producing institution, or by creating a very similar package. However, when the services of highly competent academics and tutors, registry staff, student advisors, and counselors are added, a strong and unique bond can be created between the university and its learners. This unique bond becomes a differentiating competitive advantage when the institution subscribes to a vision of quality, support, service, and excellence (Woudstra & Powell, 1989).

A vision of excellence for online learning institutions is not a choice, but a market driven imperative. The institution cannot rely upon the recruitment of learners within a geographic catchment area, as can many campus-based institutions. In order to gain global competitive advantage and respect, the online learning institution must prove that it is an "excellent fit for purpose," not only for its suitability to its target market, but also for its strategic and operational processes. Capella University Online is pursuing a differentiation competitive advantage. Capella is "trying to provide adult learners with programs that are going to have an immediate impact in their work, that are going to provide sustained value to them as professionals, that are based on what we call an intimate learning experience" (Lorenzo, 2003, p. 2). To differentiate itself from other online learning institutions, Capella uses the tag line "Education. Reborn℠" everywhere in its internal and external public relation documents and Web sites.

Capella emphasizes competency-based learning, and targets adult working learners seeking to have learning relevant to their jobs. Capella has shaped its programs and courses to suit the very particular needs of its learners. For example, Capella revamped its MBA Program, introducing a unique component called the "professional effectiveness" core that was developed as a result of a market study conducted in 2001 of 37 U.S. companies. The professional effectiveness core addresses perceived corporate management needs with courses that focus on such issues as building relationships, leading and facilitating change, leading teams, and negotiating for results (Lorenzo, 2003, p. 6).

Capella re-enforced these offerings with a patented "Professional Effectiveness Coaching℠" process, encompassing two forms of coaching. One is an in-course process, where learners do peer coaching with each other; the other is one-on-one coaching, where each learner has the option of choosing a certified coach, hired by

Capella, to provide guidance in improving the learner's "management effectiveness and apply new behaviors on the job" (Lorenzo, 2003, p.6).

A third competitive strategy not depicted by Porter's framework is called *focus*: a strategy for targeting a very specific segment of the market as defined, for example, by type of learner (e.g., Aboriginal students), specific type of program offered, or specific characteristics of a geographic area. This strategy is used to choose market niches where competition is the weakest, or where the online learning institution has a competitive advantage because of technology or other forms of differentiation. The focused institution succeeds by avoiding direct competition. It may also have strong differentiation advantage, a low cost advantage, or both, for its market segment. For example, professional organizations, such as the Certified General Accountants Association (www.cga-canada.org), the Society of Management Accountants of Canada (www.cma-canada.org), and Chartered Accountants School of Business (http://www.calearn.ca) fall into this category of focused competitive advantage.

Value Chain Analysis

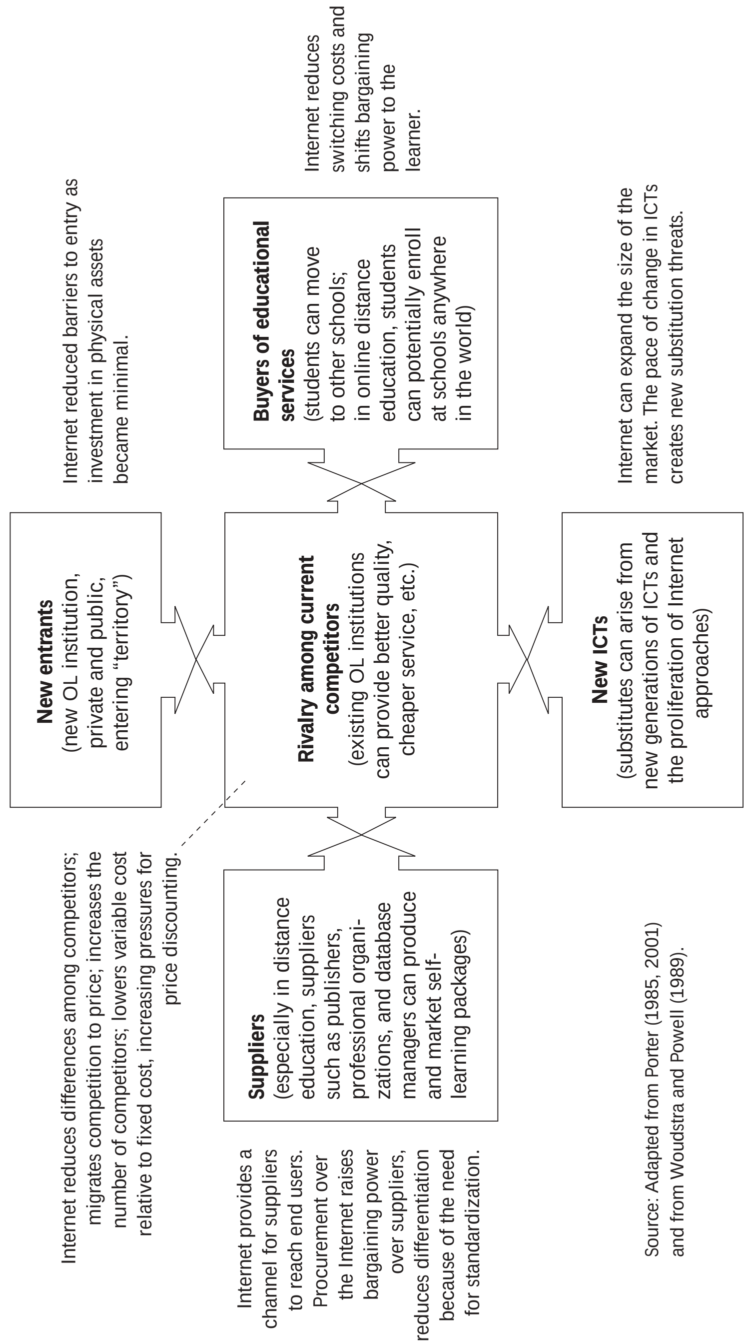
Value chain analysis can help an institution determine which type of competitive advantage to pursue, and how to pursue it. There are two components of value chain analysis: the industry value chain and the organization's internal value chain. The industry value chain is composed of all the value-creating activities within the industry, beginning with the first step in the course development process, and ending with the completed delivery of courses and related services to the learner. Porter (1985) identified five competitive forces interacting within a given industry: the intensity of rivalry among existing competitors, the barriers to entry for new competitors, the threat of substitute products and services, the bargaining power of suppliers, and the bargaining power of buyers (see Figure 3-2). Analyzing these forces will reveal the industry's fundamental attractiveness, expose the underlying drivers of average industry profitability, and provide insight into how profitability will evolve in the future, given different changes among suppliers, channels, substitutes, competitors, or technology.

The structural attractiveness of the distance education industry is also determined by the same five underlying forces. In 2001, Porter argued that, while the Internet has helped distance education to expand impressively, it has only changed the front end of the industry process (p. 66).

Hence, the competitive attractiveness of online education can be analyzed using Porter's framework. The competitive forces presented in Figure 3-2 show that deploying the Internet and other ICTs within distance education has expanded the size of the market, not only allowing access to greater markets but also bringing many more companies into competition with one another. This development can place intense demands on university administrations to manage costs while ensuring quality education and service (Woudstra & Powell, 1989). The pressure on administrators comes from the changing cost structure that the Internet and the use of ICTs produce; that is, a reduction in variable costs and a tilting of cost structures towards fixed costs (Porter, 2001). In fact, compared to other distance education systems, online learning requires a heavy investment in technology (computers; servers; learning specific hardware; learning systems; acquiring authoring development tools, delivery tools, and collaboration tools; etc.) and also requires specialists (multimedia instructional designers, Web designers, technologists, faculty, etc.) to develop, run, and integrate mediated instructions. These two major categories of costs are mainly fixed. On the other hand, instructional materials are partially or totally digitized, thus reducing variable costs. The concepts of fixed and variable costs are central to cost analysis, in particular to understanding the behavior of costs, and to cost/volume/profit (CVP) analysis.

CVP analysis is concerned with how profit is determined by sales volume, sales price, variable expenses, and fixed expenses. A major application of CVP is in breakeven analysis, which provides a concise presentation of the relationship between cost and volume changes, and their effect on profit. The breakeven point is the point where total revenue equals total expenses, resulting in neither a profit nor a loss. Once "breakeven" is achieved, net income will increase by the contribution margin per unit for each additional unit sold. From a managerial perspective, fixed costs increase the risk to the company because they cannot be altered once incurred;

Figure 3-2. Industry competitive forces.



therefore, online learning increases the risk to the institution. This kind of cost structure creates greater pressure for managers to engage in destructive price competition.

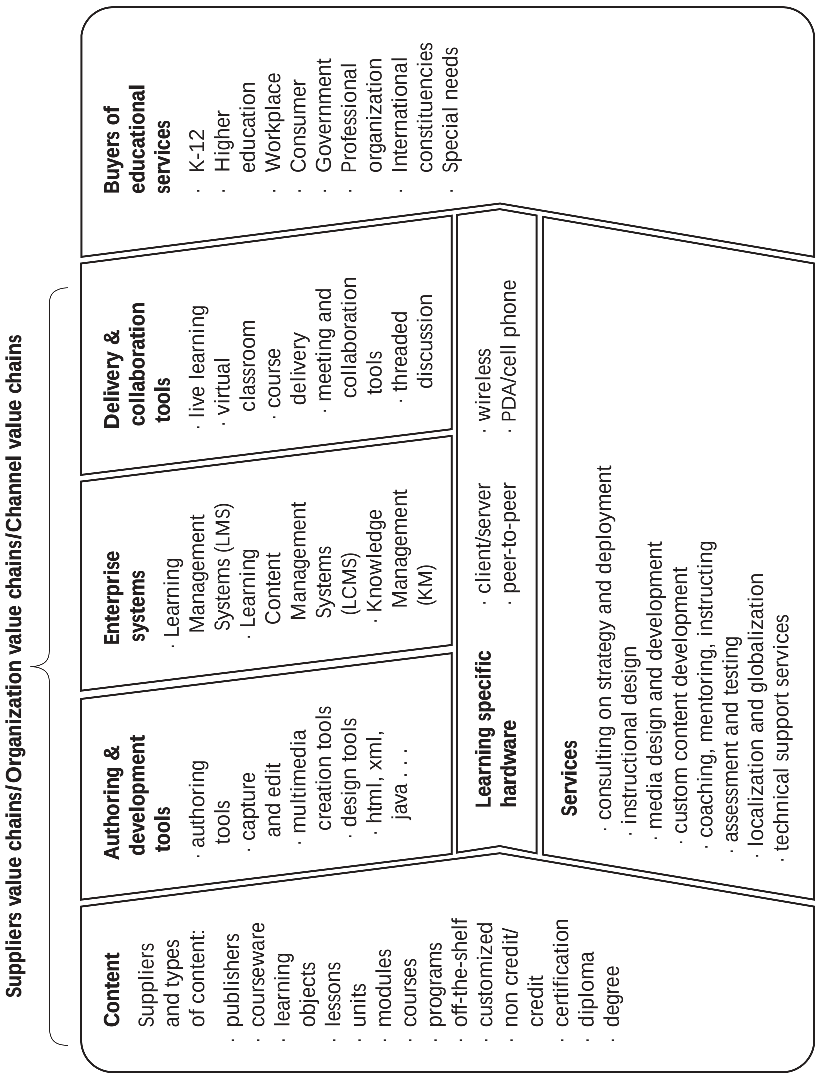
To understand why managers adopt price competition strategies when corporate cost structure is predominately fixed, it is necessary to understand the concept of *operating leverage*. Operating leverage is the measure of the extent to which fixed costs are being used in an organization. Using fixed costs, managers apply operating leverage to convert small changes in revenue to significant changes in profitability. The idea of operating leverage is consistent with the *economies of scale* concept developed by economists to describe the fact that cost per unit can be reduced by taking advantage of opportunities that become available as the size of an operation increases.

The degree of operating leverage is very important to managers, as it enables them to focus on the appropriate activities. For example, when the company operates near the breakeven point, managers should focus their attention on activities that increase sales (hence, the destructive price strategy), because increased sales will have a significant impact on profitability. On the other hand, when the company operates far from the breakeven point, the focus of managers should be oriented to cost control or new product development.

Online Distance Teaching Value System and Market Map

Online learning institutions operate in an open system; therefore, companies have more difficulty in maintaining proprietary offerings, and require a sound strategic perspective to gain sustainable competitive advantage. The Internet has intensified the competition and rivalry among post-secondary institutions, especially in distance education, where the pressure to enhance efficiency and effectiveness is intense. While it is true that Internet and the use of ICT in distance education have changed significantly the look and feel of the learning experience, conventional factors, such as scale, the skills of personnel, internal processes, and physical investments, remain a permanent source of competitive advantage.

In online distance teaching organizations, many actors are involved in the educational process: faculty, course coordinators, editors,



Source: Adapted from Stacey (2001).

Figure 3-3. Online distance teaching value system and market map.

instructional designers, technology specialists, academic experts, examination invigilators, and technical and other administrative personnel who support the educational process. As these actors work in administratively distinct units of the organization, intra- and inter-departmental linkages are critical to efficient and effective service in online distance education organizations (Woudstra & Powell, 1989).

An online learning distance education institution is typically only a part of the larger set of activities in what Porter (1985) calls the value delivery system. As depicted in Figure 3-3, the value chain of an online learning institution affects (and is affected by) others in the value system, including publishers, providers of authoring and development tools, enterprise systems, portals integrators, distributors and delivery partners, suppliers, the government, other educational institutions, and learners (buyers of educational services). In effect, each firm establishes itself in one or more parts of the value system, on the basis of a strategic analysis of its competitive advantage.

The application of the Internet and ICT to distance education is enabling the integration of the industry's entire value system; that is, the set of value chains in an entire industry, encompassing those of suppliers, channels, organizations, and buyers of educational services. For example, an online learning organization can incorporate the suppliers' design capabilities to reach back to its suppliers' value chains to form linkages, improve response capabilities, share costs, and gain competitive advantage (Woudstra & Powell, 1989). By connecting various activities and players in the value system, the use of Internet and ICT in distance education will optimize its workings, including sourcing, production, delivery, and service to students.

The value chain framework highlights how the online learning institution's offerings fit into the learner's value chain. When Capella University launched its revamped Online MBA, with its unique "professional effectiveness" component, the intention was to fit this program into buyers' specific program and organizational needs. Value chain analysis explicitly recognizes the fact that the various activities within a firm are not independent, but rather, interdependent. By recognizing interdependencies, value chain analysis admits to the possibility that deliberately increasing costs in one value activity may bring about a reduction in total costs. For example, the extra money spent in creating or buying a high-quality self-contained course might reduce the cost of student support and overall cost as well. The next sections discuss value chain analysis and methodology.

The internal value chain of an online learning institution consists of all physically and technologically distinct activities within the institution that add value to the learner's experience. The key to analyzing the value chain is understanding the activities within the institution that create a competitive advantage, and then managing those activities better than other institutions in the industry. Porter (1985) suggested that the activities of a business can be grouped under two headings: primary activities, those that are directly involved with the physical creation and delivery of the product or service; and support activities, which feed both into primary activities and into each other. Support activities (e.g., human resource management, technology development) are not directly involved in production, but have the potential to increase effectiveness and efficiency. It is rare for an organization to undertake all primary and support activities. Value chain analysis is thus a means for examining internal processes and identifying which activities are best provided by others. Figure 3-4 presents a generic value chain adapted for an online learning institution.

Support activities consist of

1. organizational infrastructure, which is concerned with a wide range of support systems and functions, such as finance, planning, quality control, and general senior management.
2. human resource management, dealing with those activities concerned with recruiting, developing, motivating, and rewarding the workforce of the organization.
3. technology development, dealing with those activities concerned with managing information processing and the development and protection of "knowledge" in the organization.
4. procurement, which deals with how resources are acquired for the organization (e.g., sourcing and negotiating with suppliers).

The overall primary structure in an online distance education organization such as the UK Open University (http://www.open.ac.uk) or Athabasca University (http://www.athabascau.ca) can be described in terms of five sectors: inbound logistics, production,

Figure 3-4. (opposite) Online learning value chain.

outbound logistics, delivery and marketing, and service to learners. These sectors are discussed briefly below.

Inbound logistics involves preparations for course development, including curriculum planning; acquiring or preparing for learning specific hardware (LSH), learning management systems (LMS), and learning content management systems (LCMS); hiring of authors; ordering of reference materials, including textbooks; and formation of internal course teams.

Operations involve the actual process of course development, including writing, multimedia creation, editing, formatting, graphic design, printing, and Web publishing.

Outbound logistics concerns the packaging and storage of courses, and the process of mailing or otherwise delivering the material to the students. Providing registered students with access to their courses through an integrated portal where they can retrieve customized and relevant information about their account is another aspect of outbound logistics. Student portals are important for online learning, as they help build a virtual campus community. In one secure place, a student can access their account to register in a course, order a transcript, ask for student financial aid, access the library and bookstore, and benefit from a variety of student orientation tools, including advising, support, counseling, and other resources.

The university enters into a contract for tuition and other services with a student when they register in a particular course. A registration is considered a sale, as funds change hands for access to the course and for purchase of the learning materials. The core revenue stream of the online learning institution derives from the provision of learning; therefore, tuition is often considered the main source of revenue for such institutions. Other sources of revenue include government funding; sales of in-house-developed products, design tools, and databases; and provision of other services to students (e.g., admission, contract extension, transcripts, challenge fees).

The preparation of brochures, advertising materials, and the university calendar is the traditional and main marketing strategy to promote the university's offerings. Given the nature of online learning, the online university must craft a branding strategy to communicate the benefits, attributes, culture, and competitive

SUPPORT ACTIVITIES

Organizational infrastructure

- Web-based, distributed financial and ERP systems
- Online learner relations (e.g., information dissemination . . .)

Human resource management

- Self-service personnel and benefits administration
- Web-based training
- Internet-based sharing and dissemination of organization information
- Electronic time and expense reporting

Technology development

- Collaborative course/program design across locations and among multiple value-system participants
- Knowledge directories accessible from all parts of the organization

Procurement

- Internet-enabled demand planning; real-time available/capable of promise and fulfillment
- Other linkage of purchase, inventory, and forecasting systems with suppliers
- Automated “requisition to pay” and “expense claim” systems
- Direct and indirect procurement via marketplaces, exchanges, and auctions

PRIMARY ACTIVITIES

Inbound logistics

- Learning Specific Hardware (LSH) (client/server, wireless peer-to-peer)
- Learning Management Systems (LMS)
- Learning Content Management Systems (LCMS)
- Knowledge Management (KM)
- Real-time integrated scheduling of reference materials
- Dissemination of real-time inbound inventory data
- Hiring of authors
- Authoring tools

Operations

- Course instructional design
- Content (learning objects, units, etc.)
- Courseware, study guide, and student manual development
- Writing
- Formatting
- Capture and edit
- Multimedia creation
- Graphic design
- Printing
- Integrated information exchange, scheduling, in-house course production, contract SMEs, and publishers

Outbound Logistics

- Real time transaction of orders
- Online registration
- Integrated portal
- Packaging and storage of courses
- Learner access to course (Web access or mail delivery)
- Integrated channel management (process control)
- Automated learner specific account and contract terms
- Real-time information available to advisors PR, and channels

Delivery (sales), collaboration and marketing

- Live learning
- Virtual classroom
- Course delivery
- Threaded discussion
- Audio/video over IP
- Real time access to student information, calendar, fees, course availability
- Real-time learner feedback through Web surveys and promotion response tracking
- Branding
- Entering strategic partnership
- Shared communities

Service

- Online support of learners
- Coaching, mentoring
- Assessment and testing
- Technical and support services
- Learner self-service via Web sites and intelligent service request processing
- Real-time field service access to learner account/courses reviews, etc.
- Localization and globalization
- Tutor support
- Academic experts/marking
- Counseling
- Granting awards

Generation of knowledge and research

Source: Adapted from Porter (2001).

advantage of the institution and its unique online learning offerings; it must also establish strategic partnerships and alliances that are able to give the institution a unique position in the minds of stakeholders.

The service sector provides online support (technical and academic) to learners, counseling, tutoring, marking of assignments and examinations, delivery and invigilation of examinations, and maintenance of student records. It also includes learner self-service through Web sites and Web portals.

It may seem surprising that research is not mentioned explicitly as a sector in the value chain, especially as research has traditionally been considered a primary function of universities, one perceived by academics and the public as a value adding activity, as it helps the university to make a significant contribution to society. As you can see in Figure 3-4, however, research and the generation of knowledge are components of many value chain activities. Research is an essential element in all world-class universities. It ensures a vibrant academic environment, and enables the university to attract and retain good faculty, while building a strong academic reputation and contributing to the continual improvement of curriculum, learning systems, and programs.

A value chain analysis explicitly recognizes the interdependencies and the profit cost efficiencies accruing from exploiting linkages among value activities across the organization. For example, the timing of promotional campaigns (one value activity) significantly influences capacity use in course production and operations (another value activity). These linked activities must be coordinated if the full effect of the promotion is to be realized. Promoting a new program while a number of required program courses are unavailable will damage the image of the institution and result in lost registrations (revenue). Consider also that a well-designed course (one value activity) will lose value if not complemented with a suitable delivery strategy (a second value activity), and by a well-thought-out student support strategy (a third value activity). By focusing on such linkages, the value chain analysis provides a powerful tool for strategic thinking to gain sustainable competitive advantage.

Value Chain Methodology

The methodology for constructing and using a value chain involves four steps: identify value chain activities, determine which value chain activities are strategic, trace costs to value chain activities, and use the activity cost information to manage the strategic value chain activities. An organization that can do these things better than its competitors creates a sustainable competitive advantage.

Identify Internal Value Chain Activities

To identify its internal value chain activities, the online learning institution should first look for discrete activities that create value in fundamentally different ways. Figure 3-4 lists a set of discrete activities, such as course design, online registration, program and course promotion, counseling, etc. Each of these activities has distinctively different costs, cost drivers, and assets, involves different personnel, and creates value in a fundamentally different way.

Second, when identifying value chain activities, the institution should take a broad view of the organization's activities. To gain an understanding of this big picture, the institution should identify and separate out three categories of value chain activities: structural, procedural, and operational (Porter, 1985; Riley, 1987; Shank & Govindarajan, 1993; Donelan & Kaplan, 1998).

Structural activities, such the number and location of satellite campuses and learning centers, or the number of course production facilities, determine the underlying economic nature of the online learning institution. *Procedural activities*, such as total quality management, or awarding degrees and diplomas, pervade all aspects of the institution operation and reflect the organization's ability to perform processes efficiently and effectively. Finally, *operational activities,* such as course production, instructional design, printing, and teaching are the day-to-day activities of the institution.

Third, the institution should focus on structural and procedural activities. Most traditional cost management efforts concentrate on operational activities that have unit- or batch-driven costs. These traditional cost control efforts can be relatively easy to initiate, but may be too narrow in focus, because they seek to control short-run operational costs. If competition is intense, then controlling short-run operational cost is necessary but may be insufficient. It is important to identify, and then focus management attention on, the organizational and procedural cost drivers, because they often represent the long-run strategic drivers of organizational cost. It is likely that such activities will be the source of an institution's competitive advantage.

Determine Which Activities Are Strategic

To determine which of the value chain activities are strategic, the online learning institution must begin by identifying the characteristics of its services that are valued by existing learners, and the characteristics that the organization can best exploit to create value for future learners. These characteristics may include quality, perfect fit to specific learners' needs, student support, or any other tangible or intangible feature of the institution's offerings.

After identifying the distinctive characteristics of its offerings, the institution should find out which specific activities in the organization are responsible for creating those characteristics. The identified activities represent the most important value chain activities, or in other words, the strategic value chain activities that provide a competitive advantage.

For example, Athabasca University, a not-for-profit university is seeking to gain competitive advantage by meeting student's needs. The university provides students with open access, flexible learning systems (with continuous enrollment and flexible completion times for undergraduate courses), and high-quality courses, programs, and student support services. Therefore, the activities considered strategic within the University include developing a wide variety of new undergraduate and graduate programs; promoting courses and programs; seeking new partners for strategic alliances and collaborations; targeting and attracting students identified with traditionally under-represented groups; reducing traditional barriers to access (e.g., residency); offering prior learning assessment and different and flexible course delivery modes (e.g., individualized home study, electronic, etc.); and integrating appropriate technologies into course development, delivery, student support, and administrative systems.

After identifying strategic value chain activities, the institution must identify the non-strategic activities as well. These remaining value chain activities are important, but they do not represent the sources of strategic advantage for the organization.

For example, the role of research remains a contentious issue among universities when attempting to differentiate between strategic and non-strategic activities. For many, pursuit of new knowledge through research is a critical and defining feature of the University. However, research is expensive and is more often associated with a de-emphasis on quality of teaching than one might expect, given the often strongly held belief that research enhances the quality of teaching (Pocklington & Tupper, 2002). A metadata analysis of research on the relationship between quality learning and teaching concluded that "the likelihood that research productivity actually benefits teaching is extremely small . . . the two, for all practical purposes, are essentially unrelated" (Hattie & Marsh, 2002, p. 529). Universities that use faculty from other institutions to create and deliver courses thus have considerable cost advantages, but they may be vulnerable to criticism and lack of public support as a result of a perception that they make a smaller contribution to society because of their neglect of the traditional research function of the University. Thus for some universities, research is viewed as a non-strategic activity, whereas for many others, research remains a core strategic value. Athabasca University has attempted to strike a balance by supporting a core research faculty with a special emphasis on research on the core strategic activity of the university—teaching and learning at a distance.

Trace Costs to Activities

Each value activity incurs costs, generates revenues, and ties up assets. After identifying the value chain and its strategic and non-strategic activities, one must assign operating costs, revenues, and assets to individual activities. The accounting system should be designed to accomplish this task. One technique developed to aid the process of allocating costs to the appropriate value chain activities cost is activity-based costing (ABC) (see Cooper, 1990a, 1990b, 1997; Cooper & Caplan, 1997).

Identifying the value chain activity cost drivers is a way of understanding cost behavior and identifying strategic and non-strategic activities. However, managers must keep in mind the broader framework of the value chain as a whole. What is more useful in a strategic sense is to explain cost position in terms of structural choices, procedural practices, and operational skills (Shank & Govindarajan, 1993; Donelan & Kaplan, 1998). Figure 3-5 provides some examples of structural, procedural, and operational activities for an online learning institution, including possible cost drivers for each. It is important to note that, for strategic analysis, volume is usually not the most useful way to explain cost behavior. Financial and non-financial measures and cost drivers both lagging (those that result from past actions) and leading (those that inform future performance) are important. The Balanced Scorecard Framework (Kaplan & Norton, 1992) provides senior managers with a focus on the organization's vision and strategy, helps them communicate strategy throughout the organization, links strategic objectives to long-term targets, and helps managers create consensus on organization competitive advantages.

Improve Management of Value Chain Analysis

Organizations achieve a competitive advantage by managing the value chain better than other institutions in their industry. Managing the value chain implies increasing the quality of products and services, while reducing the institution's costs and increasing revenue, thus increasing competitive advantage. Examining a firm's value chain and comparing it to those of key rivals indicates areas of cost advantage or disadvantage. An online learning institution's decision to undertake certain activities is directly linked to achieving competitive advantage. For example, a school wishing to outperform its competitors by differentiating itself through higher quality will have to perform its value chain activities better than the competition. By contrast, a strategy based on seeking cost leadership will require a reduction in the costs associated with the value chain activities, or a reduction in the total

Figure 3-5. Examples of value chain activities and cost drivers.

VALUE CHAIN ACTIVITIES	COST DRIVERS
Structural activities	
Manage location and articulate strategy. Location and strategic choices need constant articulation and are considered cost drivers. Activities in this category include framing the market opportunity, managing the scope of the market, managing the value proposition, managing the organization's unique resource system, articulating the financial model, and managing integration (vertical or horizontal).	number and location of satellite campuses, number of industry and social segments in which the institution is present, number of students or registrations
Manage technology. What process does the online learning institution use to manage its technology through the value chain? The level of expertise and effectiveness of use, compared to competitors, will affect overall organization-level costs.	types of process technologies
Manage complexity of university offerings. The breadth of the programs and courses being offered is an important driver of costs.	number of different courses and programs
Manage institutional structure. Financial structure, accountability, and debt level affect many costs and the organization's flexibility.	debt level, debt capacity, tax status (favorable or unfavorable)
Gain experience, learn, and manage skill sets. An organization's learning, growth, experience, and application of that experience drive significant portion of cost. For example, when a university lacks experience in developing online courses, this fact would be a significant driver of its online course introduction costs.	effectiveness of professional training, team building, knowledge sharing, economies of scale

Manage and support research activities. This activity requires that the institution develop, promote, and support an active research culture; network with funding agencies, government departments, companies, and other potential sources of funding; and support the development and enhance the reputation of the university's research profile.	amount of external funding; number of successful research publications; impact of research on learning, teaching, and support services; number of graduate programs
Procedural activities	
Provide quality. Quality management training, quality standards, and employee empowerment are directly related to overall organizational quality.	employee training level, student drop out rate, student satisfaction
Manage employees. Management determines employee-grouping schemes, including the degree of centralization of authority, size of work unit, and number of work units. The work environment and climate are also managed through the extent and nature of training, degree of employee empowerment, maintenance of a networked working environment, and other factors.	employee morale and satisfaction level, turnover rate, span of command
Manage capacity. Capacity utilization may be considered a strategic driver of cost of organizational offerings. Unused capacity must be dealt with through efforts to bring more students to the institution, reducing the capacity (if possible), changing some capacity constraining policies, or a combination of these strategies.	percentage of course development capacity utilization, percentage of delivery capacity utilization, percentage of tutorial system capacity utilization, discretionary policies restraining capacity

Manage efficiency. There are many type of efficiency, but this activity represents a broad perspective of efficiency, including efficiency in program and course introduction, and overall course production, delivery, and student support.	lead time from program or course concept to up-and-running offering, course availability
Manage course complexity. Given the breadth of offerings for the online learning institution, procedures must be in place to control the complexity of the course design, production, delivery, and service to student.	use of learning objects repository, standard components, and authoring and development tools
Operational activities	
Manage course production. The actual process of course development including writing, multimedia creation, editing, formatting, graphic design, printing, and Web publishing	number of faculty, instructional designers, editors, graphic designers
Manage inbound logistics. Preparation for course development, including curriculum planning; acquiring or preparing for learning specific hardware (LSH), learning management systems (LMS), and learning content management systems (LCMS); hiring of authors; ordering of reference materials, including textbooks; and formation of internal course teams.	hardware and software availability (LSH, LMS, LCMS), procurement, set-ups, number of direct-labour hours

Source: Adapted from Donelan and Kaplan (1998).

amount of resources used. An online learning institution might also choose to follow a focus strategy by targeting a specific market segment or a specific offering.

In controlling costs in a value chain, managers try to answer the questions given below.

- Can we reduce costs in this activity, holding value (revenue, service, credibility, etc.) constant?
- Can we increase value in this activity, holding costs constant?
- Can we reduce assets in this activity, holding costs and value (revenue, service, credibility, etc.) constant?

Costs for an activity can be reduced only if the reduction does not adversely affect strategic advantage. For example, an across-the-board spending cut may result in a short-run cost reduction, but it could be a disastrous long-run strategy. Reducing spending on course design and development could reduce course quality, increase overall production costs, and delay the scheduling of new courses. Benchmarking against similar institutions is another way to gain cost advantage, acquire good practices, and create differentiation advantage (see Jackson & Lund, 2000). Thus, internal value chain analysis makes one thing clear: value chain activities are interrelated, and no activity should be managed independently without considering its impact on all other activities.

Concluding Remarks

Chapter Summary

The use of value chain analysis facilitates the strategic management of an organization. Michael Porter's seminal work in strategic management explains the fundamentals of how organizations compete. The three main types of competitive strategy are cost leadership, differentiation, and focus. Cost leadership is a strategy that relies on lowest-cost production and delivery, while differentiation relies on outstanding quality or product (program/course) features. The focus strategy relies on differentiation or cost leadership for a particular product or market niche.

Value chain analysis is a framework that can provide a number of benefits to the management of online learning organizations. This analysis can help managers of these organizations to identify linkages between value activities within the organization, and to think in terms of process rather than function or department. Through analysis of the value system, managers can identify potentials for strategic alliances with various actors in the industry value system. Identification of cost drivers and linkage with value chain activities help managers focus on cost reduction and on finding ways to optimize returns throughout the value chain. As well, value chain analysis helps managers understand cost management problems. Failure to see the impact of a decision on the overall value chain will result in missed opportunities.

The value chain framework allows online learning organizations to break down the chain—from basic infrastructure and support, to content development, to student support and service—into strategically relevant activities to understand the behavior of costs and the sources of differentiation. The online learning organization is typically only one part of the larger set of activities in the value delivery system. Gaining and sustaining a competitive advantage requires that the organization understands the entire value delivery system, not just the portion of the value chain in which it participates. Suppliers and distribution channels have profit margins that must be identified if one is to understand an organization's cost or differentiation positioning, because the end-users (learners) ultimately pay for all the profit margins throughout the value chain. An example of an online learning university value chain and illustrations of how value chain analysis can improve the management of the university value chain activities follows.

A Value Chain Example: Athabasca University

Woudstra and Powell (1989) presented an interesting analysis of the value chain of Athabasca University. They divided the University's primary activities into five fairly discrete chains as depicted in Figure 3-6.

The five value activity chains are supplemented and supported by many others in the areas identified as "support activities" in the generic value chain depicted in Figure 3-4. The primary chains themselves can be subdivided into smaller and smaller chains, depending on the detail of analysis required. As value chain analysis shows patterns within and relationships among primary and support activity chains, it becomes a helpful tool for coping with change.

The discussion below provides some examples of decisions and projects undertaken at Athabasca University in the last few years, and considers how they have affected the performance of the institution's value chain.

- Improving course availability and quality through a problem-solving approach in the course development process and production value chain (for examples, see the discussions in all of the chapters in Part 3 of this volume).

- Improving the quality of service to students through the improvement of turnaround in assignment and examination marking. Besides expanding the use of communications technologies, Athabasca University looked at training and empowerment to provide employees with the skills and authority to affect these factors. The creation of a call center (Adria & Woudstra, 2001) that responds to and tracks student, academic, technical, and administrative requests serves this objective as well (see Chapter 12 of this volume). Athabasca University's Tutorial Services Department plays an integrative role in this process. This department has its primary function in the course delivery chain, but also performs some support activities through its involvement in the hiring of tutors, and in maintaining and developing tutorial policy. Finally, it participates in the marketing area through its field officers, who contract with outside agencies and partners for collaborative delivery of courses.

- Working with suppliers of telecommunications, publishing, authoring, development, and other suppliers to digitize the University's authoring, publishing, and printing processes. In addition, the University is establishing liaisons with publishers to gain access to their learning materials and Web sites, so that their materials can be customized, adapted, and integrated more easily into Athabasca University's course offerings.

- Focusing the electronic student support services on the needs of individual learners by implementing U-portal technology that enables the creation of individual "My AU" entry points to

Course development & production	→	Admissions & credit transfer	→	Course registration & materials dispatch	→	Course delivery	→	Marketing
Course design, writing, editing, and printing. The course package is assembled by combining produced and purchased components and made available to the course delivery function.	→	The admission and credit transfer chain provides a service to students. Transfer assessment of prior education is mandatory.	→	Begins with student's application to register for a particular course, which triggers the release of a package of course materials to be sent to the student. The student is also assigned a telephone tutor.	→	This chain is accomplished by the call center, telephone tutors (called Academic Experts), markers, and the course coordinator. Examinations are issued and marked centrally. Some student services and counseling services, library, and other activities are included here.	→	The production of the university calendar and other brochures and materials promoting the university and its services. Included in this chain are activities by certain personnel who look after cooperative arrangements,

Source: Adapted from Woudstra and Powell (1989).

Figure 3-6. Athabasca University's value chain.

online student services, and by launching an online, Web-interfaced registration system (see Chapter 15 of this volume).

- Integrating appropriate technologies into course development, delivery, student support, and administrative systems by developing and implementing annual, three-year operational Online Learning, Student Services, and Systems Development plans.

Other initiatives include linking curriculum to students' priorities by ensuring that the curriculum is relevant to diverse student populations; and increasing linkages in program development, delivery, and administrative systems, and in research agendas, both between undergraduate and graduate centers, and across graduate centers. These internal collaborations are designed to maximize synergies and facilitate cross-fertilization of best practices.

Value Chain Analysis Challenges

There are several challenges in using value chain analysis. First, traditional accounting systems are not designed for classifying costs by value activities. But with newer accounting systems, such as those based upon activity-based costing, this type of cost classification problem can be solved. Furthermore, some online learning institutions may have very complex value chains, a fact that makes the analysis difficult. Some would even argue that strategic management is unsuitable for knowledge-based organizations (Moran, 1998). We argue that online learning institutions possess characteristics very similar to those of industrial organizations, and that, therefore, strategic planning is essential to their operations and their survival. Value chain analysis is an important tool for strategic management, and when competition is intense, companies must manage activities and costs strategically, or they will lose their competitive advantage.

The model presented in this chapter originated from strategic management theory and has been proven very effective in the corporate world. The industry of online learning is an open market for both for-profit and not-for-profit organizations. According to Michael Brennen (2002), Online Learning Research Manager at International Data Corporation, spending on online learning within corporations will jump from $3.65 billion to $12.98 billion by 2005.

Sensing a market opportunity, for-profit universities, such as the University of Phoenix and Capella University, also target working adult students with online programs. Added to this mix of providers are the technology companies that offer Web-based continuing education, and traditional publishers that offer product certification courses, and Web-portal companies that aggregate course content from other content sources. A potentially lucrative and very competitive market has emerged.

In this environment, not-for-profit universities have little choice but to play by the same rules that govern for-profit universities. Value chain analysis may play a significant role in enabling them to do so. A not-for-profit university must satisfy funding authorities, political leaders, and the general public as to its effectiveness and efficiency. Value chain analysis can be used for determining at what point costs can be reduced or value added in the organization's value chain. A not-for profit organization must continually prove that it is serving specific public needs identified in its mission statement. The organization must also develop its various resources, and use them effectively and efficiently, and to demonstrate its ability to manage its operating systems successfully by delivering a quality service to the public served. The value chain analysis is a useful framework to facilitate these requirements.

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PART 2

Infrastructure and Support for Content Development

CHAPTER 4

DEVELOPING AN INFRASTRUCTURE FOR ONLINE LEARNING

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Introduction

In 1995, distance learners at Athabasca University (AU) were surveyed about their access to and use of computers in their learning. About 25% of those surveyed responded to the effect that they had access to a computer and to the Internet. Interested staff members considered this proportion high enough to push ahead with all sorts of computer-based learning initiatives. By 2002, the number of students with access to the World Wide Web had grown to 93%, and the pioneers were smugly standing by watching their colleagues reinvent “the online learning wheel” (Athabasca University, 2002a). It was planned that, by 2003, as a result of the implementation of an e-learning plan, AU would officially be an “online” institution (Athabasca University, 2002b). As is the case with many other institutions and organizations, much has changed in a very short time.

Online learning is now becoming ubiquitous at all levels of education, in all institutions of learning, and in the workplace. Distance education has been at the vanguard of these developments, but campus-based students are also mixing and matching their classroom and online learning in all sorts of often unanticipated ways.

Building the infrastructure for online learning requires that many factors be considered, so it is difficult to provide a straightforward checklist or recipe to follow. All educational endeavors are systems, made up of various interconnected components. In traditional universities and colleges, teachers can be unaware of all the complexities involved, but in distance education, understanding how the entire system of course development and delivery occurs, and how these systems link to services and other components are vital aspects of ensuring effectiveness and quality.

Scientists often classify systems as "ideal" versus "non-ideal" (more commonly understood as "real"). If we apply this concept here, we can define the ideal, and then look at the deviations from ideality that manifest themselves in the real (Lu, 2002).

The *ideal* online learning and teaching system is one that is developed from scratch, without restriction on costs and staffing, and uninhibited by resistance to change from previous practices. A *real* system, however, is one where any or all of the following deviations from the ideal occur: limited resources, legacy systems that have loyal advocates, key staff who must be retrained, unworkable policies and practices that you never knew existed, inadequate governance processes, administrative systems that might or might not be made to work with the new systems, etc. Furthermore, after these deviations from the ideal are factored in, curricula, online learning technologies and approaches evolve all the time, and therefore any real system must also be able to change constantly.

In this paper, therefore, the key aspects of an ideal online learning infrastructure are described and then adjusted for real situations, and some ideas are presented on how subsequent and inevitable change can be managed.

Basic Thinking

Any system is built in a context, and for any online learning endeavor, each discipline, department, faculty, institution, or company will have a mandate, a mission, specific goals, and values that have to be considered when planning and designing an ideal system. For a real system, even at this conceptual level, there will be many other internal and external environmental factors, such as competing priorities, budget constraints, professional group requirements, and so on. All of these factors must be well understood and accounted for at the outset.

All teaching and learning systems should be built on two foundations: the *needs of the intended students,* and the *learning outcomes of the course or program* (i.e., the knowledge, skills, and attributes that students want). An ideal online learning system will be based on a plan that flows from a full understanding of these two fundamentals.

An understanding of the technological background of the intended students is crucial, including their expectations, their financial and other resources, their access to the Web or other online networks, their bandwidth limitations, and any other pertinent information about their preparedness and ability to participate equally and fully in the learning experience. In reality, of course, such a complete picture is rarely available, and a judgment call must be made on how much the system employs technologies that we know the students are familiar with and have access to, versus those that are new and unfamiliar, but are expected to become widely available. A good example is the extent to which distance students have access to high-speed connectivity. Since this access is expanding, an organization might choose to use a system that requires high bandwidth, and to provide alternative access to the online learning components (e.g., by CD-ROM) to the declining number not yet served by high speed systems. Considerations of student demographics and other factors would, of course, affect the timing of such a decision.

The clear identification of the learning outcomes of a course, a program, or a training event of any kind is useful in many ways: in the design of a learning assessment system, in determining the degree of prior learning considered necessary, and in measuring the quality of the offering. In applied and professional fields, describing the intent of the educational experience in terms of the knowledge, skills, and attributes expected of a successful completer is fairly routine, and a curriculum and associated teaching and learning system can be devised and cross-referenced with those ends clearly in mind.

In academic fields (the “real” world in this context), such outcomes are not often so well or explicitly stated. For example, all programs claim to develop critical thinking skills, but few define those skills, identify what taxonomy is used to determine the extent of their achievement, or discuss exactly how the content and program design link to them. If the ability to work in groups is an outcome, or the ability to undertake independent research from a wide range of resources, or the ability to make critical analyses of case studies, then these goals will drive the design and functionality of the online learning system needed to deliver that curriculum.

Having comprehensive and clearly stated learning outcomes, and a curriculum and associated teaching approaches that are designed to meet these outcomes, makes the task of building the ideal online learning system much easier. If well-expressed learning outcomes are not available, at least some understanding of, and linking with, good principles of teaching and learning should be in place (Chickering & Ehrmann, 1996).

Closely related to these two foundations (intended students and learning outcomes) is the size and scalability of the online learning system. Whether the program is to be delivered to a well-defined and selected cohort of students once a year, or is to be made available to all comers (as driven by mandate or a business plan predicated on growth) will have a strong impact on how the system is designed.

The real situation, of course, is much less rational. Online learning initiatives often spring from the experimentation of an individual educator or a small group of educators and technologists who sometimes have no clear idea of what benefit (if any) the experiment will bring to the learning experience, but who are well intentioned nonetheless. The addition of a new functionality, new content, or a new tool sometimes does not add value and is ignored by students, but in other cases, a simple enhancement can reap great educational and other rewards for all concerned, and sometimes in unanticipated ways. The degree to which an organization (department, faculty, company, or institution) wants to foster and allow experimentation, versus keeping tight control over a single online learning system, will be driven by its mission, mandate, core values, and financial resources. There are interesting case studies of how institutions have adopted various strategies, intentionally or not, along this centralization/decentralization spectrum [see *International Review of Research in Open and Distance Learning, 1*(2) (2001)]. The decision is a very important one, however, because it will determine how the online learning system is to be designed, developed, resourced, and governed.

Even where the student market is well understood and learning outcomes are clearly defined or prescribed, the implementation of online learning often involves a good deal of trial and error. With the best information and intentions, the results and experience rarely meet expectations, and thus the ability to adapt and refine the online learning system is crucial.

Overall Structure and Organization

The ideal case is based upon a good understanding of an institution or company's core business and values, of the nature of the intended student market, and of the needs of the curriculum. This understanding is expressed through the learning outcomes of the program to be developed and delivered. On this basis, an overall online learning framework can be developed. This framework will show the organization of the various components of the proposed system, and will facilitate the development of a fairly complete business plan for the endeavor. Figure 4-1 and the subsequent discussion describe one such framework for a post-secondary institution.

Ideally, the learning outcomes (i) are translated into course content, resources and an approach to the teaching and learning process that will enable a student to achieve those outcomes. Once these basic parameters have been thought through, the courseware development team (ii) will share the responsibility of translating the theory and intentions into courseware and online learning functions to be delivered by the learning management system (LMS) (iii), which interfaces with the library and other digital resources (iv), related services (v), and the student information system (SIS) (vi) through a secure server (vii) that can authenticate the student login.

From the students' point of view, they will connect to the LMS and the related services through a user-friendly users' portal (viii), so that, with a single login, they can have access to their courses and can be linked to all related resources and services.

Finally, to ensure ongoing improvement, an evaluation process for the effectiveness of the system, based on achievement of the learning outcomes and students' feedback is in place, in the form of an independent quality assessment process (ix), which also feeds back into the development cycle.

Aspects of the online learning infrastructure are discussed below; however, to conclude this section on overall organization, the general relationships, particularly among the units responsible for information technology support, should be considered.

Paul (1990) raised a number of important issues about the incorporation of technology into learning systems, many of which

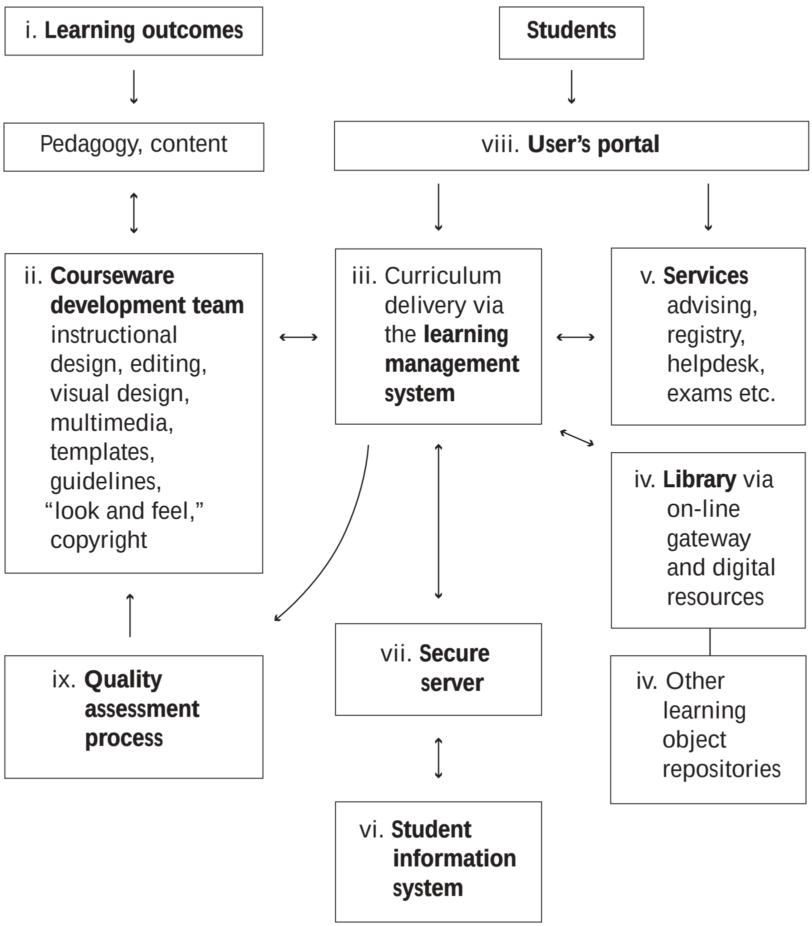

Figure 4-1.
An online learning system framework.

we still grapple with. Two in particular are intertwined and are pertinent here.

The first is the relationship between academic and administrative computing, that is, whether or not these two information technology functions should be connected, and in either case, how they can interface with each other. This relationship is a significant aspect of the centralization/decentralization issue. Although the normal structure is to have the functions separated, and often reporting through different executive officers, the online learning staff and systems need a lot of support and maintenance from the central administrative computing unit, as do key service areas, such as student registration, the library, and other learning resources.

The second and related issue is that of centralization versus decentralization of control. Normally, the administrative computing units prefer a more centralized system to avoid duplication, ensure security, and minimize the divergence of approaches and the subsequent complexity of support. Those involved in the design and delivery of educational programming prefer a more decentralized approach, with more freedom to innovate and to choose platforms and applications that suit their specific needs and preferences. Of even greater possible political consequence is the deep desire for academic values and needs to have priority over those of the central administrative unit.

In an ideal case, it should not matter how such units are organized or linked, because the overall goals and values of the institution or company would govern people's behavior and attitudes, and everyone would accommodate each other's needs, responsibilities, and functions. In the real world of online learning, conflicting priorities and approaches quickly arise, and clear statements of roles and responsibilities, processes, and policies must be established to help balance the relative need for control/centralization and freedom/decentralization.

The Components of an Online Learning System

The Development of Courseware

Even in the initial stages of thinking about the development of an online learning program, it is wise to involve all those who are likely to be involved at any stage. To foster such involvement, the sponsors of the program can prepare a preliminary proposal laying out the objectives of the program, the intended student market, and the proposed online learning approach. This strategy gives the service units a chance to comment on matters that will affect them, and for fellow educators to comment on the proposed content and pedagogy. The proposal should also identify the composition of the development and delivery teams that will be established to undertake the project. The nature of these teams can vary widely.

The smallest "team" would be a single person, the content expert, who is also the educator, and who is also well trained to use a comprehensive Web learning platform that is already fully supported by the institution or company. This individual would just need routine support from areas such as copyright and the library. A complex team, however, involves a project manager as well as content experts, educators, instructional designers, editors, visual designers, multimedia designers, programmers, systems staff, etc., who undertake the design of a course that needs new online learning functions, connects uniquely to the other systems, and involves the creation of new multimedia digital learning objects. In either case, the preliminary proposal must provide sufficient information for all concerned to understand what their probable roles and responsibilities will be, and what direct and indirect costs are involved.

For those familiar with formal project management processes and techniques, this detailed discussion of the proposal and the project team will seem redundant, but it is surprising, in academe especially, how little attention is paid to this process. Much of it is just common sense, common courtesy, and good planning. However, depending on the size and scope of the task, some basic understanding and application of the principles of project management are also needed for online learning courseware development. The roles of team members can vary widely, but the types of positions, and the general roles they play in the team, are described further in Chapter 7 of this volume.

The Learning Management System

Another key decision to be made at the development phase is the choice of LMS. The first question to be considered in this decision is whether to use imported proprietary software or to develop an in-house system, which may or may not also be based on freely available, imported open-source software.

Many very good and comprehensive proprietary packages are available; some come as an add-on to the SIS, and others can be interfaced with the system. Staff can be oriented to and updated on the software's development and functionality at training events, conferences, and meetings. Assessing which of the available proprietary options is the best fit for the needs of a particular online learning system can be an onerous task, and choices must be carefully considered, and are often made with the help of an independent evaluation source (see, for example, Edutools, 2001).

For the in-house system, many free, open-source solutions are available, which can emulate the functionality of the proprietary systems, and can be adapted in any manner needed. This approach, however, might require more initial development and different skill sets among staff to ensure the robustness of the system, to provide a higher level of on-going technical support, to prepare documentation and training, and to interface with other systems as necessary.

In the ideal case, the choice of LMS is based on the needs of the course, without consideration of costs, the availability of qualified staff, or any requirement to use existing systems. The real case, however, is often more complicated: either one is constrained to a single solution based on previous institutional or company decisions (which some would think of as ideal), or the choice is limited (as it should be) by practicalities such as the costs of adopting yet another proprietary LMS, or the human resource and other implications of building or adapting an open-source LMS. Each new solution adds considerable pressure on back-end systems, especially services such as the technical helpdesk, and the need to adapt to a new LMS can have a negative impact on a student's learning experience. Finally, there is a lock-in factor: the costs of changing systems can be very high, and, although much effort is being made to develop standards for online learning that will improve interoperability and reusability of online content, the promise has not yet been met.

Library and Digital Resources

Linking the course or program LMS to the necessary online resources is a key element of any online system. Institutional and public libraries have been leaders in the development of systems and protocols to acquire and share resources. Many now have electronic gateways to their own holdings, to those housed elsewhere, to digital databases of journals, magazines, and government publications (including much in the way of full-text materials), and to specially developed supplementary databases of materials selected for a particular course. In addition, learning objects will be increasingly accessible through in-house and external digital repositories.

These components are discussed in greater detail in Chapter 14, but the key point in developing the infrastructure for online learning is that the availability of such online resources should be ensured, or at least anticipated, so that the courseware is developed accordingly, the LMS is appropriately configured, and any access that the student may require is enabled.

Learner Services

In online learning, most attention is always paid to the courseware and delivery platform. However, those who have worked in various forms of distributed learning for any length of time know only too well the vital importance of the non-academic learner supports that are needed to ensure student success and satisfaction. Depending on the enterprise involved, such supports would include technical help, educational advising, various forms of counseling, services for learners with special needs, and so on (see Chapter 15). In an ideal online learning system, these aspects would be given equal priority with and would be developed in conjunction with the curriculum. In the real situation, it is likely that such services already exist, and must be converted and enhanced for online learning, and provided with the ability to adapt and change as new options appear and learner expectations change.

Interface with the Student Information System

Ideally, the LMS is linked to the SIS in such a manner that the right student is automatically in the right course at the right time, and that all the right student information is easily available to the right instructor and any other authorized person. This strategy avoids the need to input student names into the LMS, with the associated errors and waste of time. The instructor should be able to manipulate the student data as needed for the course (e.g., submitting and editing final marks), and to contact the students as a group, in sub-groups and individually.

All this requires clever and robust programming in the LMS, a server to authenticate student log-ins and ensure a secure interface with the SIS, and some appropriate programming in the SIS itself. This is where an integrated SIS/LMS system might seem attractive if one is building an online learning system from scratch. In many real situations, there will be more than one LMS, each of which needs to be interfaced to the SIS, and any or all of which might be composed of proprietary, imported, or home-built systems.

The Users' Portal

As in most sophisticated online enterprises (travel, banking, shopping, etc.), the nature of the portal provided to the user (and indeed to staff in various ways) is important. Ideally, the portal should allow the learner, with one secure login, to access everything that is of interest to them: the LMS (and from there, other essential links), their grades and other applicable documentation on their student file, and related learner services and accounts. It will also allow them to customize their portal Web page to be a unique interface, showing their own preferences, and allowing them to link easily with other learners and staff, related services, and the student association.

Quality Assessment

Most institutions and organizations will have a unit dedicated to providing a thorough and independent evaluation of any enterprise as part of the routine process of quality assurance and improvement. Ideally, the development of an e-learning system should include a plan for the independent evaluation of all aspects of the system, and especially of the degree to which it enables or enhances the achievement of the stated learning outcomes (primarily in the opinion of its users). Furthermore, such an evaluation would also provide information on the return on investment of the system, especially the unanticipated or unseen costs of implementation on back-end systems, staff attitudes, and infrastructure.

In the real situation, where a variety of systems could be in place, the tendency will be for each group to undertake its own research, which can often be biased (intentionally or not) and difficult to compare with that of other groups unless a strict, common framework is in place. Even if only one system exists, larger corporate pressures might be applied to ensure that a project is "doomed to succeed."

Quality assessment is an aspect of online learning in which a strong and centralized approach is preferred. The type, scope, and framework of evaluation must be independent and structured if the results are to lead to real improvements in systems, and to appropriate decisions about whether to scrap them or to build on them with new resources (see Chapter 16).

Related Issues

Many institutions and organizations that have shifted their core business to an online environment have noticed both predicted and unanticipated effects on all aspects of their enterprise. For online learning, some of these effects are straightforward and can be factored in early on, with systematic updates.

Back-end hardware (servers, switches, etc.) and connectivity will need to be estimated in the beginning, and then adjusted routinely as the number of users grows, the system evolves, and standards and expectations for "up-time" increase (usually to 24 hours a day, 7 days a week).

Policies related to access to servers, to security, and to the use of the online learning system need to be in place, and must balance the need for stability and security with the need to innovate (Kotter, 1996).

Technical help and helpdesk support must be in place, possibly linked to a training, orientation, and documentation function that provides support to students and staff. Since this function can be spread between the core information service units and the teaching units, clear mandates and lines of responsibility must be in place to avoid duplication of effort or gaps in support.

A host of human resource issues must be addressed. Some of them are tied to collective agreement and employment contract terms and conditions, especially those related to the service standards and expectations (which go beyond the normal working day), and to the automatic flexibility that online learning provides, not only to the student, but also to the staff in terms of the place and time of work. New policies may be needed on attendance and on standards for being in touch with the central office for administrative matters.

Another human resource issue is the constantly shifting nature of the work that staff undertake. Many of those working in online learning have had dated training, or no official training whatever, but have learned and adapted successfully to new approaches and new technologies. There are many stories of staff who entered organizations at a junior level and worked their way into key roles in online learning quite unexpectedly, as the organization's needs and their abilities evolved. Traditional approaches to hiring, appointment, promotions, position classification, access to training and professional development, etc., must be adapted to maximize the opportunity to invest in and reward staff in such a dynamic environment, and to avoid exploiting staff who might be working well above the level for which they are paid. The long-term sustainability of the online learning system will depend to a large extent on how this new human resource environment is addressed. The online learning system itself should inspire new kinds of flexible training for staff, with inter- and intra-institutional support groups and learning communities, information links, etc.

Finally, the process for decision making and resource allocation related to online learning must be carefully considered. If new committees are to be established to provide recommendations on directions and investments, care must be taken to balance the discussion between those who know and understand a lot (but might champion one approach), central and decentralized technical staff (who directly support the online system and who often want more freedom), the central administration (who likely do not know as much, but are accountable for the success and effectiveness of the system), and the users (teachers and learners). The role of independent and thorough evaluation becomes very important in this process.

Change Management

Any credible educational endeavor is dynamic in nature, responding to new knowledge, understandings, and approaches to the disciplines, to new employment market needs, to changing student demographics, and so on. In a traditional campus or classroom environment, the expectation is that the teachers and curriculum developers will ensure this "currency," and the same is true in online systems. However, in the online system, change is more complicated, because any change in content or approach can have a wide impact on a number of aspects of the system. Because online learning technologies evolve as quickly, and often as unexpectedly, as do the curriculum, students' expectations and connectivity, etc., the ability to manage change effectively is important.

Assuming that the organization as whole respects and encourages change in such systems, there still remains the matter of how it is to be managed within the context of online learning. The first issue is one of balance: between constant change every time an idea or product comes into view (and so frustrating those affected, including students), and sticking with a system (for administrative ease and staff convenience) long after it has been superseded by better, proven systems.

The degree of centralization or decentralization of the system (or systems) also drives the change process. To what extent will some units be free to explore and try new systems, and to what extent should those lagging behind be forced to update their approaches? Because they relate to core aspects of an organization's business and culture, such questions can only be answered in that context, but the following dimensions of an online system infrastructure would appear to be key factors in handling change well.

Leadership

As in any organizational issue, effective change starts with leadership. Having the right attitude toward change and its importance and value is essential. Change should be embraced, and not seen to be just another headache to be dealt with. Kotter (1996) gives a concise explanation of why change is inevitable and crucial in modern business, and provides specific ideas on how change can be led.

Scouting Reports

Some staff must be assigned the tasks of looking for emerging trends and ideas in online learning systems, and of providing a place for others to feed information they come across. These scouting reports need to be compiled and shared.

Governance

A governance body is needed that not only deals with current issues related to online systems, but also provides a forum for discussion of emerging trends, organizes meetings and events for sharing and demonstration of new ideas, and revisits the vision for the online learning system regularly (perhaps once every year or two). [Note that the vision should be detailed enough to allow affected managers to adjust plans and budgets in the context of the organization's regular cycle.] The terms of reference and reporting relationship of the governance body should be commensurate with the importance of online learning to the organization.

The membership of such a body can be difficult to determine. The first impulse is to include those most intimately involved in online systems—the technical experts and educational technology champions—and their opinions are, of course, valuable. However, a more important criterion for membership is the individual's willingness to consider a wide variety of alternatives, and not stubbornly to defend their own preferred approach. In addition, users of the online systems, such as neophyte teachers, students, and user-support staff, will provide an important balance to discussions that otherwise can degenerate into purely technical banter. Finally, this body should be chaired by the highest possible level of relevant management.

Communication

The governance body must establish a process whereby developments and ideas in online education are regularly broadcast internally through newsletters and other forums, and, where appropriate, externally through journals and conferences. In any communication between the governance body and the users' community, simplicity of language is important. Furthermore, such communications must give users the opportunity to provide input to the governance body, and that body must be seen to be responding to the input; for example, by explaining seeming inconsistencies of approach.

Pilot Projects and Evaluation

An important dimension of change is the use of pilot projects for new developments. Of course, the impacts of such projects must be evaluated before the developments proceed to wider adoption. The governance body could provide the approval for such pilots, and could have a pool of resources to allocate to approved projects. Evaluation of the pilots should be conducted at arm's length, and the results should be widely shared. In this way, the organization can receive the fullest benefit from the pilots, and the process of innovation can be seen to be open and effective.

Resources for Change

As implied above, new ideas and approaches must be fostered, not just by words, but also by financial and in-kind resources, and they need to be coordinated by an open and widely representative governance body. The intention would be to balance the need for some control over innovation, which can diverge rapidly if separate units are left to their own devices, and the need constantly to explore and innovate in anticipation of broader change. For the employees, a balance must be struck between recognition for contributions to innovation and to ongoing operations.

Conclusion

In developing an infrastructure that supports excellence in online learning, the issues to be addressed are almost all the same as for any post-secondary educational enterprise: a clear understanding of the goals of the curriculum and of the characteristics and needs of the intended students; and a healthy working environment, with committed staff, where implementation can proceed, and where constant change is understood to be the norm. Within these general areas, there are, of course, a host of technical, procedural, and policy decisions to be made, but online learning is now mature enough that such decisions need not be made haphazardly: plenty of research and information is available, and there are many successful examples of online learning systems to learn from (see *International Review of Research in Open and Distance Learning, 1*(2) (2001)). In contrast to those who were in the vanguard of this exciting educational development, new contributors can focus on getting the basic principles and goals in order before proceeding to implementation. Ultimately, as is any educational system, online learning is fundamentally a human endeavor, with the technology available to support the agreed upon principles and goals, not vice versa.

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CHAPTER 5

TECHNOLOGIES OF ONLINE LEARNING (E-LEARNING)

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Introduction

This chapter includes an examination of some of the most exciting technologies and features used in online instruction today, and those we may use tomorrow. Education is one of the fastest-growing economic and social sectors in the world, and the use of new technologies is an integral and driving component of that growth.

Multimedia on the Internet

Multimedia incorporates text, graphics, and audio media (often with real video or animations) and combines them, using a computer. Almost every personal computer built today is capable of delivering multimedia presentations for entertainment, advertising, or education. *Edutainment* is a word for applications that incorporate multimedia entertainment with educational objectives.

Multimedia on the Internet is still not an everyday reality in the same sense as multimedia on CD-ROM or DVD, which may be commonplace in the home or classroom. Internet connection speeds limit the quality and quantity of what can be transmitted. Even with wired/wireless and high-speed advances, the transmission of large sound, animation, and video files can be time-consuming and frustrating.

However, with the introduction of streaming multimedia in the past five or six years, large multimedia files can now be delivered even over modem connections. Streaming multimedia is an Internet data transfer method that facilitates the transfer of audio and video files from computer to computer in a "stream." Streamed media packets can be played as soon as the data starts arriving at the receiving computer—users do not have to wait until the full file has been downloaded. Streaming audio has been more successful than video, which has generally been limited to small picture sizes or low resolution (grainy) video projections, but as the bandwidth increases, higher quality, full-screen video becomes possible.

The key to this breakthrough is the format in which the files are distributed, or served, over the Internet. Large audio or video files are converted into a format that can be sent as a continuous stream of small pieces to a user's computer. At the user's end of the connection, special software interprets the "stream" of data and begins to play the sample. While the first part of the sample is being played, the next is being downloaded. The second begins seamlessly, the first is deleted, and the third is downloaded. Using this format, hours of audio and video content can be received over a slow modem connection.

Recommended Links

The following links provide some good examples of educational multimedia on the Web:

- Arnett, B., *Nine Planets: A multimedia tour of the solar system:* http://seds.lpl.arizona.edu/nineplanets/nineplanets/nineplanets.html
- East-West Project, Digital Numbering (flash): http://teleeducation.nb.ca/it/module3/section2/ASCII/ASCII.html
- Malloy, T., *Understanding ANOVA Visually* http://www.psych.utah.edu/stat/introstats/anovaflash.html

Streaming Audio

Audio was the first type of multimedia to be delivered over the Internet in a streaming format, and concerts and "live" radio broadcasts were among the first examples of streamed audio to appear. A wide range of streaming audio formats is in use on the Web today, but while each is different in name, the basic technology remains the same.

When a sound file is to be prepared for streaming, it is compressed to reduce the overall size of the file. A news broadcast, for example, consisting of a single recorded voice, would normally be a smaller file than an orchestral sample. In some cases, compression also means that the quality of the file is affected.

Different programs are available for receiving streaming audio, each with its own proprietary sound or media format. Quality varies from format to format, but all are compatible with modem connections. Recently, these programs have become more generic, which is good news for the end user, who no longer faces the hassle of installing three different programs in order to listen to three different sound formats. Instead, the newer, more powerful media players can decode, decompress, and play a variety of proprietary sound samples.

Many of the Internet's most widely publicized "firsts" have happened as a result of streaming media events. The longest continuous Internet broadcast in history was in the form of a "jam session" held during the East Coast Music Awards in Moncton, NB, in 1997; and the record was bettered during the following year's ceremony. Producing a live, continuous stream of music (and in subsequent years, video) for over 80 hours was truly an impressive feat. Another, more widely known "first" was Paul McCartney's 1999 return to The Cavern, the bar in Liverpool where the Beatles first played. This live broadcast over the Internet was the most listened-to sound production in Internet history.

Educational Uses

Streaming audio is currently being used as a supplement to classroom-based and online course delivery, usually in the form of prerecorded lectures, interviews with guests, student projects, samples of student classroom interaction, or sound bytes of content relevant to the course of study. For music or English composition courses, it could be used by teachers or students to record samples of their work and to make them available to the teacher and other students. Streaming on demand is becoming a key feature in Web-based education. For example, listen to Gustav Holst's musical interpretation of *The Planets* included in the list of recommended links given below.

Recommended Links

- Trussler, B., *Gustav Holst: The Planets Suite:* http://www.aquarianage.org/lore/holst.html
- Jupitermedia Corp., What's New: Internet News Channel: http://www.internet.com/sections/news.html
- East Coast Music Association, *Your Music:* http://www.ecma.ca
- Jupitermedia Corp., Streaming Media World: http://www.streamingmediaworld.com

Streaming Video

First came radio, and then came television. And on the Web, first came streaming audio, and then streaming video. When a video sample is presented in electronic format, there are many more "layers" of data to be converted and compressed than is the case with audio alone. As a result, when this multimedia format is delivered over the Internet in a streaming delivery system, more technical and educational issues must be taken into consideration.

Size is the first issue. Video files are much larger than audio files, and video combined with audio is larger still. Video samples also demand more processing power on the part of the receiving computer. It is relatively simple to record sound—music, voice, or both—even on a home computer. However, recording video and saving it in an electronic format is more demanding on hardware and requires additional software. Because of this and other issues, video has taken longer to become an industry standard, and it is harder to find educational applications for streaming on the Web.

Receiving streaming video feeds on a home computer is not difficult. The newer versions of Windows, Apple OS, and Linux come with pre-installed streamers for audio and video. Generally, these streamers are sufficient for most educational applications. As is the case with streaming audio, different formats require different applications; however, most multimedia applications now available for the home market have been designed to receive both audio and video streams. Superbowl XXXV, held in January 2001, saw the recreational and commercial use of streaming multimedia go to new heights. Long known for its glamorous halftime shows and extremely expensive commercials, this event was different from those of past years because of the means by which the commercials were broadcast. For those unable or unwilling to sit through hours of football to see a few commercials, several online video streaming sites encoded and broadcast the commercials within minutes of their "traditional" broadcast. By noon of the next day, hundreds of thousands of people had a chance to see what they had missed the night before. This application illustrates how events or sequences can be decomposed to extract only the relevant components. This technique is now driving the creation of modular, chunk-sized content objects often referred to as *learning objects*, or more precisely, *knowledge objects*.

Educational Uses

The stiff, unemotional "talking head" of a professor or tutor in a corner of an e-learning Web page is the image that most quickly comes to mind when one considers video clip use in an online educational situation. In such a presentation, a professor or tutor delivers a prepared lecture or shows an example of a hands-on activity; however, almost any video sample with educational value can be converted to a streaming format, and many will serve as excellent additional resources on an educational Web page or for classroom courses or online courses delivered synchronously. When implemented wisely, video can alleviate the "page-turning" boredom of many online courses. The LearnAlberta.ca project, included in the list of recommended links provided below, is an example of an educational video streaming project with a variety of video-based curricula for Alberta teachers and students. This project was established to define and deploy a prototype K-12 application.

Recommended Links

- Alberta Learning, LearnAlberta.ca: http://www.learnalberta.ca
- University of Washington, EDGE, Streaming Video Site: http://www.engr.washington.edu/edge/streaming.html
- CyberTech Media Group, *Streaming Video over an Intranet:* http://www.cybertechmedia.com/intranet.html
- MP3, *Top 40 Charts:* http://genres.mp3.com/download_charts

Push Technologies and Data Channels

It was inevitable that proponents, developers, and consumers of the existing forms of media (television, radio, and print) would attempt to take advantage of the Web's capacity to play "on demand," its exponential growth, and its diverse global audience. There are innumerable examples of new technologies that try to address the marriage between existing media, with their synchronous broadcasting of news, weather, and sports, and the asynchronous nature of Web publishing. Pointcast (now Infogate Inc.) was the first such service, offering up-to-the-minute customizable information to individual desktops.

Channels of "pushed content" are another source of dynamic and often media-rich content online. Channels are customized communications paths between computers, and are comparable to "Bookmarks" or "Favorites" within a browser, but with added features and interactivity. Standard Web sites require that the user browse the site to see any new developments or changes; however, Web content that is formatted for channel-based delivery is pushed directly to the end-user's desktop. Channels can be chosen, modified, or created from scratch. They are used for monitoring new content from relevant sites, as well as for navigating sites that the channel holder considers interesting. An individual user can create his or her own channel that links to a number of sites that pertain to a specific subject of interest. Customizable default channels might be "Archeology" or "Arachnids." Each channel can be subdivided into folders with further links; for example, "Archeology" could be divided into "Roman," "Greek," "Indian," and "MesoAmerican" subchannels.

Educational Uses

Push technology applications can be used to feed inexpensive and timely news, weather, and sports or other information from relevant sites to a classroom for use in reports, essays, or current events classes. The growing number of channels available for subscription can offer supplementary information from a wide variety of sources, including sites such as NASA, the Science Channel, and the Computing Channel. As these technologies evolve, individual classes and schools will create their own dynamic channels, narrow-casting school updates to parents and other interested parties. Schools and parents should be vigilant in their school's use of these channels to ensure that they are used for educational purposes and not for advertising and other commercial concerns.

Recommended Links

- Discovery Communications, The Science Channel: http://science.discovery.com
- ZDNet, The Computing Channel: http://www1.zdnet.com/datafeed/ie4/channels/zdnet/cached/index.htm
- NeoPlanet, Neoplanet Browser: http://www.neoplanet.com/site/products/browser.html
- TEAM Software, Channels.com (the largest collection of channel links on the Internet): http://www.channels.com

Audio Chat and Voice over Internet Protocol

Text chat has long been a popular feature of the Internet. More recently, audio chat has also become popular. Point-to-point audio connections can be made between almost any two computers on the Internet, and some Internet service providers (ISPs) and online services are now offering free Internet-based long-distance service that connects individuals calling through a personal computer to the public telephone system.

Although the quality of Internet phone calls, or voice over Internet protocol (VoIP), is currently somewhat inferior to that of dial-up long-distance telephone, consumers are becoming increasingly attracted to Internet telephony because of the lure of free or extremely cheap calls. About 25 million Americans now use Internet-based voice communication, up from five million in 1999 (Romero, 2000), and about two dozen companies have begun to offer online voice communication. Internet telephony is relatively simple, requiring an Internet hookup, headphones or speakers, and a microphone. After signing up with an Internet telephony provider, users can make local or long-distance calls to people with any type of phone. However, since voice transmissions are carried over the Internet in small packets, in the same manner as data transmissions, conversations can be subject to delays. Without a high-speed Internet connection, the quality of an Internet call can be poor, but companies are working to improve it. By 2006, International Data Corporation (IDC) estimates that 50% of the traffic minutes will be transmitted using VoIP (Glascock, 2002).

Educational Uses

Classroom-based, e-mail pen pal programs have been used for a long time as a way of making intercultural connections between schools. Internet telephony will add an opportunity for students to speak to others in their age group, almost anywhere in the world, It will, therefore, facilitate more fluid and natural communication between different cultural groups, and will be especially useful for foreign language exposure and practice.

Teacher or tutor and student communication can be greatly enhanced by the opportunity to speak to one another to discuss an assignment or a difficult concept without the expense of long-distance tolls. An *electronic blackboard* can be used along with VoIP for synchronous teaching. This practice is known as *audio-graphic teleconferencing.* Microsoft's NetMeeting is often used in this way.

Recommended Links

- FunPhone.com (Internet telephone and communicator): http://www.funphone.com
- Cybration Inc./ICUII.com. ICUII Video Chat (I See You Too, audio and video phone): http://www.icuii.com
- Selectra OOD, PC-Telephone.com: http://www.pc-telephone.com
- Microsoft Corp., NetMeeting: http://www.microsoft.com/windows/netmeeting

Web Whiteboarding

Web whiteboarding is a form of graphic conferencing used in combination with VoIP as a single tool in general Web applications that support real-time collaboration. Whiteboarding emulates writing or drawing on a blackboard. With a whiteboard, both teachers and learners can create, manipulate, review, and update graphical information online in real time while participating in a lecture or discussion. Using a mouse, an electronic stylus with a tablet, or even a large electronic classroom-sized whiteboard, users can annotate by writing; cutting and pasting; or clicking, dragging, and dropping. Contents can be saved and used in future presentations. Imported graphics can be used as underlays that the user can trace over, using an "onionskin" "placed" on top of the image; for example, routes can be drawn and redrawn on maps. The providers listed in the "Recommended Links" section below sell or rent "virtual classrooms," with size (number of simultaneous log-ons permitted) determined by the license and the bandwidth available at the central site. These products are now incorporating small video images as well as "Web safaris," in which the teacher leads the class to visit various sites, and application sharing that allows any of the distributed users to control a single application.

Educational Uses

This blackboard substitute allows for the emulation of classroom lessons. Students in different locations can participate actively and collaboratively with the teacher and with other students in the creation and adaptation of graphical information. It is particularly appropriate for brainstorming sessions.

Recommended Links

- Centra Software, Inc. Centra.com: http://www.centra.com
- Elliminate, Inc., Elluminate.com: http://www.elluminate.com
- Electronics for Imaging, Inc., eBeam: http://www.e-beam.com
- Department of Computer Science, University College, London, WBD Whiteboard: http://www-mice.cs.ucl.ac.uk/multimedia/software/wbd

Instant Messaging

ICQ (I seek you), a commercial product distributed freely over the Net, has been heralded as the "killer app" of the instant messenger genre. The easiest way to describe ICQ is to call it an Internet paging device. It has some similarities to other modes of text-based communication, such as e-mail or Internet Relay Chat (IRC). It allows short messages to be sent electronically from computer to computer. As in e-mail, the messages are stored on a central server until the recipient collects them; however, ICQ is more dynamic in that it shows all of the group members when the recipient logs on. Thus, the exchanges are often very rapid and work much like synchronous text exchanges. Attachments and Web addresses (URLs) can also be sent. Unlike e-mail, however, ICQ allows group chat sessions to be opened and voice chats to be established. In addition, and unlike most e-mail systems, ICQ is highly transportable: a user could have ICQ on a computer at work, at home, and on a laptop, and receive "pages" only on the active computer.

ICQ is only one of a growing number of *instant messenger* services that have appeared online in the last three years. Other than ICQ, users can choose from MSN Messenger (from Microsoft), AIM (AOL Instant Messenger), and a bevy of other similar applications. ICQ has been popular for some time, especially with technically proficient Internet users. More recently, because of the capacity of central servers, immediate and delayed message delivery, and increased functionality, instant messaging has become a popular choice for millions of users.

Educational Uses

Instant messaging is not yet used as an efficient content-delivery teaching tool. Its strength lies in its ability to facilitate immediate contact with other students and teachers, or with a tutor who is supervising chat sessions.

Recommended Links

- ICQ, Inc., ICQ: http://www.icq.com
- Microsoft Corp., MSN Messenger: http://messenger.microsoft.com
- AOL Canada Inc., AOL Instant Messenger: http://www.aol.ca/aim/index_eng.adp
- Jupitermedia Corp., Instant Messaging Planet: http://www.instantmessagingplanet.com
- International Engineering Consortium, *Instant messaging* (tutorial): http://www.iec.org/online/tutorials/instant_msg

Hand-held and Wireless Technologies

Imagine the power of the Internet in the palm of your hand, using a HandSpring, Palm Pilot or other personal information manager (PIM). Wireless technologies, cellular modems and hand-held devices are moving from elite gadgetry into the mainstream. How will this cord-free revolution change how we work and learn? *Fortune* magazine claims that

> Your next computer probably won't be a computer. It'll be a phone, an organizer, or a pager. You'll use it for communications: to read e-mail on the go, to find the nearest gas station, to check your bank balance, to buy groceries. And it will connect to the Internet wirelessly. (Shaffer, 1999)

Mobile computing has arrived. Already, wireless devices are being chosen over desktop and even laptop computers, not only as the preferred Internet access tool, but also for common computing applications, such as word processing and spreadsheets. These devices are being disguised as telephones, tablets, e-books, and Web pads, and are now including a Web browser, an instant messenger, and an e-mailer, along with other features.

So your next computer probably will not be just a computer. It will also be a phone and an organizer, and will include other serious and gaming applications. You will use it to check your bank balance, buy groceries, and bet on the lottery. Cordless devices, pocket PCs, or PDAs (personal data assistants) are the wallets, checkbooks, calculators, and Rolodexes of the twenty-first century. The size of a calculator, or smaller, these devices are capable of basic computing tasks, such as handwriting-recognition text processing and contact management. More complex and higher-end hand-helds have multimedia capabilities, wired or wireless Internet access, and the ability to send and receive data and text alike. With the advent of infrared networking, these hand-held computer devices can offer students and teachers a previously unknown degree of flexibility.

Dr. Bess Sullivan Scott, a principal at Goodrich Middle School in Lincoln, Nebraska, has this to say about her handheld device:

> My Palm IIIc has improved my focus on instructional leadership by eliminating organizational time spent coordinating various paper records. Through analysis of data I have increased my time in classrooms as well as distributed my time among teachers more equitably. (Scott, 2001)

Dr. Scott understands the usefulness of wireless technology in educational management.

The basic construction set for much of the wireless traffic and applications to come stems from the Wireless Applications Protocol (WAP). Microsoft, among others, has joined a forum that will help to shape the programming languages, protocols, and processes for the next generation of the Internet, one that transcends the very infrastructure—cables, servers, and phone lines—that the Web is founded upon (see Wireless Application Protocol Forum Ltd., 2002).

Educational Benefits and Uses

According to a 2001 report produced by the research firm eTForecasts, in 2002, more than 673 million people would use the Internet, and 225 million of them (about one-third of all users) would have wireless access. By 2005, there should be a total of 1.2 billion people on the Internet, with the anticipated 730 million wireless users accounting for 62.1% of the total (Ewalt, 2001).

As affordable access to high bandwidth increases, and as the cost of wireless devices that will be able to incorporate all the features of a PC decreases, the educational possibilities become unlimited. It might mean the end of paper-based teaching and learning, lost homework, missing tests, and costly textbooks. In the Philippines, for example, people living in rural environments, even in communities without electricity, are using their cellular phones for text-based digital messaging. Newer applications, available using small devices, are opening up the possibility of using wireless to deliver graphics and video to users no matter where they are. Learning becomes universally accessible.

Recommended Links

- PDA Verticals Corp., pdaED.com: http://www.pdaed.com
- Palm Inc., Palm Products: http://www.palm.com/us/products
- Casio Computer Company, Inc., Casio.com (for handheld devices, go to "USA" and check under "Personal PCs"): http://www.casio.com/index.cfm

- Handspring, Handspring.com (handheld devices): http://www.handspring.com
- Tucows, Mobile/PDA (PDA and handheld device software): http://pda.tucows.com
- Lincoln Public Schools, Goodrich Middle School: http://goodrich.lps.org

Peer-to-peer File Sharing

Perhaps the most publicized Internet event in the past couple of years has been the controversy surrounding peer-to-peer, or file-sharing, applications. Peer-to-peer applications allow users, regardless of location or connection speed, to share practically any kind of file with a limitless population of other Internet users. In contrast to the currently predominant client-to-server model, where users retrieve information from a centralized server, the peer-to-peer model allows members of its "community" to transer files directly between users, without having to access, or be constrained by, a centralized server.

Of all the P2P (peer-to-peer) applications, Napster has become the most well-known, because of its popularity and its ultimate demise in the courtrooms. Napster became prominent because of its focus on facilitating the distribution and sharing of files, and especially copyright-protected media, mainly music files encoded in the MP3 format. While P2P software and services have been considered mainly as a means of downloading music files, the technology and goals behind the peer-to-peer concept allow for much more wide-ranging uses.

Andy Oram, editor of *Peer-to-peer: Harnessing the Power of Disruptive Technologies*, notes that communities on the Internet have been limited by the flat interactive qualities of e-mail and network newsgroups, and that users have great difficulty commenting on each other's postings, structuring information, and so on. So he recommends the use of peer-to-peer applications with structured metadata for enhancing the activities of almost any group of people who share an interest (Oram, 2001).

Educational Uses

It is easy to make connections between learning objects, intelligent educational systems, and the peer-to-peer model. Research and other materials could easily be offered online and “harvested” by a well-designed P2P program, offering the student or teacher a wealth of knowledge that might not otherwise be available. Upcoming peer-to-peer educational applications include edutella and eduSplash, products that support the exchange of learning objects or units of learning.

Recommended Links

- Nejdl et al., Project edutella: http://edutella.jxta.org
- eduSplash.net, *Welcome to Splash:* http://www.edusplash.net
- Roxio, Inc., Napster (the infamous P2P application): http://www.napster.com
- Audiogalaxy, Inc., About the satellite (the next generation of P2P): http://www.audiogalaxy.com/satellite/about.php?
- Sharman Networks, Kazaa Media Desktop (P2P continues): http://www.kazaa.com/us/index.htm

Learning Objects

Knowledge objects are discrete items that can be integrated into lessons; for example, a text, graphic, audio, video, or interactive file. *Learning objects* are more highly developed, consisting of discrete lessons, learning units, or courses. A video clip from a speech would be an example of a simple knowledge object. It becomes a learning object when a lesson is added to it. Many different learning objects can be created from one such component; for example, lessons in politics, history, ethics, media studies, and many other subjects could be created from a single video clip. They could then be made available in online databases for efficient access by learners using international standards. Imagine having seamless access to a vast store of learning objects in the form of animations, videos, simulations, educational games, and multimedia texts, in the same way that Napster users had access to music files.

Educational Uses

The principal benefit of learning objects comes from their reusability. As discrete units, they can be incorporated into a wide range of courses or learning scenarios. Their standards-based structure makes them available for use in many different learning management systems and other applications. They also appear to be pedagogically effective:

> NETg compared typical expositive courses with a blend of case-based learning and self-study learning objects. They found that the students who used the objects-based course enjoyed a 41 percent drop in the time required to complete the task that was taught. (Clark & Rossett, 2002)

Recommended Links

- MERLOT, *Welcome to MERLOT!*: http://merlot.org
- CAREO, Home: http://www.careo.org
- Longmire, W., A primer on learning objects: http://www.learningcircuits.com/mar2000/primer.html
- McGreal, R., & Roberts, T., A primer on metadata for learning objects: http://elearningmag.com/ltimagazine/article/articleDetail.jsp?id=2031

Conclusion

Does the Web offer us the potential to expand our classrooms and study halls beyond the school grounds, beyond provincial and national boundaries? Can our educational systems evolve into entirely new institutes that support learning by taking full advantage of the emerging technologies? Certainly, distance education and traditional correspondence courses will never be the same because of the World Wide Web. All levels of education stand to benefit from what the Internet has to offer. For educators, Web participation could range from simply putting class notes and lecture materials online for absent students, to integrating dynamic online quizzing systems, to preparing classes for upcoming tests and examinations, all the way to enabling learners to participate in highly interactive, true-to-life simulations and games.

With the evolution of more user-friendly applications and interactive content encapsulated in learning objects, one need not be a coding expert to take advantage of the learning opportunities that are becoming available on the Web. Many instructors and learners are already bridging the divide by using hybrid access and delivery models, complete with an Internet component. As the cost of hardware, software, and telecommunications declines, even developing countries can look forward to a future where access to the wealth of the world's knowledge is assured. The future has arrived.

Disclaimer: The site links in this chapter were working at the time of submission in summer 2003. Some sites are those of small companies that tend to change from time to time. If you find a dead link, you should try a search using the title given.

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CHAPTER 6

MEDIA CHARACTERISTICS AND ONLINE LEARNING TECHNOLOGY

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Introduction

The decision to adopt online technology (defined here as predominantly Internet-based delivery, with provision for interaction throughout the process), even on a limited basis, is always complex and can be risky, especially if the adopting organization lacks structural, cultural, or financial prerequisites (Welsch, 2002). A discussion of some attributes of media and of the modes of teaching presentation and learning performance they support, in relation to some influential learning models, might help to clarify some of the implications in the choice of any specific delivery or presentation medium.

Other chapters in this volume address learning theories and styles (see Chapters 1 and 2). The analysis of media characteristics in this chapter draws directly upon Fleming's (1987) six-element typology of teaching tasks and objectives: 1) attention, 2) perception and recall, 3) organization and sequencing, 4) instruction and feedback, 5) learner participation, and 6) higher-order thinking and concept formation. The following media and modes are considered because they are common and familiar, and also because they constitute the tools most available to online teachers, trainers, and learners: 1) print and text, 2) still graphics and illustrations, 3) sound and music, 4) video and moving graphics, and 5) multimedia.

Teaching Tasks and Learning Theories

Before applying Fleming's typology, it might be useful to determine how this conception of learning relates to some well-known pre-online learning models and standards. Figure 6-1 shows the correspondence of Fleming's categories to those of Bloom's alterable variables of learning (1984), Chickering and Gamson's (1989) seven principles of good practice, and Moore's needs of distance learners (in Garrison, 1989). The point to note is that most of the attention in the three pre-online learning models is focused on direct teaching and student involvement tasks, while pre-learning tasks, such as attention, perception, and recall, are not specifically addressed. The task of organization and sequencing (which assumes that instructional materials and activities may vary in response to individual needs and circumstances) is found only in two of the models[1].

Figure 6-1 suggests that older models of learning, which the above represent, may not address all of the elements necessary for efficient learning. Fleming's (1987) framework is more complete, addressing as it does the pre-learning elements of attention, perception, and recall. For designers and users of online learning, Fleming's model also draws attention to key learning activities which media might help to accommodate and monitor, as described in the following discussion.

[1] Bloom did in fact deal with the issue of prerequisite knowledge in other work (1956, 1976), as did others (Carroll, 1963), but in his mastery learning model, this element received reduced emphasis, and does not constitute one of the "alterable variables" that emerged from mastery learning research.

Analysis of the Requirements of Teaching Tasks

This section contains a summary of conclusions about media in learning, drawn primarily from Fleming's (1987) work. The purpose of this review is to provide a basis for the observations contained in Figure 6-1, and those to be made later in the chapter regarding uses and limitations of multimedia.

Attention

Given the importance of attention in learning, it is surprising that the learning models displayed in Figure 6-1 do not mention it specifically. (To be fair, gaining the attention of the learner may simply be

Learning and best-practice models	Attention	Perception & recall	Organization & sequencing	Instruction & feedback	Learner participation	Higher-order thinking & concept formation
Bloom (1984)				Quality tutorials; reinforcement and feedback; cues and explanations	Learner participation; time on task	Reading and study skills improvement
Chickering & Gamson (1987)			Respond to learners' diversity	Feedback; contact with instructor	Cooperation among learners; active learning; time on task	High expectations communicated to learners
Moore (in Garrison, 1989)			Guidance; support	Understand-able teaching; feedback	Active involvement	

Figure 6-1. Learning and best-practice models, and learning tasks.

assumed to be an outcome of other activities, an element of quality learning materials, or an outcome of contact with the instructor or other learners, for example. The message of Figure 6-1 is more the importance of the task and the possible usefulness of media, than a critique of these models, which are used here because they have otherwise proven useful, even classic, in their scope and influence.)

A key learning principle, according to Fleming (1987), is that attention by the learner to appropriate instructional stimuli is fundamental to learning. To be effective, training must attract and hold the learner's attention. Instruction must also recognize that attention tends to be

- individual—the capacity to be attentive varies among individuals, and it varies for any individual at different times (e.g., fatigue or lack of background can cause attention to wander sooner than usual).
- selective—at any one time, a learner's attention can be focused on only a small part of the learning content.
- fluid—as a teaching topic changes, the learner must know when and how to shift attention; however, some learners may become distracted, confused, or otherwise lose the main point during shifts in attention.
- especially attracted to novelty, to moderate levels of complexity, and to the contents of more focused, less complex displays.

Perception and Recall

Perception requires that the learner selectively focus on and make sense of stimulation in the environment, including the learner's own internal states and responses (thoughts, feelings, and physiological states). In a sense, all education and training is intended to make learners capable of finer and more articulate perceptions and distinctions (Bourdieu, 1984). Recall involves the ability to remember and make use of relevant prior learning, as well as of the learning acquired in a given situation.

Perception and recall in teaching draw on principles such as those below (Fleming, 1987).

- Organization affects perception; that is, events, ideas, words, concepts, and other stimuli that are not organized in some meaningful way are more difficult to understand and remember than those that are.
- Perception and recall can be aided by comparison and contrast; similarity and grouping also assist recall.
- Presentations that focus on differences are distinguished better by learners, and their contents may be easier to recall.

Organization and Sequencing

Organization and sequencing are present in the learning models represented in Figure 6-1. In Chickering and Gamson's (1987) model, responding to diversity in learners' needs suggests the possibility of reorganizing and resequencing materials and activities. In regard to Moore's (in Garrison, 1989) model, providing guidance and support has direct implications for organization and sequence. (Bloom's [1984] "quality tutorials" could also extend to organization and sequence, depending upon the definition of "quality.")

For Fleming (1987), the organization and sequencing of materials is an important task in instructional planning. The general principles listed below particularly apply to media design.

- The first and last items in a sequence are especially important; introductions and summaries represent key learning opportunities.
- Modeling and demonstrations can result in learning. While learners eventually must become active in the process of acquiring skills and knowledge, students can also learn while watching. Active internal states produce intellectual engagement, just as psychomotor activity accompanies the learning of physical skills.
- Repetition and review increase learning up to a point. Repetition can be used to increase skill, automaticity, and speed; however, power (depth of understanding, breadth of proficiency) is usually not increased by repetition alone.

Instruction and Feedback

While learners require skilful instruction, they also require feedback to enable them to monitor their progress, to discover errors or misconceptions, and to recognize what they should do differently (or continue to do) to gain further proficiency. Not all feedback is equally useful, however, and not all learners require the same kind of feedback (Fleming, 1987). Principles applicable to media design and use include those listed below.

- The more mature the learner, the more informative the feedback should be.
- With mature learners, correct answers should simply be marked "correct." Mature learners tend to dislike excessively demonstrative praise (Grow, 1991).
- Feedback should be prompt, but it does not have to be immediate. Learners should know how much delay to expect in test results and marking.
- Exceptions to the above point occur when feedback on previous steps is needed before subsequent ones can be taken; when there is a safety concern (i.e., previous steps must be correct or later ones could result in a dangerous situation); or when the task is highly complex.
- Feedback can be reduced as the learner becomes more experienced and more proficient. Initially, feedback should be frequent for most learners, to ensure that they have a positive initial experience.

All of the models in Figure 6-1 recognize that quality instruction includes the presentation to the learner of appropriate explanations, with the option for additional feedback. Chickering and Gamson's (1987) reference to student-instructor "contact" implies this element in their model. Importantly for this discussion of media-based learning, none of the models assumes that contact or interaction need be face-to-face to be effective.

Learner Participation

Learning requires engagement with the subject matter, and engagement often implies some kind of performance. In the case of psychomotor skills, the activity is usually physical, with evaluation dependent on observable outcomes. Occasionally, however, an activity may be completely or largely mental, according to the following principles (Fleming, 1987; Mayer, 2001).

- Activities that encourage the formation in the learner of mental images increase learning. Activities that require the learner first to process and then to reproduce a version of the original information do more to encourage learning than do rote reproduction and imitation alone.
- Language use accompanying or providing context for newly learned concepts increases learning; for example, composing a verbal narrative while learning complex or abstract material assists in retention. This principle can even extend to psychomotor skills, which is the reasoning behind "visualization" exercises in sports.

The use of experience and practice in learning requires willing learner participation and the conscientious application of new skills and knowledge for proficiency to develop. Peter Garrison (2001) quotes Galison's observation that moving from declarative knowledge (knowing that something is true, or how something might theoretically be done), through procedural knowledge (knowing how an activity is performed), to craft knowledge (being able to perform a procedure or to use knowledge with expert proficiency) requires practice, feedback, and application. Craft knowledge, the distinction between the novice and the expert, is the objective of many kinds of academic learning, and all higher-level skill training.

As are the tasks of instruction and feedback, learner involvement is common to all three learning models under discussion here (Figure 6-1). Time on task is added to show that participation must be purposive and relevant. The noun "cooperation" and the adjective "active" in Chickering and Gamson's (1987) model add the notion that the learner's involvement should be more than passive observation of others' efforts or conclusions, a position with definite implications for media implementation.

Concept Formation and Higher-order Thinking

The learning of concepts or principles is often intended to be part of a process leading to engagement with other, related concepts. In formulations such as Gagne's (1970), below, the learning sequence is hierarchical, and as the learner moves up the sequence, more complex orders of reasoning are required:

1. *signal learning*—involuntary responses; for example, the startle response, or removing a hand from heat.
2. *stimulus-response learning*—voluntary, selective responses; for example, signaling in response to a specific cue, or imitating an action.
3. *motor-chain learning*—performing a sequence of actions in a certain order; for example, dancing, parallel parking, or replacing a light bulb.
4. *verbal association or verbal chaining*—reciting correct responses to cues; for example, singing the lyrics of a song, reciting the alphabet, or translating a word from one language to another.
5. *multiple discrimination*—responding differently to similar stimuli; for example, distinguishing individual but related members of a group, or giving an appropriate English equivalent for a foreign word.
6. *concept learning*—responding to new stimuli according to properties they share with previously encountered stimuli, or comparing properties of phenomena; for example, estimating the characteristics of similar objects based on knowledge about their composition (a large rock vs. a large pillow), identifying members of a group (saltwater vs. freshwater fish), and distinguishing examples and non-examples of a class or phenomenon (vegetables vs. non-vegetables).
7. *principle learning*—putting two or more concepts together in a relationship (without necessarily being able to explain the underlying rule governing the relationship); for example, applying

physical laws (“matter expands when heated”) or mathematical theorems.

8. *problem-solving*—recalling previously learned principles and using them in combination to achieve a goal; for example, selecting and combining facts in an essay to persuade, analyzing a problem to determine its cause, or solving a complex problem by selecting and applying previously learned facts and principles.

Higher-order thinking skills (HOTS) are a challenge in technology-based learning. A persistent criticism of computer-assisted learning (CAL) and case-based learning using intelligent agents and artificial intelligence algorithms has been their failure to move beyond the mere identification and use of facts, to creative and synergistic linking of concepts (Bridges, 1992; Ihde, 1993; Cooper, 1993; Newby, Stepich, Lehman, & Russell, 2000).

In Figure 6-1, HOTS are present by implication in two of the models, in references to improved reading and study skills (Bloom, 1984), and in the objective of communicating high expectations to learners (Moore, in Garrison, 1989). However, the lack of specific reference to concept formation or higher-order thinking in these models, and the other apparent gaps in the resulting table, may be less a lapse than a reminder in this discussion that *somehow* these tasks must be addressed in media-based learning. The developers of the pre-online models represented in Figure 6-1 undoubtedly accept that higher-order outcomes are preferred. The challenge to media developers is to make this objective specific and achievable, as discussed below.

Implications

The implications of the above observations for the design and use of technology in general teaching include the following (Fleming, 1987).

Attention

- Change and variety can help to create and sustain attention.
- Skill in interpreting cues embedded in materials, and in shifting

focus appropriately within the instructional environment, should be taught.

- In graphics, captions increase learning by focusing attention on appropriate elements of illustrations.
- Learner expectations can be increased and attention focused by instructional design, including pre-reading questions and cognitive organizers, embedded cues and questions, skimming and scanning exercises, advance instructions, knowledge of objectives of an activity, pre-testing, and summaries.
- Mental sets are associated with some learning media or activities. For example, TV can be associated with trivial content or passivity, and the Internet with nonlinearity, or a "surfing" mentality. The learner's attention may be distracted if mental sets differ from the intention of the instruction.
- Mental sets may, on the other hand, assist learning: the expectation that a CAL program will contain useful information, or that a simulation will be intense and realistic, can be an advantage.
- Moderate uncertainty about what will happen in instruction, or about the eventual outcome of a presentation, may increase and help maintain attention.

Merrill's (1996) caution about the use of attention-getting strategies, especially on the computer, continues to be relevant. He notes that screen motion and animated movement are very powerful in attracting attention. The program should be careful about asking a user to do more than one thing at a time, such as requiring reading during an animated display (p. 112). Audio, however, might be used effectively with animation, since listening should not distract from watching the graphic display (Mayer, 2001).

Perception and recall

- Captions aid recall.
- To make distinctions easier to perceive, displays should especially highlight differences (ideally moving from more obvious differences to finer ones).

- Vision and hearing comprise perception. Vision is most acute in the center of the spectrum of visible light (yellow and yellow-green are the most visible colors, especially in dim light); and hearing is most acute in the center of the range of audible sound.
- Similarity, predictability, and routine aid the process of perception. The use of familiar designs and displays with new material permits learners to use previously learned perceptual skills when focusing on salient elements of new material.

Organization and sequencing

- In organizing and structuring opportunities for learning and practice, the designer or teacher should consider, and where possible accommodate, individual differences. If the information or skill is new to the individual learner, they will usually need more time to acquire it and to bring it to proficiency and automaticity. Novice performance is typically slow, self-conscious, and awkward; with proficiency, execution becomes more fluid, automatic, and natural ("craft knowledge"; Garrison, 2001).
- Practice is effective in facilitating long-term memory; if long-term retention is desired, practice should be spaced rather than massed. "Cramming" does not promote long-term retention.
- Repetition with variety (paraphrasing, rephrasing, and other forms of learner processing of information) is more effective for long-term retention than rote reproduction. Regurgitation of information is less likely to produce learning than reworking and rephrasing it.

Feedback

- With fully mature learners, all incorrect responses should be accompanied by some explanatory feedback, not simply a "wrong" mark.
- For mature learners, correct responses should not be indicated by sound effects or other displays; a simple "OK" is sufficient.
- If feedback is to be delayed (for any reason, deliberate or otherwise), trainees should be told how long the delay will be.

Learner participation

- Participation in learning may take many forms, limited chiefly by the creativity of the participants, the resources, and the technologies available. Possible examples include questions, activities, seminars, learning teams, small-group discussions, case studies, team learning, peer and cohort groups, written assignments, tests, field trips, labs, oral presentations of written reports, debates, expert panels, etc. (Cannell, 1999).

Higher-order thinking and concept formation

- In any discipline, the solving of authentic problems is the best test of a learner's mastery of facts, data sources, reasoning processes, and fundamental principles.
- In Bloom's terms, concept formation occurs at the higher levels of the taxonomy, specifically in activities that call for analysis, synthesis, and evaluation.
- Non-examples are helpful in enabling learners to develop concepts. They illustrate the differences between a concept and others that are similar. Similarly, non-examples can help learners to distinguish and clarify examples. When using examples and non-examples, the contrast between them should initially be large, and should be made progressively smaller as the learner demonstrates the ability to discriminate.
- Concrete concepts are generally easier to grasp than abstract ones, and thus may be useful in illustrating abstractions. It is easier to learn abstract (or concrete) concepts when constructs such as examples, models, analogies, descriptions, synonyms, and definitions are used.

Constructivism and Media

The use of media for teaching assumes that learning, as both an individual and a social activity (Haughey & Anderson, 1998), may be facilitated by intentional interaction. *Constructivism* is a general term for the view that the world is often too complex for general principles to be useful in teaching, and that the best learning results when the learner processes and integrates new experiences into his or her existing constructs (Coleman, Perry, & Schwen, 1997).

Constructivist teaching tends to be more holistic, more collaborative in method, and more encouraging and accepting of learner initiatives, including greater freedom and variety in assignments and assessments (Henriques, 1997). The role of the instructor also changes in constructivist teaching from “sage on the stage” to “guide on the side,” or coach (Burge & Roberts, 1993; French, Hale, Johnson, & Farr, 1999). Constructivism is discussed further in Chapter 1 of this volume.

In relation to Figure 6-1, constructivist teaching addresses the teaching tasks shown by emphasizing the learners’ unique background and consequent preparedness. Constructivist learning outcomes strive to apply real-world standards, and to assure that learning outcomes are applicable beyond a merely academic context. “Higher-order” constructivist outcomes have the potential to be relevant in daily life to real problems or situations.

The uses of technology may vary, too, in different constructivist environments. *Social* and *radical* constructivists view interaction as of greater importance to learning than mere access to information, while *information processing* and *interactive* constructivists view information, facts, and contact with a wide circle of informed people as critical to the student’s development of a fully adequate construction of the world (Henriques, 1997).

In common, constructivists tend to use technologies for purposes such as those identified by Jonassen (1998):

- acquainting and involving students with real-world problems and situations.
- modeling the analytic and thinking skills of the instructor and other experts, which learners then apply, with appropriate feedback, to their own problems and constructs.
- working within an authentic problem context that reflects as much as possible the problem’s real context and characteristics.

Overall, the contribution online media often make to constructivist teaching is in expanding the range and variety of experiences usually available in classroom-based learning. Because online media are by definition linked to networks of external resources, they can provide access to people, ideas, and information beyond those found in the classroom. Whether the result is a nearly self-sufficient *collaborative learning environment* (Jonassen, 1998), or, more simply, a forum for problem-based learning (Bridges, 1992), the result is an opening-up of the learning space to a wider variety of ideas and points of view.

Media, Modes, and Learning

Background Concepts

Technologies, as *channels* through which *modes* (symbols acting as stimuli) pass, differ in the responses they evoke in users. For example, text is a mode of presentation. Print-on-paper is one possible *medium* (channel) for text, but there are others: a computer monitor, an overhead projection, a television screen, film (moving or still), etc. Wherever it is used, text remains text, and must be read to be comprehended.

Despite their different characteristics, useful online training technologies have in common the effect of somehow bringing students into contact with their tutors, the content, and their peers (Moore, 1989). In this way, media may help to reduce "transactional distance" in learning—the communication gap or psychological distance between participants which may open in a teaching-learning situation (Chen & Willits, 1998). Although similar in producing these outcomes, the differences in how various technologies accomplish their effects are important to their potential usefulness.

Human and Technology-based Teaching

Technologies differ from one another, and instruction delivered online differs from human-delivered teaching. Consider, in the analysis below (Figure 6-2), the effects of media-based training compared with training done by stand-up, face-to-face instructors (Fischer, 1997).

A conclusion following from Figure 6-2 is that, as in most instructional design decisions, there are trade-offs related to the needs of the users and the resources available. An analysis such as that presented above may assist in identifying the trade-offs involved in the choice of one online technology over another approach.

Training element	Human trainer	Technology-based training
Planning and preparation	Can design training to correspond to the training plan, then assure subsequent consistency with the plan	Must be systematically designed to conform to the training plan
Expertise	Presenters hired from industry represent the most current knowledge and highest expertise	May depart from industry standards if subject-matter experts are not carefully selected, or if materials are not kept current
Interactivity	Tend to train the group, ignore individual needs	Can focus on individual needs for content, pacing, review, remediation, etc.
Learning retention	Retention rates vary	Can be up to 50% higher than for instructor-led group training
Consistency	Tend to adapt to the audience, lose consistency	Rigorously maintains the standards set for it, but may also adapt to learner's performance or preferences, if designed to do so
Feedback, performance tracking	Humans are especially good at ongoing evaluation, and response to trainee performance	Better at keeping records and generating reports of outcomes; designing systems to adapt instruction based on feedback (a cybernetic system) is costly, complex

Figure 6-2. Comparison of human and technology-based instruction.

Elements: Fischer, 1997, pp. 29-30.

Interestingly, it appears from Figure 6-2 that human trainers are superior in exactly those activities shown to be overlooked in Figure 6-1: planning and preparation, and feedback and performance tracking (in relation to higher-order outcomes). Human trainers can deftly detect and respond to unexpected needs, if disposed and permitted to do so, while technology-based training programs must be specially designed to assess and respond to unanticipated outcomes. Fleming's (1987) framework again appears to be superior for analysis of media's design needs.

Media Characteristics and Impacts on Learning

Five types of media, from print to multimedia (defined as "the integration of video, audio, graphics, and data within a single computer workstation"; Bates, Harrington, Gilmore, & van Soest, 1992, p. 6, cited in Oliver, 1994, p. 169), are discussed below. The intention is to make distinctions among media in relation to modes of delivery and presentation commonly used in teaching and training. The argument here is that, as technologies continue to evolve, it will be increasingly possible, technically, to use ever more complex media, including multimedia as defined above, to deliver instruction. Criteria will be needed, therefore, for making wise choices among the options, and for designing and supporting instruction based not only on the capabilities of the technology to deliver it, but also on the ability of learners to make effective use of the tools.

Print and Text

There is no medium more ubiquitous than print, and no mode more familiar than text in its many forms. Print was part of the first teaching machine—the book—and books were the first mass-produced commodity (McLuhan, 1964, p. 174). Print has been the dominant medium to date in distance education (Scriven, 1993, p. 73), and distance students have traditionally spent most of their time studying alone, often using print materials only (Bates, 1995, p. 52). The question is whether this situation is likely to continue. The answer requires consideration of the strengths and weaknesses of text and print. The chief strengths of print and text have traditionally included

- cost—Bates (1995, p. 4) reports that print is one of the lowest cost one-way technologies.
- flexibility and robustness—print scores highest on these features (Koumi, 1994).
- portability and ease of production—with desktop publishing hardware and software, printing has become enormously simpler and its quality much higher (Bates, 1988). In addition, costs can be reduced with local production.
- stability (Kozma, 1991)—organization and sequencing are positively affected, since text-only printed and online materials can be reorganized and resequenced with relative ease by cut-and-paste operations, using word-processors and HTML editors.
- convenience, familiarity, and economy—instruction and feedback are facilitated by the medium's familiarity, as, for adept learners and the highly literate, are higher-order thinking and concept formation (Pittman, 1987).

Ironically, the major disadvantages of print are related to some of its advantages, and include those listed below (Newby et al., 2000).

- Print is static, and may fail to gain adequate involvement from low-functioning readers. Attention, perception and recall, and active learner participation may thus be lower for less able learners.
- Print is relatively non-interactive, or at least non-responsive, and may lead to passive, rote learning.
- Print often requires substantial literacy levels.

Print is accessible (to the literate), and comparatively low in cost; furthermore, online text is easy to produce, translates well across various platforms and operating systems, and in some of its forms, may be manipulated by the user if desired. However, print may be seen by some as the "slightly seedy poor relation" (Pittman, 1987) of other instructional media. Text's lack of appeal is exacerbated by the alternatives to reading which are increasingly appearing, and which use multimedia (especially audio and graphics) and improvements in voice recognition and reproduction technologies to make reading less critical for users. As a result, non-print multimedia-based technologies could come to be regarded as cost-effective, especially in cultures or industries where high levels of literacy cannot be assumed, or where the costs of reading inefficiencies are high. Developments such as instant text messaging and e-paper could reverse this trend, giving print and print-based materials new life, at least until e-paper-based multimedia evolve to make text less important once more (Mann, 2001).

Still Graphics and Static Displays

A wide and growing selection of graphic technologies is available to online programmers, from older technologies, such as overhead projectors and 35mm slide projectors, broadcast TV, and pre-produced videotapes, to various forms of digital video (interactive and non-interactive), computer-generated video, and interpersonal communications tools such as group and desktop video-conferencing using Voice over Internet Protocol (VoIP).

Graphics can increase the motivation of users to attend, prompt perception, and aid recall, and assist in the development of higher-order thinking and concept formation. Furthermore, still graphics combine high information content (they can illustrate abstract or unfamiliar concepts) with relatively low production and distribution costs. Online compression formats, such as .jpg, permit low-bandwidth distribution of high quality graphics.

Screen resolution can be an issue in the use of graphics. The size at which a graphic is captured is key: capture at a high resolution and display at a lower resolution will result in a much larger image, which, depending upon the monitor's settings, may not be completely visible on the viewer's screen; conversely, an image captured at a lower resolution than that at which it is displayed will appear smaller. The end-users' likely technology platform should be the standard, to ensure that graphics will be viewed as intended. Online users should always be advised about which settings are optimal.

Online static visual displays which draw upon established design principles, including those listed below (Dwyer, in Szabo, 1998, p. 20), are more likely to be successful.

- Visuals that emphasize the critical details relevant to learning are most effective. Unnecessary visuals may be distracting, especially to learners with limited attention spans or discrimination skills.
- The addition of detail and realism to displays does not increase learning. Unnecessary detail can add to learning time without increasing achievement, and in online situations can increase transfer times dramatically. Depending on the relevance of the cues to the learning task, simple line drawings tend to be superior to photographs or more realistic drawings.
- Winn (in Szabo, 1998, p. 21) cautions that diagrams, charts, and graphs should not be assumed to be self-explanatory, but may require the learner to process the information given and to understand certain conventions. He suggests that graphics should routinely include supporting captions.

With the exception of instruction that directly employs color for teaching (e.g., identifying color-coded elements), there is little evidence that color enhances learning. Color may even distract some learners (Dwyer, 1970, in Szabo, 1998, p. 27). Some other generalizations about color are given below (Dwyer, 1970, in Szabo, 1998, pp. 27-28).

- Color may increase the speed at which lists can be searched.
- The use of too many colors may reduce the legibility of a presentation. A maximum of four colors was suggested in one study, but up to eleven colors in screen displays were found to be acceptable in another.
- The most highly recommended colors are vivid versions of green, cyan, white, and yellow.
- The heavy use of color may degrade performance of some older microcomputers and monitors, or may be displayed differently on various systems.

Based on his review of the data, Szabo (1998) concluded that "The disparity between effectiveness and perceived effectiveness is nowhere as great as it is in the realm of color" (p. 27).

Some further advice on the use of color in media production is presented below (Rockley, 1997).

- End-users should control the color of displays, given the prevalence of color-blindness (found to some degree in 8% of men and 0.5% of women).
- The best color display combinations are blue, black, or red on a white background, or white, yellow, or green on a black background.

For online uses of still graphics, the following characteristics of the computer as a delivery medium must be accommodated by developers (Rockley, 1997).

- A PC screen is about 1/3 of a piece of paper in display area, and most monitors are less sharp than the best laser printers or photographic reproductions. Screen positioning is critical: important information should go to the top-left; the lower-left is the least noticed area of the page/screen. What works on paper may not work, without translation or redesign, on a computer screen. (Designers should not assume users have superior equipment; design should be for displays of mid-range quality and size.)
- Single-color backgrounds, with a high contrast ratio between the background and the text, are easiest for readers; white or off-white is best for the background.
- Textured backgrounds display differently on various systems, and should be used with care, if at all.
- Sans serif fonts, with mixed upper and lower case, are best for legibility and reading ease.
- The size of the font depends on the purpose. For extended reading, smaller (12-point) fonts are suitable; for presenting information that will be skimmed or scanned, larger fonts may be more appropriate.
- Font changes can be effective for emphasis (size and type), as can capitals, underlining, and especially the use of bolding. The use of color alone should be avoided for emphasis, as systems handle color differently. All of the above techniques should be used sparingly, to preserve their impact.

Sound and Music

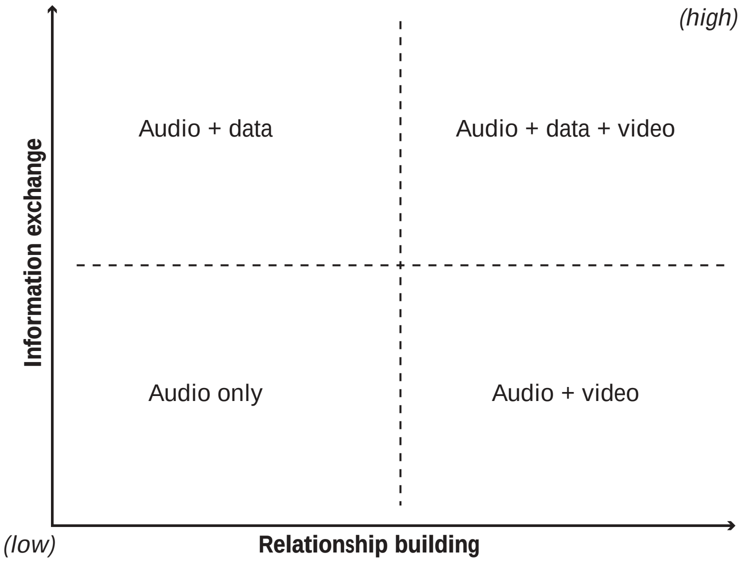
The principal issues in online audio are technical (storage and bandwidth) and pedagogical. For maximum effect, materials must not simply be a recorded version of another medium (e.g., a lecture), but should be rescripted to incorporate and interrelate with other modes of presentation (Koumi, 1994).

Online audio (including, when file sizes are large, distribution by CD and DVD) can be particularly useful in teaching for several technical reasons, presented below.

- An audio summary of previous material can aid recall, help retention, and lead to concept formation and higher-order thinking.
- Although CDs and DVDs are one-way technologies (non-interactive, like a lecture), they have the great advantage of learner control.
- CDs and DVDs are easy and cheap to produce and ship, and so reduce cost and improve accessibility.
- The technology of discs is easy to use and familiar. Operating systems (Windows, Apple OS, and Linux) now usually offer built-in sound reproduction technologies for both streamed and static sound files.
- The mode of presentation most often found on this medium, the human voice, is a familiar and powerful teaching tool.
- Audio may be more motivating than print alone, and together with print may form a powerful alternative and aid to reading alone (Newby et al., 2000).

A key issue in selecting a mix of other technologies to be used with audioconferencing is the relative importance of *relationship building* vs. *information exchange*. Picard (1999) sees audioconferencing's key contribution in its ability to promote relationship building in work or learning. The need for other technologies, according to Picard, is dependent upon the degree to which there is also a need to exchange information (for which, she warns, audio is not particularly effective). The schema presented in Figure 6-3 emerges from Picard's analysis.

Figure 6-3. Association of audioconferencing, data, and video with information exchange and relationship building objectives.



In Picard's (1999) analysis, when relationship building and information exchange needs are both low, audioconferencing alone may suffice. When both needs are high, however, audioconferencing, video, and data (including text) should all be present. Relationship building can be enhanced by combining audioconferencing and video together with data, especially text. (Text has formidable relationship building capabilities, as anyone who has ever had a pen-pal knows, but it assumes considerable skill on the user's part.) Video increases the likelihood that interaction will promote relationships, but audio alone is less capable of promoting this outcome. Data exchange alone seems to do little to promote relationships among those with access to other forms of interaction.

As technological evolutions permit more audio-based delivery, both interactive (e.g., VoIP) and one-way (streaming audio clips), research findings about audio's teaching capabilities become applicable (Szabo, 1997, 1998).

- Learning gains from one-way audio alone are at best weak.
- Learners possessing higher verbal skills usually do not benefit from audio added to text.

- There are few or no apparent significant immediate recall effects between text-only and text plus audio presentation, except that sometimes audio may lengthen the time required to complete instruction (see also Mayer, 2001).
- Audio may limit the ability of learners to proceed through material at their own individual rate.
- The quality and utility of digitized speech depends upon the amount of compression, the sampling rate, and the bandwidth available to the user.
- Users may relatively quickly become accustomed to synthetic speech; however, more cognitive effort is needed, and increased demands on short-term memory may reduce retention. (Synthesized speech may be more useful in reading back a learner's work, for example from a word processor, than in presenting unfamiliar learning content.)
- For general audiences, the possible benefits of audio must be weighed against the increased costs. Exceptions include uses such as language training, music instruction, and as an aid to the visually impaired.
- Where possible, the learner should be able to decide whether or not to use available audio.

The key limitation to the use of synchronous (live) audio on the Internet continues to be bandwidth, but impressive advances in VoIP audio programs are reducing the limitations. Some VoIP packages permit only point-to-point voice communications between two computers, while others permit point-to-multipoint group interaction, much like a teleconference, and require as little bandwidth as 56 Kbps. This online technology is expanding rapidly in business: in 2001, the proportion of companies of 100 employees or more using VoIP for business communications rose from 7% to 26% (Net Talk, 2001).

Video and Animation

Video suffers from the same kinds of limitations as audio, but to an even greater degree; bandwidth is the primary limitation to greater video use online. According to Roberts (1998), video

- adds a sense of direct involvement and physical presence among geographically dispersed learners.
- provides quality learning opportunities (as good as or better than those offered by other methods and technologies).
- gives distant sites live, interactive learning opportunities.
- enables the delivery of global expertise to remote learners.
- eliminates or reduces travel time and time away from jobs and family.

The following strengths of video for learning and teaching can be exploited, with appropriate instructional strategies.

- The social presence and cohesion that video fosters among users is often valued, especially by participants new to distance education, and may improve motivation.
- The technology permits the sharing of various visual resources.
- Group-based learning activities may be more attractive and feasible with video technology support.
- Well-designed and appropriately implemented uses of video can help in the teaching of abstract, time-protracted, hazardous, or unfamiliar concepts.

The advantages in actual practice of various forms of video continue to be debated. In some studies, animation has been shown to result in a reduction in study time, "suggesting that animation results in more efficient learning" (Szabo, 1998, p. 30), with learning effects persisting over time (Mayton, in Szabo, 1998, p. 30). There is, however, also some indication that, when compared with "highly imaginative examples and illustrations," the advantages of animated simulations were less obvious (Rieber & Boyce, in Szabo, 1998, p. 30). Szabo concluded from his analysis that "any widespread belief in the superiority of animation over non-animated instruction within the context of computer-based instruction is at odds with the research" (1998, p. 31).

According to Roberts (1998), critical issues in the delivery of video-based training include those listed below.

1. Proper training of instructors.
2. User self-consciousness.
3. Integration of other media into video presentations.
4. Optimum length of sessions and size of groups.
5. Session variety.
6. Technical design and support.
7. Professional quality visual elements. (p. 96)

Obviously, video delivery is complex, potentially costly, and of uncertain benefit for some teaching tasks over simpler, more economical media. A clear pedagogic and business case is obviously needed for its use.

Multimedia

As Oliver (1994, p. 169) notes, the term *multimedia* has not always designated computer-based media, as it does now, but originally referred to combinations of audio, visual, and print materials delivered by various media. Now, however, "the term has been adopted by the computer industry and re-defined to mean 'the integration of video, audio, graphics, and data within a single computer workstation' (Bates, Harrington, Gilmore & van Soest, 1992, p. 6)" (Oliver, 1994). Roblyer and Schwier (2003, p. 157) note that the term has become "too slippery" to define easily, that consensus about its characteristics is rare, and that as a concept it is converging with others, including hypermedia.

While multimedia applications offer advantages and benefits, these do not come without costs, awareness of which may help users to make informed decisions about the true advantages of the medium (Grabe & Grabe, 1996, 243-247). The key concerns include unnecessary duplication of existing instructional materials; teachers untrained in design becoming bogged down in the production of low-quality multimedia; problems of assessment using multimedia materials, which occur because learners using hyperlinks in multimedia do not always cover the same material in the same sequence; and high technical demands, with technical difficulties arising because of the complexity of some multimedia applications.

Obstacles to the widespread use of multimedia are myriad, and arise in part from the fact that multimedia applications, even if instituted carefully and with the intention of altering the learners' experiences, are an example of change and innovation, and so may provoke resistance, including such obstacles as (Helm & McClements, 1996):

- reluctance on the part of teachers to see materials transformed.
- the fear felt by users (staff and learners) over the level of technical knowledge required to get involved.
- the need of many tutors for special training (which may or may not be conveniently available) to use multimedia effectively.
- the significant challenge and expense of "adapting and transforming material intended for traditional delivery methods into new media" (p. 135).
- the desire to tinker endlessly and mindlessly on presentations, with negative results for productivity (Fahy, 1998). This effect, called "the futz factor" (Fernandez, 1997), has been estimated to cost US $5600 yearly for every corporate computer (Dalal, 2001). Futzing may be a "revenge effect" of technology, an unexpected and troubling result of the interaction of computer technology with the "real world" (Tenner, 1996).

Despite these potential limitations and weaknesses, multimedia also has potential strengths when used appropriately. Newby et al. (2000, p. 108) list the following advantages of multimedia for instruction:

- multiple, active learning modalities.
- accommodation of different learning styles and preferences, including disabilities.
- effective instruction across learning domains, including affective and psychomotor (with simulations, case studies, and other representational and interactive uses), promoting development of higher-order thinking skills, and concept formation.

- realism, especially when coupled with graphics and video.
- potential interactivity.
- individualization, with use of computer branching capabilities and CML (computer-managed learning).
- consistent experiences, compared with group-based face-to-face instruction.
- potential for high levels of learner control.

The impact of multimedia in teaching is ultimately dependent upon the incorporation of certain principles that govern its usefulness and effects. Mayer (2001) has suggested seven such principles, based on empirical evidence from his ongoing research on multimedia and actual learning. These principles not only describe the various impacts of multimedia on learning, they also constitute a good basic primer for instructional designers working with media generally.

1. *Multimedia principle:* Students learn better from words and graphics or pictures than from words alone (p. 68).
2. *Spatial contiguity principle:* Students learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen.
3. *Temporal contiguity principle:* Students learn better when corresponding words and pictures are presented simultaneously rather than successively.
4. *Coherence principle:* Students learn better when extraneous words, pictures, and sounds are excluded rather than included (p. 117).
5. *Modality principle:* Students learn better from animation and audible narration than from animation and on-screen text (p. 135).
6. *Redundancy principle:* People have only limited capacity to process visual and auditory material presented simultaneously (p. 152); therefore, students learn better from animation and narration than from a combination of animation, generation, and onscreen text (p. 153).

7. *Individual differences principle:* Design effects are stronger for low-knowledge learners than for high-knowledge learners, and for high-spatial-ability learners than for low-spatial-ability learners (p. 184). (*Spatial ability* is the ability mentally to generate, maintain, and manipulate visual images, see p. 172.)

The Internet

As noted at the outset of this chapter, "online learning" almost always denotes learning "on the Internet." The Internet offers both advantages and challenges to educators and trainers. The advantages arise from the Internet's enormous capacity to link participants with information and with each other (Haughey & Anderson, 1998). But problems with navigation, structure, interactivity, complexity, security, and sheer consumption of time must be addressed.

The Internet is potentially a powerful linking and communication vehicle. Heinich, Molenda, Russell, and Smaldino (1996, p. 263) suggest that the Internet's power lies in its capacity for providing numerous connections to engrossing, multi-sensory experiences, suited to individual needs. The fact that these can be constructed by teachers themselves, and can incorporate knowledge of their students' needs and feature meaningful student-student collaboration and student-teacher interaction, also makes the Internet a revolutionary learning tool. At the same time, the Web's inherent lack of structure may result in some users getting unintentionally "lost in cyberspace," or making poor use of time ("surfing," or exploring interesting but irrelevant minutiae). Also, Internet materials often fail to exploit the medium's potential for interactivity, consisting of one-way presentations of information. The reliability of online information may also be suspect, unless its provenance is known. And successful use of the Internet currently demands proficient literacy and computer skills. (As noted earlier, this may change as bandwidth availability makes supplemental audio and video more available.)

In relation to Figure 6-1, the Internet offers a means for gaining the attention of learners, and of presenting opportunities for focusing perceptions and prompting recall. Learner participation can also be supported, especially with CMC and use of collaborative learning projects. Providing instruction, and assuring appropriate organization, sequencing, and higher-order outcomes are less easily accomplished with the Internet, for reasons discussed here.

Limitations such as those mentioned above may account for some of the increasing class of former users called "Internet dropouts." Of those who have stopped using the Internet, only 28% expect to return, having concluded that they have "no need" for the Web. While other reasons include cost (cited by 17% of dropouts) and lack of convenient access to a computer (14%), the fact that lack of utility is the most common reason indicates a serious potential problem for future Internet growth: unless a tool has a perceived legitimate purpose, it may not prosper, or even survive (Crompton, Ellison, & Stevenson, 2002).

Two related Internet-based media show particular instructional promise for those with the skill and discipline to use them well, especially in relation to organization and sequencing challenges presented by the Internet: *hypermedia* and *hypertext*. Hypermedia is the linking of multimedia documents, while hypertext is the linking of words or phrases to other words or phrases in the same or another document. Internet delivery may be hyperlinked or linear. As a technology, hypermedia has existed for decades, but with advances in hardware, software, and human-computer interfaces, it is now technically feasible to incorporate hypermedia systems routinely in teaching, and dozens of hypertext and hypermedia development systems now exist.

While hypermedia permit huge amounts of information from a variety of media to be stored in a compact and easily accessible form, the sheer amount of available information may also overwhelm learners, especially if they are unable to refine a search or conduct an exploration successfully (with focus). Users require skills (some technical, others related to organization and self-discipline) to make efficient use of hypermedia materials (Marchionini, 1988, p. 3*ff*.). Although the results of hypertext use in teaching have previously been somewhat mixed (Szabo, 1998, pp. 36-38), the promise is in the potential to offer self-directed learners the option to control the details of their own learning to a much greater extent than is possible in group instruction. With emerging online communications capabilities, the ability for teachers to oversee and monitor this kind of learning also increases. The problem, as in many of these new implementations, is to overcome the users' tendency only to "focus on facilitating access to information," and not on actual learning outcomes (Szabo, 1998, p. 52). This is an important distinction, and one that could be applied to any of the media discussed here.

Conclusion

Online learning is still in its early infancy. There are many outstanding, and, in some cases, vexing issues: costs are declining, but still limit widespread access; many users (teachers, trainers and learners) feel they do not have all the skills they need to make mature use of online learning's potential; administrators and policy-makers often overstate the likely impacts of going online (Nikiforuk, 1997); and the relation of learning outcomes to technology use, for specific populations and in particular circumstances, has not been clearly identified, and is not well understood (Garrison, 2000).

Although these realities prove that there must be evolution before online learning can be seen as mature, at the same time there are promising signs. Access to the Internet is improving, especially for some previously disenfranchised groups; for example, women as a group now exceed men in numbers of Internet users (Pastore, 2001). Some consensus about good practice is emerging, including examples of clearly successful uses of technology to meet persistent learning needs. Finally, in-service training is increasingly available to potential users.

Will these trends continue? Change has been a constant in the online learning world, and as technical capabilities come out of the lab, they are quickly packaged and made available to users by entrepreneurs. Education could keep pace, and could avoid the costs and uncertainties of invention, by merely following the technological lead of the corporate sector.

Whether online learning follows this path or not, it has a good chance to grow because online access to information—wired or wireless, structured or user-driven—and interaction using various computer-based technologies are established social and economic realities (Mehlinger, 1996; Machrone, 2001; Networking, 2002; Rupley, 2002). Whether one deplores or applauds this reality, it is nevertheless a fact that as a culture we now go online for many purposes. Consequently, every educator—and especially every distance educator and trainer—should consider the potential of online media as an element of their practice.

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PART 3

Design and Development of Online Courses

C H A P T E R 7

THE DEVELOPMENT OF ONLINE COURSES

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Introduction

In the ideal world, instructional media developers—those who will actually create the planned instructional materials with which the student will interact—are included in the course development process from the beginning, to consult with and advise course team members on development-related topics as they arise. Then, on receiving a detailed design document from the subject matter expert or instructor, developers will set to work, assured that

- the instructional designs of the learning materials are stable because they have been based firmly on sound, proven learning theories;
- these instructional designs will meet the institution's identified and articulated internal and external standards for quality, usability, and interoperability;
- appropriate media have been selected to meet these standards;
- the technologies selected for course delivery are not superfluous—rather, the course design will exploit the unique characteristics of the selected media in engaging and supporting both learners and teachers (such characteristics may include accessibility of content, multimedia, hyperlinking, multiple or global perspectives, ease of revision, accommodation of many forms of interaction, etc.); and
- the designs are practical and can be developed in a cost-effective and timely way.

Of course, most of us do not have the luxury of working in an ideal world. There's a good chance that a very thick file has just landed on your desk(top), and you're not sure where to start! The first part of this chapter discusses the infrastructures that must be in place to support the development of course materials. The second part considers the key roles on a course production team, a few instructional development models, and some technical issues in the process of developing an online course.

What Must Be in Place before Development Can Occur

Computer-mediated distance education is becoming ubiquitous and is being demanded more and more by students. However, despite what some might believe, Internet-based instruction is by no means the “magic bullet” that automatically guarantees a rich learning environment. Although research continues to confirm that there is no significant difference among student outcomes based on mode of course delivery (Russell, 1999), we must keep in mind that Web-based distance education technology and pedagogy is still very much in its infancy. Hence, those of us working in Internet-based instruction are blazing new trails in developing the essential elements and processes that will lead to high-quality, active, online learning environments.

It is generally agreed that the World Wide Web is a compelling, resource-rich, multimedia environment with great potential to serve large numbers of widely dispersed students at relatively low cost. Although many educational institutions have undertaken strategic planning for the systematic implementation of Web-based distance education, not all have succeeded. An institutional model that is distinct from the traditional instructional-planning model, and that supports the design, development, and implementation of high-quality instruction on the Internet, is a fundamental requirement for gaining support for Web-based instruction from faculty, administrators, and students. Each of these stakeholder groups has to be assured that Web-based instruction is a viable means of delivering courses and programs, and accommodating student needs. To create those assurances, the Web-based instruction model that is to be implemented must deal with some fundamental issues that may have never been addressed before.

Definition of an Online Course

What does it mean for a course to be considered "online"? Since the Web-based delivery option is new to many institutions, there is no standard, accepted definition of what constitutes an online course. An examination of Internet-based courses currently offered reveals two basic categories, with a large middle ground: courses that are primarily text based (the text being delivered either online or by mailed hard copy), with computer-mediated enhancements; and courses that are designed specifically for the distributed Internet setting, and that merge several smaller educational components into a single course of study.

To date, the majority of distance-education courses found on the Web are of the former type, involving text that has merely been converted to electronic form and placed on a Web site for students to read, or, more likely, to print and then read. The advantages of this method of delivery include getting the materials to the student almost immediately and circumventing postal delays; facilitating easy searching and manipulation of the text by the student; cutting the costs of publishing and shipping; and increasing the ease of development (often using a course template), updating, and revision. In addition, the communications capability of the Internet allows for a variety of forms of student-student; student-content, and student-teacher interaction, which can be used to augment the students' independent interaction with the printed course contents. An example of a text-based, template-produced online course can be seen at http://eclass.athabascau.ca/eclass/Demoec.nsf (Athabasca University, 2002a).

The loudest criticisms of this type of course are that it does not make any use of the multi-modal, computer-mediated instructional means that are available, and that the printing costs are downloaded onto the student. Another criticism is that these text-based online courses are often supplemented with electronic interactive tools, such as discussion forums and chats, that are implemented as "extras" or afterthoughts to the course—their pedagogical value is often artificial and suspect.

As online course development evolves, the type of course at the other end of the online course spectrum is gaining popularity. These courses take advantage of the strengths of the Internet as a teaching and learning environment; that is, its open, distributed, dynamic, globally accessible, filtered, interactive, and archival nature (Elliot & McGreal, 2002).

In this type of online course, all course materials and activities are Internet based. Although text can still play a part in instruction, it appears in short, concise "chunks"; the instruction is also distributed among other multimedia components. These online components, which are becoming known as learning objects, include text; electronic mail, discussion boards, chat utilities, voice over Internet protocol, and instant messaging; synchronous audio; video clips; interactive activities, simulations, and games; self-grading exercises, quizzes, and examinations; and Web sites.

Building an entire course of study around these learning objects can satisfy both immediate learning needs, as in a knowledge-based or skills-based course, and current and future learning needs that are not course based (Longmire, 2000). To date, finding an exemplary course built entirely around learning objects is difficult; however, Web sites such as National Geographic's children's site (http://www.nationalgeographic.com/kids) and the British Broadcasting Corporation's history site (http://www.bbc.co.uk/history/multimedia_zone) show the beginnings of how multi-media objects can be used online to promote learning in a subject area.

The type of online course you are planning to develop might fall into one of the two categories above, or it might fit somewhere in between, and it might contain any combination of the above learning objects. However, regardless of how you define your online instructional materials, your course should contain certain administrative documents to help instructors organize and prepare, and to help orient students, especially if they are new to online learning. These documents could include

- a personalized letter of welcome for each new student.
- general information about online learning, technology requirements, and the resources available to students for technical help and for obtaining the proper software and Internet services required for the course.
- information about how to access the course on the Web, and how to navigate it it successfully.
- student log-in and password information for course Web site.

- rules, procedures, and help for use of the interactive tools.
- a course syllabus—preferably on public pages so that prospective students can see what they are getting into in advance—including instructor or tutor contact information; a course overview; a course schedule; a list of required text and materials (if applicable); clearly defined academic and computer skills prerequisites; clear communication about expectations; instructions about activities, assignments, and deadlines; faculty contact information and office hours; and student support contact information.
- administrative regulations, including guidelines on plagiarism, privacy, academic appeal procedures, library facilities, and access to counseling and advisory services

Faculty Buy-in

The World Wide Web was unveiled in 1992, and only in the past few years has it begun to be accepted as a workable vehicle for the delivery of instruction. Consequently, many faculty working in post-secondary educational institutions were not hired with the expectation that they would employ educational technology in their teaching. This new mode of learning is also redefining teaching. Access to new cohorts of students and to new media makes it possible, sometimes necessary, to teach in new, innovative ways.

Some faculty will take to these new methods immediately; others will be unsure if they have, or even want, the technical abilities to develop an online course. The importance of the degree to which faculty feel that they are receiving encouragement and solid support in all areas of online development should not be underestimated. Administrators can initiate certain policies designed to encourage and support faculty acceptance of online teaching. Faculty should be reassured that they are not about to lose their jobs to technology, but rather that they can expand the ways they do their jobs by employing technology. Finally, it is crucial that undertaking the considerable personal effort and risk to develop courses and teach online is adequately rewarded, especially within the merit award and promotion processes associated with performance reviews.

Focus on Sound Pedagogy

> Any given instructional strategy can be supported by a number of contrasting technologies (old and new), just as any given technology might support different instructional strategies. But for any given instructional strategy, some technologies are better than others: Better to turn a screw with a screwdriver than a hammer—a dime may also do the trick, but a screwdriver is usually better. (Chickering & Ehrmann, 1996)

Faculty concerns about using new teaching methods and media often center on pedagogy. Unfortunately, there are many examples to be found of poor pedagogical application in Web-based instruction, often in the form of the text-based online courses described above. The prevalence of such examples is largely the result of the novelty of the notion of online instruction, and of the fact that a critical mass has yet to be achieved, in design and in practice, that proves the value of online learning. One way to address concerns about inferior pedagogy online is to dictate that the same educational standards will apply to the development of instruction for the Internet as to any other delivery medium, such as the classroom.

The American Association of Higher Education's "Seven principles for good practice in undergraduate education" is one such set of standards (Chickering & Gamson, 1987). Originally written for classroom instruction, it was subsequently revised to include online educational practice, and is now widely accepted among post-secondary institutions.

> Good practice in undergraduate education:
>
> 1. Encourages contacts between students and faculty.
> 2. Develops reciprocity and cooperation among students.
> 3. Uses active learning techniques.
> 4. Gives prompt feedback.
> 5. Emphasizes time on task.
> 6. Communicates high expectations.
> 7. Respects diverse talents and ways of learning. (p. 3)

Arthur Chickering and Steve Erhmann have recently updated these practice guidelines to illustrate how communications technologies, and especially the Internet, can be used to support these seven "good practices" (see http://www.tltgroup.org /programs/seven.html).

Another set of standards is presented in the Western Interstate Commission for Higher Education's "Principles of Good Practice for Electronically Offered Academic Degree and Certificate Programs" (WICHE, 1999). Some of these principles can be paraphrased as follows.

- Programs provide for timely and appropriate interaction between students and faculty and among students.
- The institution's faculty assumes responsibility for and exercises oversight over distance education, ensuring both the rigor of programs and the quality of instruction.
- The institution provides appropriate faculty support services specifically related to distance education.
- The institution provides appropriate training for faculty who teach in distance education programs.
- The institution ensures that students have access to and can effectively use appropriate library resources.
- The institution provides adequate access to the range of student services appropriate to support the programs, including admissions, financial aid, academic advising, delivery of course materials, and placement and counseling.

Your institution may have its own set of standards. The point, however, is that all instructional endeavors, regardless of their medium of delivery, should be measured equally against an explicitly stated set of criteria.

New Teaching Paradigm

The unique possibilities inherent in Web-based instruction originate, not from the Web itself, but from the instructionally innovative ways in which it may be used. It is helpful to consider the Web not simply as a new medium for distance education delivery, but also as a partnership of a new teaching paradigm and new technology, creating the potential for fundamental changes in how we undertake teaching and learning.

Instructors and other members of the online course development team should strive to create learning environments that exploit the features inherent in computers and the Web, in order to promote active learning that resides in the control of the student, and that can effectively lead to the development of high-order and critical thinking skills. In addition to the AAHE's seven principles, cited above, Fox and Helford (1999) list several more suggestions specific to effective teaching online. They are paraphrased below.

- Develop tolerance for ambiguity (recognize that there may be no "right" answer to a given question, emphasize cognitive flexibility).
- Use scaffolding principles (create material that is slightly too difficult for the student, to encourage cognitive "stretch").
- Use problems that require students to understand and manipulate course content.
- Create opportunities for high levels of interaction, both student-student and instructor-student.
- Integrate formative assessment throughout the course.

Teacher Education Is Critical

One of the WICHE principles of good practice recommends appropriate training for faculty who use technology to teach by distance education. Many of the skills that faculty had honed in face-to-face settings no longer apply online; and some teachers must "unlearn" certain teaching methods as much as they need to learn new ones. For the sake of both teacher and learner, faculty should undergo some training before launching into the online teaching arena.

One way for faculty to become familiar with the skills and resources needed to be successful online teachers is to become online learners. Many institutions advocate that their online teaching faculty initially enroll in an online course that teaches them how to develop online instruction. This strategy often proves invaluable, as teachers experience the same challenges that their students will face: problems with inadequate computer abilities, learning about the variety of interactive tools, and underestimating the amount of time needed to complete the online readings and homework. To be successful in the online course, faculty must not only develop new pedagogical skills, but like their students, they must also gain new administrative and technical skills. The lists below summarize the most crucial of these new skills.

Pedagogical proficiencies

- Think of the online environment as just a different kind of classroom for interacting with students.
- Look at other online courses, take some yourself, and ask colleagues if you can access theirs.
- Be prepared to invest the effort and time necessary to deliver a course online. Exploit technology to help provide students with responses to questions and requests for assistance, as well as timely feedback on assignments and grades.
- Always remember to weigh how important something is against how much time it takes to transmit and receive it, and to ask whether or not the user can see and hear exactly the way you intended.
- Be creative in planning how to use technology to teach more effectively. To inform your planning, invest time and effort in gaining a basic understanding of how the technology works (see “Technical skills,” below).

Administrative skills

- Teaching online often requires more anticipatory effort than teaching in a classroom. Lay out your ground rules right away. Unless you explicitly tell them otherwise, students will want to interact with you right when they need you. Earlier, you were advised to create a course syllabus. The syllabus should include the class rules, and you should make sure that your students read it, so that they are aware of the rules. Then stick to those rules.
- Find out where your help is, and know when use it. As mentioned in the WICHE principles above, your institution should have various personnel whose job it is to support you;

for example, computing helpdesk staff or media development departments. Find out who those people are before you need them, and do not wait to call on them.

Technical skills

- Determine whether you possess that basic PC skills; for example, at minimum a familiarity with file structure, with opening, copying, saving, and moving files, with creating and managing backup files, with keyboard and mouse functions, with screen and windows features, and with Web browser functions.
- Determine whether you need to learn new software applications for teaching on the Web, and if so, whether you are willing to learn them, and whether can you do so with external support systems.
- Determine whether your institution supplies regular training in new software applications.
- Make certain that you are very comfortable with using e-mail. It will be the most common means of communication with students.
- Make certain that you understand basic Internet functionality, bandwidth, and connections speed issues. Your computer and computing environment is probably not like the ones that your students are using. At work, you are likely to be using a local area network (LAN), but when you log on using a modem and an older computer, you get a better sense of what your students see and experience.
- Make certain that you have a basic understanding of how Web browser windows on different types of machines affect the appearance and functionality of your material.

Time and Resource Management

During the semester in which the course is implemented, the instructor's time is frequently taken up with responding to student e-mails, marking homework assignments, and dealing with other interactive components of the class, such as discussion forums and chats. Because of the nature of Web courses, student interaction will be sporadic, and will at times produce a surge of e-mail messages for the instructor to respond to. So, for example, an instructor should expect to receive many e-mail messages at the beginning of the course (students will initially have many questions about online learning), if course material becomes inaccessible as a result of technological problems, and from students experiencing difficulty with submitting assignments. To deal with e-mail messages, instructors can

- solicit help from a technical assistant (graduate student, teaching assistant, etc.) to respond to course e-mails;
- create a "frequently asked questions" page, where students can find information typically needed throughout the course;
- create a protocol in which students must ask questions over the course forum (bulletin board) prior to e-mailing the instructor;

  or
- refer students to a helpdesk contact to handle the inevitable technological obstacles that are inherent in accessing a Web-based course.

It is important that you get your course online, but it is equally important that you plan and design your course completely before it is opened to students, because positive first impressions in this new medium are vital for the success of teachers and learners. Trying to develop course materials while teaching the course can be overwhelming.

Many instructors underestimate the time and assets required to develop, maintain, and offer an online course. Efficient planning and time management are fundamental to the success of the course. Faculty are strongly advised to become familiar with their institution's Web development unit, technical training unit, IT unit, and other supports, and to strike a strong working relationship with those supports.

Rewarding Faculty

A final strategic building block in the success of online course offerings is the institutional development of a process that encourages and inspires faculty to be creative in a Web-based environment. Faculty are often suspicious about technology-based instruction, and hesitant to experiment with it. Setting up supportive systems, as described above, will go a long way toward gaining faculty "buy in." However, it is often more meaningful for faculty members to know that they will receive recognition for their willingness to engage in innovative online education activities, and that their efforts will reward them with tenure, promotion, salary merit increases, and other tangible benefits.

Online Course Development

Centralizing the Online Development Unit

Online course development is a complex endeavor, and it is not reasonable to believe that a high calibre online course of instruction can be created by just one or two people. Quality courseware production requires a highly organized, concerted effort from many players.

Centralizing Web development roles into one departmental unit has proved to be beneficial in ensuring that courses are of high quality and meet institutional guidelines. Members of this department may be described as "para-academics," a role comparable to that of paramedic in medicine. Para-academics are the "first on the scene" of course development; they liaise with the course author or subject matter expert (SME) throughout the authoring process to prevent or remove any instructional barriers that might arise, and they also look after the interests of the institution (e.g., obtaining copyright permissions for images used in the course) and undertake other routine tasks that must be dealt with before a course can be published. Roles in this group include project manager, copy editor, IT expert, HTML coder, media developer, instructional designer, graphic designer, administrative assistant, and, sometimes, copyright officer.

The Course Development Team

The core of an online course development team might comprise as few as five key roles: SME or author, graphic designer, Web developer, programmer, and instructional designer. In larger commercial organizations, it is not uncommon for development teams to be much larger, as the expertise in each of these five roles is subdivided and specialists are employed. However, in non-profit education circles, where budgets are tight, it is more likely that a few people will fulfill hyphenated roles; Web developer-programmer, for example.

There are both advantages and disadvantages to these hyphenates. Although one person who performs multiple roles can perhaps exercise more creative control, their workload may, in essence, double. Hyphenates can also see their capabilities and their output become "watered-down," as they end up working in areas in which they may not have expertise. The reality is that, in online educational development today, those who already possess strong skills in at least one of the areas described above are considered even more valuable if they also possess the ability and desire to learn new skills in other areas.

It is worth noting that, as the popularity of the Internet continues to increase, software applications and other development tools that are able to combine and automate several development tasks into a single package are constantly being introduced. Macromedia's Flash® application is one example: it allows its users to create script-based interactions without actually writing any programming code, and to export the results in a Web-based format automatically, without having any in-depth knowledge of Web development.

Although the team roles are described and discussed linearly here, each member will work with other team members, often in different combinations and at different stages within the development process.

Subject Matter Expert

SMEs are responsible for ensuring that the content of the online course is an appropriate alternative to the lecture content normally given in a traditional course. In addition, the SME must write the exercises, activities, and examinations needed to reinforce the new learning. It is also essential that SMEs commit to working as an integral part of the team throughout the development process, ensuring that the online course content is easy to access and interesting for the students. Other tasks that SMEs perform include

- identifying or creating textbooks, readings, and resources;
- ensuring a pedagogical "match" among the course objectives, content, exercises, examinations, and assignments;
- identifying materials that require copyright clearance, and providing the instructional designer with the necessary information; and
- providing other team members with a legible copy of any written material.

Instructional Designer

While there are hundreds of instructional design models, certain generic processes emerge from their common features (Seels & Glasgow, 1998). These processes are described by Seels and Glasgow as follows.

> - Analysis—the process of defining what is to be learned.
> - Design—the process of specifying how learning will occur.
> - Development—the process of authoring and producing the materials.
> - Implementation—the process of installing the instruction in the real world.
> - Evaluation—the process of determining the impact of instruction. (p. 7)

In practical terms, the instructional designer

- helps to make the SME aware of appropriate pedagogical strategies and options;
- helps to determine, create, and adapt instructional resources;
- provides advice on how best to present information;
- writes statements of learning outcomes;
- sequences learning outcomes;

- sequences activities;
- evaluates instruction;
- arranges technical production and services;
- usually acts as project manager;
- acts as editor; and
- acts as Web developer.

Web Developer

It is one of the challenges of the Web course designer to help create an atmosphere of confidence in the process in the early stages of development. Web developers should show faculty examples of online materials that illustrate the various kinds of content and interactive options that are available to them. They should then describe to faculty how their courses can be produced using a consistent organizational template that provides students with knowledge of the learning objectives, an outline of the content, assignments, evaluation information, resources, links, a list of requirements, and FAQs. An example of such a template is available at http://teleeducation.nb.ca/content/eastwest/template (TeleEducation, 1997-2003).

Other roles of the Web developer include

- helping the SME or instructor to use the tools to create the course Web pages, and to maintain the course when complete;
- helping the instructor or tutor to use the tools needed to make the course interactive, such as e-mail and chat utilities;
- working with the graphic designer to conceptualize the screens, backgrounds, buttons, window frames, and text elements in the program;
- creating interactivity, and determining the "look and feel" of the interface; and
- creating design storyboards.

In a small production group, the Web developer may act as the graphic designer, photographer, and director, and as the editor of video, audio, and animations. In a larger group, the Web developer would consult with other team members for the additional aspects of the program; for example, collaborating with the sound designer on the music, or working with the programmer on functionality issues.

Graphic (Visual) Designer

> Visual design for Athabasca University courses, whether print-based or electronic, is driven by the needs of students and academics, and by the content of the course itself. Course materials can be enhanced for distance education by including technical drawings, illustrations, graphics, and photography to interpret course content . . . . Visual design for electronic courses or optional electronic enhancements of print-based courses includes the development and creation of generic or cus-tomized templates, navigational icons, icons or images to aid recognition of location within a non-linear presentation of materials, and visuals or graphics to enhance textual content. (Athabasca University, 2002b)

The World Wide Web has turned the Internet into a compelling visual medium; however, in production terms, good visual design and development can often consume the largest amount of time in a project. As the Web allows educational media to rely more and more on visuals, the importance of clear visual design cannot be overstated. The visuals that students, especially those new to online learning, encounter in an online course can often set the tone for their entire learning experience.

As content is being developed, the graphic designer works with the Web developer and the author to create a unique course look, while at the same time integrating the course's functionality into the common institutional template. The use of these common elements provides familiarity for online students and makes it possible for them to take several courses, but to learn how to learn online only once. The graphic designer also ensures that faculty will have continuing support in designing consistent graphical elements when courses are being updated or revised.

For graphic designers, Adobe Photoshop® has been the "must-have" software tool for years. For those developing specifically for online delivery, Photoshop has added an adjunct application, called ImageReady®, that formats images for the Web. Other applications that are becoming more important in the visual designer's stable are those that create vector-based images (as opposed to bitmaps); examples include Adobe Illustrator® and Macromedia Freehand®.

Programmer and Multimedia Author

The programmer is responsible for program functionality. The programmer uses specialized software tools to enable the interactivity that is suggested and desired in online courses. In the most productive teams, programming is treated as a highly specialized and separate discipline.

There are many software applications available to programmers, and each programmer seems to have a favorite working tool. Programmers should endeavor to provide development team members with a basic understanding of the classes of programming tools and their capabilities. Generally, there are two classes of these tools: code-based programming languages, and graphical-user-interfaced (GUI) authoring programs. The code-based languages require that programmers use a proprietary computer language to create applications that can then be delivered over the Internet. For example, these languages enable the processing of information users supply on Web-based forms. GUI authoring programs may enable similar processes, but they also offer some automated generation of computer code. This chapter is not meant to be a comparison of these tools—there are hundreds of articles about that—but currently there does seem to be a clear line between the followers of code-based programming techniques and those who prefer GUI applications. One clear advantage of code-based programming is that these tools are often *open source;* that is, they are created from freely available, stable code that encourages collaborative development. Commercial GUI software often requires less technical expertise to use than code programming, but it can be expensive, and the companies who publish these proprietary software programs update them often, rendering earlier versions obsolete and constantly forcing developers who rely on them to purchase new versions.

Below is a partial list of the types of applications that programmers typically work with in a Web-based course.

Open-source code-based programming languages include

- Hypertext markup language (HTML)
- Java
- Javascript
- Perl
- Extensible markup language (XML)
- PHP
- MySQL

Proprietary GUI Web-development software packages include

- Macromedia Dreamweaver®, Flash®, Director®, Authorware®
- Microsoft .NET®, Visual Basic®
- Adobe GoLive®, Photoshop®, Illustrator®

Conclusion

Developing effective instructional materials depends on a great deal of planning and collaboration, and concerted efforts from many people skilled at using the right tools. These requirements are even more crucial in online multimedia and course development, which is highly dependent on ever-changing computer technologies.

Pedagogical standards must not be compromised, regardless of the instructional medium employed. Employing the principles and guidelines offered in this chapter will help all stakeholders involved in online instructional development to ensure that their efforts are rewarded, ultimately, with satisfied learners.

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C H A P T E R 8

DEVELOPING TEAM SKILLS AND ACCOMPLISHING TEAM PROJECTS ONLINE

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Introduction

Traditionally, the primary weakness attributed to distance education at the MBA or professional education level has been in the teaching of team or leadership aspects of the curriculum. Some academics question the suitability of a topic such as team dynamics and communications as a candidate for online learning, believing that this aspect of the curriculum cannot be adequately taught through distance means. Clearly, a lot of what occurs in typical team training programs involves experiential forms of human interaction, conflict resolution, goal setting, and so on. Questions remain regarding the ability to develop “soft” skills online.

In this chapter, we present our experience in teaching and encouraging the exercise of soft team skills in a online environment. Three examples of online team training and team skills practice are illustrated. These case examples exemplify what is possible with respect to developing knowledge of team dynamics and communications, and accomplishing team project work in an online environment. The paper begins with an online application of teaching team concepts at a distance to mid-career professionals. In describing aspects of the team dynamics module, we highlight the unique value and capabilities of an online learning environment.

The second part of the paper elaborates ideas about online learning and working introduced in the first case example through two additional examples. Case 2 examines the operation and characteristics of a highly successful online project team, and Case 3 presents some collected experiences from MBA-level online learning teams. We then synthesize lessons learned from all three cases. We highlight key benefits gained through structured interaction incorporating solid project management and team development practices—specifically, gaining agreement on how members will work together, assign accountability, manage flexibility, monitor progress, and incorporate social interaction. These, we believe, are the key ingredients for successful online teaming in learning (or any other) environments.

Two key ingredients emphasized throughout the discussion of successful online and distance teaming are technology and trust. We make some summary comments on the impact and role of these two concepts, and conclude with some practical recommendations about managing online learning teams.

Ultimately, we are interested in challenging perceived barriers surrounding the ability of online learning to contribute to soft skill and competency development. It is our view that this method of team development is not only effective in developing competency in soft skills and social interaction, but that online learning may in fact be the superior method. We hope that our evidence of what is possible in an online learning environment provides some specific practical guidance on what it takes to accomplish team development and project work online.

Developing Team Skills Online

In this section of the chapter, we describe an example of a leading-edge team development training program delivered online and at a distance. Our purpose in emphasizing this module is to provide concrete evidence of how one institution provides soft skill training online.

The module described herein is part of an overall package owned by the Canadian Professional Logistics Institute (CPLI), created in response to increasing development needs of the emerging professionals within the logistics field.[1] The CPLI decided to combine face-to-face with online learning methods within their program. Modules delivered online include the topics of team dynamics, integrated logistics networks, and logistics process diagnosis. Modules delivered in a face-to-face format include the topics of leading and managing change, supply chain strategies, ethics, and leadership. The CPLI program blends the different learning methods in a unique way to develop soft and hard

[1] Dr. Hurst worked with a team invited by the CPLI to develop learning modules for their "millennium project," a professional learning program. The invitation was based on her research interests and previous experience in the logistics field. The team dynamics and communications module was developed as a two-part learning program, the first part an individual experience of a virtual reality simulation intended to allow the participant to "learn about" concepts in a simulated team, and the second part an online learning environment via the Internet allowing the participant to "learn how to" participate in a online team with other real participants. The real team sessions are facilitated while students work through and apply concepts. This module is facilitated, evaluated, and revised on an ongoing basis by Dr. Hurst. The experiences described here are used with the permission of the Canadian Professional Logistics Institute.

practical skills and understanding (with a heavier emphasis on soft skills than is typically provided in this field), as well as tacit insight, competence, trust, and confidence in a online collaborative process for learning and working.

We refer here to the team dynamics and communications module that is delivered online. The module materials are quite like those delivered in a face-to-face context. Learners build on insights and ideas taken from Katzenbach and Smith (1999), among others, to develop key success indicators of teams. However, the online delivery method is very different, in that people connect only through information technology and do not meet face-to-face during the module. They do however, meet face-to-face in other modules, usually after they have completed the team dynamics module. The online learning environment allows users to get beyond the significant challenges of cost, time, and risk imposed by more traditional forms of corporate training and university teaching designed to provide experiential learning to employees or students.

This particular module uses technology in two ways to support learning. The module is six weeks in duration, split into two phases. Phase 1 is made up of a stand-alone CD-based virtual reality simulation that each student completes independently. The second phase involves student interaction that is facilitated technologically, through asynchronous and synchronous tools. A human facilitator also working from a distance guides participant interactions by asking questions and making suggestions throughout the module. We explore the value of both the virtual reality simulation and the online team work that follows in providing “teachable moments” from which learning—both tacit and explicit—is derived.

The Team Dynamics and Communications (TDC) Module—Phase 1

The first part of the TDC module has learners engage in experiential individual learning though a simulation containing scenarios of typical team challenges. The learner is expected to interact with simulated team members (filmed scenarios and pre-recorded graphics) on a time-sensitive, critical mission, to gather information, and to experience team and team-relevant issues as they progress through the various scenarios. Overall, the TDC simulation focuses on skills needed for effective team dynamics and "online teaming": team process discussions, role assignments, leadership, conflict resolution, decision making, and planning for goal success. Many of the scenarios crafted were taken from real experiences that highlighted the most salient issues of team development. Information on how different people store information and label organizational stories was used to construct the decision paths in each scene of the scenarios. Cultural ideas around probable failures and interpretations of these failures were used to inform the scripting. The resulting scenarios were dramatic and interesting, and encouraged participation.

The setting for the virtual reality simulation is a remote area where lightning has started a forest fire and damaged a telecommunications tower. The learner enters the online space and becomes part of an emergency response team that has been given the responsibility of repairing the tower. To ensure some team struggle at this stage of learning, participants are required to deal online with the challenges of travel by canoe, arriving, and completing the mission within a set period of time. If the team functions poorly on the tasks and arrives late, the consequence presented is that telecommunications in the area will go down, and firefighters will not be able to prevent the forest fire from approaching a small nearby town. Every decision that learners make is shown to have immediate consequences within the simulated world, and collectively they convey the risk of failure.

Teachable Moments

Although a learner's poor decision or mistake may have only caused the team to lose time on the trip, mistakes create important "teachable moments."[2] Failure on any task is considered to be an opportunity to learn by determining "what went wrong." To facilitate learning at these moments, an online coach pops up within the simulated environment to provide just-in-time positive and negative feedback, depending on the learner's decisions. The learner therefore immediately faces their mistakes, and is able to learn from them in a private and safe environment.

[2] "Teachable moment" is defined as the precise point at which a learner makes a mistake and wants to correct it, or to learn alternative information with which to interpret questions or responses. It is a brief window where the learner is most receptive to new information that is focused, personalized, and in context. Schank (1997) adds to our understanding of the teachable moment by suggesting that, once a learner makes a mistake, they are emotionally aroused. If the error occurs publicly, the individual will close off, as a result of embarrassment; however, if such failure is private, the learner at that moment is most receptive to new information and learning. The teachable moment often begins with a question and has much to do with an individual's personal curiosity (see Bennett, 2000).

It is Schank's (1997) view that real learning occurs only when people are thrown into scenarios in this way. Participants make decisions, solve problems, make mistakes, and have access to an expert as required to answer questions and to give them advice. Because simulations as such are private, Schank believes that learners may be more willing to risk failure and use that experience for learning. By contrast, failure in organizations is more often negatively perceived, a fact that stifles creativity. In a simulation, people can fail privately with dignity rather than being humiliated when failure occurs in a public way. Failure, like having fun and telling stories, is a powerful way to induce emotion and a powerful learning tool.

Emotions coupled with technology can produce a further positive situation. Computers store learning that has occurred, and can retrieve it if similar patterns are observed later on, thus making learning more specific to individual needs. It is our view that learning facilitated by emotional drive and technological tools is very powerful. Underlying this statement is a key assumption that it is through this unique approach that individuals are provided with an opportunity to learn *to do* something extremely relevant to them (rather than simply learning *about* something), making the knowledge gained through experience both explicit and tacit (Schank, 1997; Stewart, 2001).

Scenarios come to life, and require that learners interact with conceptual information built into the scenarios. Different conceptual aspects of team structure, culture, accountability, and politics are woven into the module design. Information is presented sequentially. Scripts were built in a way similar to a child's multiple path story, where the development of the story depends on choices made. Learning becomes customized, allowing participants to spend greater amounts of time dealing with concepts and skills that are more unfamiliar to or challenging for them. Story-telling is incorporated into the simulated environment as a means of relating content and experiences back to the workplace.

Getting Beyond Technological Apprehension

In an initial evaluation of this product, Hurst and Follows (2003) stated that, as participants enter the module for the first time, some learners experience technical challenges. The challenges were related not only to computer incompatibility, but also to the degree to which participants were ready to engage in online learning environments. For many, there appeared to be an initial hesitancy and fear associated with learning in a technologically mediated environment. In the evaluation phase, many related their early experiences with the technology to their later impressions of the module. They found the module to be "fun, challenging . . . an overall good learning experience," but noted that it had been "quite different and a little scary in the beginning." For some, technical problems persisted.

Interestingly, when probed, individuals remained worried that they would fail in a public way, and as a result become embarrassed, because of their unfamiliarity with the technology. This finding highlights the need to do further work in making participants comfortable with the online environment early in the process. The strength of the apprehension around failure prior to entry into the virtual learning environment was very apparent, and provides clear evidence that Schank's (1997) claim about a learner's willingness to take risks and fail privately is of critical importance.

To deal with this learning barrier, further facilitation was introduced before learners used the CD-ROM; the intent was to encourage a greater level of comfort among learners and to minimize any emergent stress. Once the apprehension surrounding technical difficulties was dealt with in this way, the learners' evaluations of their online learning experience became much more positive. One participant noted that, "I thought that the interactive CD was very well put together and a neat way to learn. I know I now have a better understanding of team building, conflict resolution and the importance of communication."

Capturing and Building on the Learning

Learners are asked from time to time to make notes of what they are thinking and feeling about their experiences, so that they can use their insights later, in online discussions. Self-evaluation tools concerned with communication preferences, leadership style, and conflict handling are built into the module to give learners an opportunity to focus on specific issues and to develop, and reflect on, their new skills and competencies. Self-reflective tools are intended to supplement the experience of the simulation through private assessment of personalized feedback. This feedback and record keeping provide learners with input to the second portion of the module, where they engage in a more traditional teamwork simulation with "live" team members, albeit facilitated online and at a distance.

TDC Module—Phase 2

In the second phase of the TDC module, learners enter a synchronous chat environment where weekly synchronous meetings take place. In addition to weekly facilitated meetings, participants are provided with an asynchronous message board for posting documents and questions for review. During the initial chat meeting, smaller teams are formed, and members are encouraged to introduce themselves, discuss their impressions of the CD-ROM experience and their past initial discomfort, and work together to come up with a team name. The new team is then asked to review their experiences of the first phase of the module, and state which aspects they found to be the most important to their learning, and most helpful in forming a new team. Members are encouraged to discuss aspects of team structure, roles, processes, measures of success, accountability, and so on. The new team is also asked to review a chat protocol, provided below, which serves to encourage the participants to discuss conduct expectations and provide additional information based on the team's needs.

Chat Protocol

- Allow each learner to complete his/her thought before responding—this means do not interrupt or intrude with your thought while another is speaking.
- Be patient; not everyone has advanced keyboard skills.
- Avoid having side conversations; it's rude not to pay attention.
- Signal when you've finished a statement [some use a happy face to signal they have completed their input ☺].

- Signal when you don't understand something; use a question mark to get the facilitator's attention.
- Signal your "reactions" by using an exclamation mark (!) for surprise or a sad face for disagreement ☹ or some combination of symbols.
- Do not shout [CAPITALS MEAN THAT YOU ARE SHOUTING].
- Do not leave your computer during a scheduled session; it is impossible to get your attention if you leave the room.
- Officially sign on and off so that everyone knows when you are present.
- Keep statements brief and to the point; the chat box has a limit of 256 characters per statement; you can keep talking but in spurts.
- Prepare notes and key ideas ahead of time so that you can engage in the discussion without trying to figure out how to word your statements. (CPLI, 2000)

Once ground rules and initial discussions have taken place, the team is assigned the task of creating a reverse logistics plan as a followup to their personal work with the CD-ROM in Phase 1. This task provides continuity as well as additional time for social interaction, allowing participants to get to know one another and become comfortable with the facilitated online chat environment. During this initial stage, it is important for participants to establish and re-establish how their conversations would take place, and who would speak, in what order, to ensure full participation in the experience.

To launch the team task, members are presented with a scenario update, and advised that the fire is almost under control, and that the crew will be finished repairing the tower in approximately six hours. The team task is to work together to create a plan to get team members and the used and remaindered supplies back to the point of origin. They are given three possible options to discuss, as well as many contingencies to consider in coming up with a detailed reverse logistics plan. The facilitator emphasizes the importance of consensus decision making for the task, and reminds team members of lessons learned during the first part of the module.

The facilitator also works to introduce new constraints in an effort to surprise the team, and as a way of introducing potentially conflicting ideas to get the team working through the developmental phases experientially as well as intellectually. Additional constraints imposed include changes in the mode of transport, environmental conditions, presence of wildlife, handling and disposing of hazardous goods, and other options to challenge the team and bring out different and creative points of view. The goal in this part of the module is to force differences among team members to the surface, with the hope of inciting conflict so that participants have the opportunity to experience and work through new ideas, skills, and competencies in team dynamics and communications.

The second task assigned is the creation of a team charter template, a tool for governing the team's work and social interaction. This is the core activity for the module. With the permission of previous module students, a sample student team charter is attached in Appendix 8A. As this sample team charter shows, the completed document resembles a checklist or template containing a summary of what the team members believe to be the important issues to be addressed in creating and deploying a new team as quickly and effectively as possible. The document contains ideas on how teams should be formed and structured; how their purpose should be defined; how team culture should be developed; and how the team should collaborate, ensure accountability, measure success, and achieve high performance. Learners are instructed first to respond individually to the questions posed, and then to work in their teams to synthesize the information and create one common document. Individuals attend weekly meetings in the chat room to discuss what should and should not be included in the document. The roles of leader, scribe, and timekeeper are rotated among participants, to allow for skill development. By the time learners are given this assignment, they are very comfortable with the online environment and appear to "forget the lack of face-to face cues" (CPLI participant, 2002, personal communication).

Encouraging Explicit and Tacit Learning

In each offering of the module thus far, learners completing the task spent most of their time discussing team structure and process issues. Interestingly, a parallel of explicit and tacit learning occurs; that is, as team members discuss pertinent team-development issues, participants also appear to experience the same issues. During a more recent offering of the module, a discussion took place around conflict resolution. There was mild disagreement among team members over how conflicts at an impasse should be resolved. While some argued that "trouble makers had the option to leave the team," others stressed that this was not an appropriate option. Their view was that "consensus must occur."

The discussion heated and circled for some time, until the similarities between the topic under discussion and the discussion itself were pointed out. This created a powerful learning moment, combining intellectual and experiential elements. Since participants had already discussed effective listening at length, they were able to recognize the value of the discussion, and moved forward with developing a process they could all live with. The learning opportunity or teachable moment was noted as one in which concepts were both discussed and experienced. The template task provided the opportunity for learners to crystallize their learning in the creation of the document itself, take stock of what they have learned individually and collectively, and consider where such learning could be recreated in future teams beyond the module.

Increasing Trust in Technology, the Process, and Each Other

At the end of the module, participants were feeling quite comfortable with the technologically mediated environment, with one another, and with the facilitator. The participant comfort level increased after the first chat meeting experience. One learner noted that, "I initially found it difficult to converse electronically with ten other people, although I see my children doing it all the time. Once I got the hang of it, it became enjoyable." People commented increasingly on the content of the module as they became more comfortable with the technology, and the use of it became tacit during Phase 2. Team members took control of the work, held additional meetings, assigned tasks to sub-group members, posted longer documents, and so on. Phase 2 activities worked to ground the learner's new skills and knowledge in additional collaborative experiences. Individuals also had an opportunity to discuss their ideas with others in a facilitated environment.

Participants also suggested improvements; for example, they thought that the short introductions at the beginning of Phase 2 to break the ice should be extended, and should perhaps include personal biographies to allow for further confidence building and comfort with the communications medium and each other in social interaction. However, while many learners thought that the initial introductions were too brief, and that it would be helpful for them to be extended, it is interesting to note that when asked to provide those same introductions at the beginning of each module, they seemed guarded and reluctant to give much in the way of personal information. It was only as team members became comfortable with one another that the personal information and humor appeared.

Learners also provided feedback for how to improve team communications during each session. One idea presented was the development of a speakers' order, so that all team members have a chance to contribute fully to the conversation. When used, this approach appeared to improve the team's performance in discussion, decision making, and collaborating in subsequent tasks, and generally improved the team's interactions with one another.

Team adjournment activities asked learners to comment on what they found to be the most positive characteristics of the team experience and each of their team members. Interestingly, during the first pilot offering of the module, team members decided that they did not want to comment on each individual in the way requested, because they did not want to single out individuals—they were a team. They met offline to discuss this issue, and the team as a unit presented their revised version of the exercise to the facilitator. The facilitator was pleased with how "the team took on the issue and discussed it actively" noting that,

> One individual on behalf of the team, suggested that the team wanted to handle the task in a slightly different way and asked first if they could as they had the full agreement of the team. The team came together with a force that night while they displayed excellent consensus decision-making. The activity worked to catalyze the team and pushed them to a higher performance level in terms of their morale and functioning. (CPLI facilitator, 2002, personal communication)

We now take lessons from the online team dynamics and communications module and apply them more broadly to further online teaming experiences. Important aspects of team development experience highlighted include an emphasis on member roles and competencies, such as autonomy, coordination, and collaboration. Here we must note in particular organizational factors, the use of technology, personal management, and interpersonal skills. Organizational factors include networking, knowing the organizational landscape, and maintaining guidelines. The use of technology in online teaming requires knowledge of when to communicate, coordinate, collaborate; of how to communicate effectively; and of communication etiquette. The personal management category includes the ability to prioritize work, set limits, create opportunities for learning and growth, collect and provide feedback, discuss strengths and weaknesses, manage boundaries, and understand cultural perspectives and how these differences can affect perception.

Accomplishing Team Projects Online: Two Further Case Examples

Building from our previous discussion of online team development, we use this section of the chapter to explore and compare the operation of a highly successful online project team and the operation of online learning teams used in an online MBA program.

An *online* team is defined as a group of task-driven individuals who behave as a temporary team, but who may be separated by geographic or temporal space and use network based communication tools to bridge these spaces. By reviewing the experience of these teams, we hope to provide insights into the practices that facilitate collaboration and learning in an online world. Recommendations from these experiences may help others working in the online world or endeavoring to use online learning teams, and so may further develop online team learning programs in a distance education environment.

We explore experience with two different types of online teams: the first is an online research team that conducted a major, practitioner-sponsored research study in three phases over a three-year term; the other is one of the online learning teams used in Athabasca University's MBA program.

Online Research Team—Case 2

The first case study of a real-life online project team provided a way to explore common assumptions and theories. The online team in question participated in a meaningful project under serious resource constraints and within a tight schedule. The project was completed slightly behind schedule and over budget, but to great critical acclaim.

At any one time the project team was composed of between four and eight members. The core team was made up of four members over the course of the first phase. During the second and third phases, only three members participated throughout. All of the core team members were academics and researchers (students). Each team member took the lead on different project tasks; however, one member acted as the formal team lead on contract documents and in the majority of correspondence. The fourth core team member, who joined the team after the project had been initiated and only worked on the first phase of the project, tended to play a lesser role overall. While three of the four core team members actually lived in the same city, the team rarely met in person because of travel and work schedules.

At the end of Phase 1 of the project, the four core team members participated in a series of self- and team-assessments. The instruments used were the Personal Style Inventory (PSI), developed in 1980 by Hogan and Champagne; the Team Effectiveness Profile, developed by Glaser and Glaser (1992); and the Trust Test, developed by Ribble Livove and Russo (1997). The tests were chosen for their simplicity, availability, and potential to provide interesting insights into the operation of the team. They are not represented as the best or most suitable tests. An earlier paper (Delisle, Thomas, Jugdev, & Buckle, 2001) presents the results of the State (behavioral—trust orientation and team process) and Trait (personality) assessments, highlighting the traits and behaviors that contributed to the operation of this creative and successful online project team.

In brief, the team as a whole was relatively balanced, with a slight proclivity towards introverted, sensing, thinking, and judging approaches to the world. All of the members tended to take a judging stance, leading to a potential weakness on the feeling factors. In addition, all four team members had a relatively trusting orientation in general. Finally, team process assessments provided evidence of a highly effective team, approaching synergistic operation. Further discussion of the impacts of these differences and the usefulness of these tools can be found in Delisle et al. (2001).

The team explicitly recognized its activities as a project and engaged in good project management practices. It did not, however, actively engage with teaming literatures.

MBA Online Learning Teams—Case 3

The MBA learning teams were made up from a student population that had an average age of 40 years, and that typically worked full time in middle management roles in a variety of industries and organizations of many different sizes. The students were randomly placed in learning teams at the beginning of each course. Most courses required that the team complete two or three major group assignments (usually based on a Harvard-Business-School-type case assessment) over the eight-week semester. These cases were done in three stages. Two weeks were spent on preparing and analyzing the case situation and providing recommendations in a report format. Then one week was devoted to critiquing another group's case report, and then responding to the critique of one's own case report. In addition, the students engaged in asynchronous text-based discussion of course materials.

In the first class of the MBA program, students were given an orientation to the online technology and to appropriate ways of working in the online environment, and a quick introduction to "best practices" in team development. Typically they were assigned to learning groups with others they had never met before. As the program progressed, there were increasing chances that the teams could include a few members who had worked together before. This situation was a relatively accurate simulation of the work environment individuals faced in modern organizations. More often than not, a team must rapidly come together with individuals who may or may not know one another, and must quickly begin to perform assigned tasks.

Unlike the research team, the students were encouraged to review and adopt good teaming practices early in each and every course. As was the case in the TDC module discussed earlier, online learning groups were assigned at the outset, and were given the task of developing an operating team charter intended to shape the way they would work together. However, this activity was not graded, and was done with varying degrees of competence and intensity by each learning team.

Another key difference from the research team is in the formal application of project management practices to the operations of each learning team. The research team consistently viewed their work as project work; the duration of memberships might vary, but the team was working toward a common completion goal. On the other hand, the MBA teams tended to view their work as process work toward an individual end result (an MBA), rather than work on a specific project. This attitude may be a result of a combination of lack of exposure to project management principles and the nature of the learning environment.

The different contexts experienced by a team working on an assigned project for the sake of the project and a team of students working on a project for grades are quite different. However, in each case, we have noticed important knowledge being transferred through explicit and tacit learning while the team members worked towards their goals. Several practices seemed to facilitate these learning processes. We turn now to a discussion of the practices that we believe support both learning and teaming in an online environment.

Key Practices in Successful Online Teaming

Looking across the two different cases of team experiences and drawing from our earlier discussions on teachable moments and tacit and explicit learning, we saw emerging a number of key attributes associated with the successful use of online teams. It is our view that these key practices include agreement on how teams will work together, assignment of accountability, monitoring of progress, and incorporation of social interaction. We discuss each of these practices with examples from the three cases presented above.

Agreement on How Teams Will Work Together

In the case of the highly successful online research team, there was very little initial discussion of how the team would work together. The three initiating team members were driven overachievers who were highly motivated by the task. All were known to each other. Two had worked on a small project together earlier, and so had already established a certain amount of trust and goodwill. This relationship and common understanding of the importance of meeting goals played a significant part in helping them to form and start working quickly. These team members understood the need to define deadlines and to complete deliverables on time. The common focus on agreed-upon goals and timelines enabled the team members to monitor their own personal goals to ensure alignment with the overall project goals.

The project began with almost impossible deadlines from the beginning. Whereas this reality could be a recipe for failure on any team, in this case, the common threat allowed the team to come together quickly, and was the catalyst for many spin-off projects. As the project careened towards its first "drop dead deadline" about two weeks after the project started, tempers frayed and workloads were heavy. Once the first deadline was met, there was a one-month period in which the team waited to see if the proposal would be accepted. During this time, the group sent numerous e-mails sharing their situations and discussing their goals, objectives, and personal commitments for the period ahead.

By the time the proposal was accepted, the team had a much clearer idea of each member's individual commitments, and about how difficult it would be to get this project successfully completed. One team member was working 80 hours a week on a high-pressure professional job. Another had a two-month-old baby, two other children, a full time job, and a thesis to finish, in addition to this project. The third was half way through a Ph.D. project and had a faltering marriage. They discussed how they would meet the upcoming deadlines, and who would take the lead on which tasks. Sharing issues, life experiences, and challenges allowed the team to feel a greater sense of cohesion and cooperation, and ultimately to jump in and help each other out when necessary.

Slowly, and in an emerging rather than conscious fashion, an agreement on how the team would work solidified. It was never written down or formally agreed upon, but it seemed to involve the principles noted below.

1. The deadlines must be met. This project was important to all.
2. Whoever was best able to lead on a particular task would do so.
3. Each member would contribute 150% to this project, and endeavor not to let the other team members down.
4. Team members would raise a flag (let others know about tasks not likely to get done on time).
5. Team members would pitch in to complete work as needed.

It seemed clear that this team would never have been able to make the progress they did if they had not had this one-month breathing space to work out how they would work together. They learned these lessons experientially, by being thrown into the process, and the result was fortunately positive. If this team had clearly applied team-building approaches to their own work prior to commencement, rather than after the first deadline, they may have been able to tackle this task explicitly and incorporate some "best practices" earlier, and avoided some angst later on. Whatever the case, what is highlighted here is once again the unique marriage of explicit and tacit learning about team process. The team learned the importance of dealing with social interaction issues and ground rules for working together as they stormed through their first real process issues, realizing the teachable moment.

Experience with MBA project teams suggests, however, that explicit teaming might not have helped. Students in every offering of the project management course are encouraged to develop a formal team charter before starting to work on the learning exercise. Some individuals and some teams do take this task seriously, and tease out the details of how they will work together before beginning work, but most do not appear to think this task important until after problems begin. The tight timelines and task-driven individuals push the teams into action, much as in the case of the research team introduced above. When conflicts begin to brew or issues around collaboration become important, charters are worked out on the fly, during the course of the first team assignment. Some teams must call a halt and revisit this exercise before they can make any progress on the projects; others fail completely on the first task before they recognize the need for and value of this process element.

The importance of this part of team process appears to be learned explicitly, but as highlighted by the case examples, does not become “real” until conflicts occur within the process and the team acquires knowledge experientially. It seems that once the importance of the charter becomes clear and the gap between theory and practice obvious, the teachable moment can occur. In some teams, this moment may be lost; however, it appears that in the experience of each online team, it was not. Within the learning module, the facilitator was able to use the moment to pull out or convey some important information. Within both actual teams, the team members were able to go back to information provided, recognize the source of difficulty, and move on to develop a charter.

In our view, it is what occurs in the gap between failure and the recognized need for additional information or work in order to deal with the failure that builds capability. This is where we believe online development products are most powerful. However, what is also clear about this gap experience is that trust in technology, trust in process, and trust between individuals are critical factors.

Team charters and chat protocols are some of the tangible tools that force teams to explore these issues in advance. Incorporating these products into any online teaming experience is likely to improve the ability of the team members to work together.

Assignment of Accountability and Building in Flexibility

A definition of roles and responsibilities is often identified as a fundamental part of high performing teams. In traditional team literature, the need for clearly defined roles is fairly well recognized. It is believed that it is absolutely essential that everyone clearly know who is doing what—particularly in online teams where you may not be able to observe what others are working on. At the same time, online teams require a certain amount of flexibility to get the most out of their members. If one member of a online team has a time differential that is advantageous, it only makes sense for that person to take responsibility for certain tasks, even though someone else may be accountable for them.

Sometimes, given the asynchronous nature of much online teaming, this necessity can cause problems.

Lipnack and Stamps (1997) suggested that in online teams, team roles defy definition, because online teams focus on achieving tasks in a fluid and flexible manner. It is also recognized that shifts in leadership can drive changes in team members' roles. In online teams, leadership moves from one group member to another, from one geographic or temporal site to another, or both (Miller, Pons, & Naude, 1996). In many cases, more than one team member possesses information vital to the team's functioning and well being, and as a result will accept leadership status assigned by the team. Team members are often willing to step into and out of the leadership role without fear of stepping on one another's toes. Although there remain paradoxes in terms of power sharing and role shifting, Gristock (1997) and Palmer and Johnson (1996) point out that online teams can experience simultaneous benefits of vertical and lateral communication without reorganizing physically.

Clearly, roles and leadership are not as clearly defined in the online environment as in the "real" world. The literature suggests that the need for boundary spanning and communication may intensify as roles and objectives become more ambiguous (Eccles & Crane, 1987; Weick, 1982). Furthermore, the amount of border spanning may vary over time, influencing communication patterns and the ability to shift roles easily (Burt, 1993; Weick, 1982; White et al., 1976). This ambiguity can be quite uncom-fortable for those used to working within traditional, rules-based organizations. Research suggests that teams that have met or have first established face-to-face relationships appear to form bonds more easily and to be more comfortable shifting roles (Walther, 1996). This finding suggests the need for some form of kick-off for each online team—face-to-face may be superior, but voice and online also work, as evidenced by the research team and the online learning teams.

Sometimes the trick is simply to assign an initial responsibility, and then trade it off as necessary. This was certainly the case in the online research team. Tasks were initially accepted or assigned to an individual based on availability or inclination. If there was some reason that deadlines could not be met, the tasks were shared out again. Careful records were always kept on who was doing what, and when. This kind of tracking allowed for the development of more ambiguous roles among members and for the sharing of responsibility, while maintaining accountability for deliverables.

In the MBA teams, we see good use of role assignment in the beginning of most courses. Every one signs up for a particular task. Where it sometimes falls down is when an individual is assigned a task for which they are not suited, or when circumstances make it difficult for that individual to fulfill the assigned role. Many people do not adapt well to the fluid nature of work that is characteristic of asynchronous online teams. Because we are not necessarily doing work at the same time of the same day, it is important that people volunteer when they see that someone needs help, and that they speak up when they are in that position. For people used to doing their own jobs and letting someone else worry about the big picture, this can be a difficult skill to master.

Teams that quickly come together and share details of their personal schedules, why they are only available at certain times, and when they may not be available, tend to work better. In the online research team, one member could only work on the project before 8:30 am or between 7 pm and about 9 pm, because of work commitments. Another tended to be a night owl, getting productive between 10 and 4. The third and fourth members tended to have more flexible daytime schedules. Thus, if one member could only work until 8:30 and couldn't finish the task, it only made sense for someone with time during the day to take the next cut at it, then the first could look at it again after dinner, and the next after 10 pm.

The balance between accountability and flexibility introduces an ambiguity into the working relationship that many find difficult to deal with. Can I count on you or not? Do I need to monitor you or not? If I don't, how do I know when to help out? To make the process work, individuals must engage in self-monitoring, team process monitoring, and proactive commitment to the work of learning. Individuals whose sole goal is completion of the course or project task are the least likely to be able to engage in this type of behavior, and the most likely to exhibit free rider tendencies. It is the commitment to the project, or the learning, or the individuals that fosters a team member's ability to deal with the ambiguity of shifting roles and responsibilities. Without this commitment, and trust, the team will not be able to balance accountability with flexibility to get to synergy.

Monitoring Progress

The research team used minutes, e-mail and conference calls, and deadlines to monitor task progress. Weekly conference calls were boisterous, friendly events that each member looked forward to. While this team rarely met face-to-face to hold each another accountable for the many decisions, promises, and activities each member took on, each individual's personal urgency and commitment to come through on the commitments they made, and to "cross another item off" their weekly list of deliverables, kept the team moving forward. When commitments could not be met, team members openly admitted the reason behind their lateness, and took steps to complete the task or accepted another's help to do so.

In the weekly conference calls, the team met for one hour once a week. The first five minutes of any conference call were devoted to catching up on "social history." Roughly 45 minutes were reserved for detailed discussion of upcoming deliverables and the status on outstanding tasks. Team members took turns chairing these meetings. The last 10 minutes of each meeting were used to report on important external commitments of the team members (thesis progress, work promotions, baby's first steps, etc.) and their personal stress levels.

The conference calls tended to be exuberant, extroverted activities. The high introversion score seemed to be a puzzle to the team members. While they all knew themselves to be quite introverted, they marvelled at the extroverted nature of their interactions both in e-mail and in conversation. One member stated, "although we have three introverts, you'd never know it from our interactions. Feeling comfortable, trusting and sharing with each other brings out the E in us" (Delisle et al., 2001). The conference calls allowed the team to stay on top of three critical elements of progress—social activities, project activities, and external activities—each of which added an important component to the interaction. Shared goals and open communication around objectives and limitations, combined with trust in future reciprocity for current efforts, made the team trust level expand.

In addition, the project team submitted monthly status reports on project activity and accomplishments to the funding sponsor. This formal requirement forced the research team to take stock on a regular basis of accomplishments and outstanding tasks. The "taking stock" activities encouraged accountability and the meeting of deadlines. It also provided a formal arena for tackling outstanding issues and raising concerns to be dealt with by all major stakeholders in the project.

The MBA teams worked on much shorter timelines, measured in weeks versus years. Their use of status reporting seemed to be much lower. Some teams did status checks during the course of the project, but most tended to set a plan and then try to work to it. As in any project, this is where many of the problems come in, as the team fails to manage the ambiguous and changing nature of the work environment.

In the Team Development Module, the regularly scheduled weekly "chats" served a similar structuring function as the monthly status reports and weekly conference calls used by the research team. The requirement to engage at one time with all members of the team, and to be ready to make good use of this time served as to facilitate some regular progress monitoring and progress checking.

Competing demands, and disparities in team member commitment and what each member desired as a team outcome ("pass" vs. "A"), combined and trapped many of the learning teams. However, competing demands are no different in the working world. The resolution as always rested with open communication of goals and expectations, and then with working around each individual's peculiar demands and interests. Status reporting and regular discussions of process and feedback appeared to be catalysts for this type of sharing, and for getting the important issues addressed on a timely basis.

Incorporation of Social Interaction

In general, the social interaction on the research team occurred sometimes by e-mail, sometimes in person, and most times by conference calls. They tended to be boisterous times, filled with laughter that all members appeared to highly value. Conference calls often acted as a welcome counterbalance to the pressure on the group to meet stakeholder expectations, deliver results on time and on budget, and work through the many obstacles that emerged. It created a supportive camaraderie that also helped members manage their own substantial professional workloads above and beyond the online project activities (Delisle et al., 2001).

Hartman (2000) suggested that "fun" on projects is a substantial motivator, and contributes to a culture where work is accomplished without the same level of burnout as in other environments. In general, there were three things that the research team did explicitly to ensure that the project was "fun" for all involved.

1. Celebrate success: The beginning of each conference call always included kudos to anyone having completed a task or reaching some other milestone. E-cards were used judiciously to celebrate any success or other event. Each status report always started with accomplishments for the period even when the more critical part was the concerns or issues that needed to be addressed.
2. Plan for interaction: Some of the project's limited funds were set aside to support celebratory dinners or events when all the parties could be found in the same locale. One research conference a year was funded for the entire team to meet face to face. This "face time" provided a lot of lingering benefits in keeping the team motivated and onside for the more "tedious grind" parts of the work.
3. Communicate about other than project activities: The research team regularly made an effort to catch up on "social" aspects of the various team members' lives. Knowing how the rest of the individual's life was going provided good insight into what you could be expected to do on the project tasks, and where others might be able to help out. It also allowed trust to grow on a number of levels. It is one thing to trust someone's competence; it is quite another to care about that individual and to trust that they will care about you.

Admittedly, the second of the above goals is difficult to accomplish, or to imagine as developing in an online learning environment. However, it is surprising how innovative students can be when given the opportunity. Since its inception, the Athabasca University MBA program has provided a non-graded workspace for students to use as they wish. It is thought of as akin to the online water cooler or coffee house. It provides MBA students with room to get to know each other away from the pressure cooker of the team project workspace. Although the space is used to varying degrees, it works most effectively as a way of enhancing the learning environment. One student has very successfully run "Joe's" bar in the roundtable workspace of every course, much to the delight of his fellow students and of academics. Sharing jokes, humor, frustration, births, deaths, and other life occurrences in these informal settings truly allows the students to get to know each other in ways that they would normally do over a cup of coffee or mug of beer outside of class time.

A variation of this phenomenon also began to occur in each offering of the team development module. Participants appear to regret the completion of the module, insofar as it means losing access to the rich social interaction they experienced with their new team. We found that adjournment ceremonies and behaviors online and in the synchronous and asynchronous environments were quite similar to those experienced in the adjournment phase of a face-to-face team. MBA students often exhibit withdrawal at the end of the program in a similar fashion. The research team experienced similar "mourning" at the end of the project, as the unique circumstances of the project drove a fiercely supportive and productive working relationship that has been difficult to replicate after completion.

Furthermore, research on the effectiveness or contribution of these technologically enhanced "social" realms to the learning activity is needed. It would be interesting to see if the number of entries in the various learning programs and actual teams correlate with grades, or entries in the course work or case work, or student satisfaction, or other measures defined as team success.

Cross-cutting Themes

Across all the online team experiences highlighted in this chapter, we note three important cross-cutting themes with respect to using teams and teaching about teams in an online context. The first theme deals with the use of technology in enabling online teaming. The second has to do with the impression that trust in the technology, the process, and the people is a prerequisite to both the learning and the functioning of the teams. Finally, developing a supportive culture through instilling beliefs, values, and processes that facilitate open communication, support, and trust is important in realizing learning and teaming in this environment. Each of these themes is briefly explored in closing.

Technology as Enabler

Technology plays two important roles in the online learning or teaming experience.

1. Apprehension and preconceived notions about technology-mediated discussion caused problems in getting teams started, as evidenced in the team module and reaffirmed in every run of the MBA courses.
2. Technology failure in online teams could be

a. a convenient excuse: "I didn't get that note"; "I couldn't participate in the teamwork because my computer hard drive crashed."

b. a significant frustration. In an eight-week course, having your hard drive go can take you down for a significant portion of the course, and make it very difficult to carry your end of the team commitment.

The Role of Trust

With respect to trust, there is one further distinction that we would like to raise between online and traditional teams. This distinction lies in the nature of the situational awareness. It has been suggested that online teams function on an intentional awareness, because only specific characteristics of suitable resources or providers may be known (Chen, 1997). Situational awareness for online teams is contrasted to the extensional awareness more likely in face-to-face teams, where the specific resources or providers are known. This different kind of awareness of the resources plays a big role in how the team becomes an entity, as well as in how it will weave together its skills sets, and in the process build trust.

It is our view that the level of trust among participants (perhaps from having members who had worked on other teams together, or from a shared level of trust in the experience through the culture of the program, or as a result of trust in the coach) determines how well people work together and how seriously the charter is taken. It is clear to the team members of the online research team that they would have been hard pressed to continue working together if they did not have a strong desire to do so, and trust in the other team member's abilities. Thus trust in competence, contract, commitment (Reina & Reina, 1999), and character (Marshall, 2000) all play a significant role in the initial stages of online team development.

Weick (1996) suggests that people organize cooperatively on teams in order to learn and complete their work. There is a continuous mix of agency and communion that creates a shared reciprocity between individuals and that benefits both learning and team function. However, as highlighted in this chapter, trust is required for meaningful cooperation, and is often missing in the early stages of relationship building.

The development of trust in online teams is not nor can it be a quick and easy task. There is a need to look behind apprehension and fear to listen to and capture an individual's heart before trust can follow. There is an interesting paradox when considering trust. On the one hand, we see that a team must be productive quickly, and that individuals need to trust and to be trusted within the team. But on the other hand, few people on teams or in any relationship will trust immediately. Team members thrown together will more likely distrust the motives of others at the outset. This human truth has implications for development, early sharing of personal information, and hence, charter development, as found in our three cases. The cases also highlight the distance people will go when they do trust, and how reluctant they are to let go of team members once a trusting relationship is in place. Social interaction and trust therefore are key in any team and learning process. Once team members trust, they are more likely to make their tacit knowledge explicit, transform explicit knowledge into tacit knowledge, and in the process, enlarge overall understanding.

We obviously need to know more about how to discern trust levels early, and about what we can do to build them rapidly. Examples of factors that heavily weight our decisions to trust other people include the degree of leeway or freedom to act without controls in place, the level of benevolence, the evidence of openness, and the degree of risk taking. When a high level of trust exists, fewer rules or controls appear necessary. Obviously, trust is a tricky concept and a necessary consideration in online teaming. If we can invoke a culture and process that encourages rapid development of such assessments, we should be able to encourage rapid trust building which can only facilitate our learning and teaming processes.

The Importance of Learning and Teaming Culture

Another point highlighted by our discussion of trust, trust building, and implications for team performance is how we might create or transform a culture to allow meaningful, trusting relationships to develop. Marshall (2000, p. 66) states that

> to create a truly customer-driven, team-based, and trust-centered organization . . . would require a fundamental change in the organization system . . . new technologies would not fix it . . . training programs [alone] could not make it happen . . . restructuring into teams by itself would not meet the need.

Instead, transforming a business requires that we transform the way work is accomplished and the culture within which it occurs. A new approach would be relationship based, and would support an agreement or covenant between management and others, spelling out understandings of trade-offs between risk, skill, labor, and rewards, and delineating the way people will treat each other. The covenant would frame character, quality, and integrity in the work relationship, and would reflect underlying beliefs about human nature, drivers of the business, and how management and other actors in the workplace will change.

Project management practices may provide tools for developing a culture of trust, accountability, and transparency conducive to rapid trust development. The importance of establishing a team charter early on to focus the team is only one example of the importance of engineering the culture of teams. The establishment of the team charter and acknowledgement of culture was shown to be important in our three cases, as in each case, team members ignored this fact until faced with situations of conflict.

Conclusion

This chapter sheds light on some of the controversies associated with teaching teaming and using online teaming in distance education programs by providing some insights into the operations of a team-building distance simulation, a successful online project team, and the use of teams in a distance-based MBA program. Our experience in these and other online team teaching and working situations convince us that these skills are teachable and transferable in a online world.

In multiple runs of the team-learning module, we have found the virtual reality simulation to be a very effective way to introduce the concepts of teamwork. Followed up with teamwork in an online facilitated setting, it appears to be developing understanding and soft skills in this new online environment.

Over the nearly ten-year history of the distance MBA programs at Athabasca University, and particularly within the project management course, we have witnessed similar results. Our students develop not only an explicit understanding of online team dynamics, but also tacit skills in making it happen. One of the primary skills developed in traditional MBA programs is networking and oral presentation of information. In our program, we work on these skills too, but the main skills our students develop as a result of the program are the ability to share information, insights, and criticism over the Web, and to build and work very effectively on online teams.

The biggest problem in any team undertaking is the assumption that you can put people together to work on a task, and they will automatically become a team and know how to work together. This assumption is equally false in both the face-to-face and the online team contexts. In the online world, it may be even easier to ignore the human process side of team work in the absence of physical clues revealing the psychic health (or lack of) of the team. The trick is to put the effort into the process side of teaming and teaching, even when it is less visible than in the face-to-face environment. We reiterate, however, that it can and must be done.

Project team learning in an online world has become a fact of life at work and in our education settings. The experience from the three cases presented provides some suggestions for how to approach this activity in a learning or work setting.

Recommendations

Effective teamwork requires continual monitoring and assessment. Effective teaching does the same. The recommendations given below may facilitate online teaming and learning endeavors.

- Work hard in the beginning to develop a trusting environment. Without it nothing will work. Trust builds as relationships build in online teaming, and therefore must be present in online team development.
- Expect shifting of roles and leadership. Sometimes the teacher will be the taught and the leader must learn to follow.
- Employ as many forms of interaction as possible in the initial phases of the collaboration. If possible, face-to-face is probably the ideal way to kick off. However, most of us do not have this luxury, and there is growing evidence about and experience with online kick-offs, such as the learning module discussed above.
- Open communication is critical to any team endeavor. Determining how to encourage it in your particular online world is your most critical task.
- Employ good project management practices. Agree how you will work together. Plan the work. Assign responsibility. Monitor progress. Celebrate success.

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Appendix 8A: Example of CPLI Student Team Charter

Model adapted from
Aranda, E. K., Aranda, L. & Conlon, K. (1998) and
Katzenbach, J. R., & Smith, D. K. (1999)

TEAM CHARTER

Team Dynamics & Communication
Canadian Professional Logistics Institute Module
October 2003

Structure

Membership

- For the purpose of voting the team membership should consist of an odd number of members (suggest 5 or 7 members).
- Members should be chosen from the various key departments within the company (Upper Management, Logistics, Finance, Information Technology, Engineering, Research and Development, Sales and Marketing, etc.).
- Members should have unique roles on the team to avoid duplication of effort and responsibility.

Skill Mix

- Members should represent experts in their field from the various key departments within the company (Upper Management, Logistics, Finance, Information Technology, Engineering, Research and Development, Sales and Marketing, etc.).
- Members should have the skills, experience, and authority to make necessary decisions, supply answers and provide direction in time of crisis.
- All team members should have excellent leadership, communication, and listening skills.

- Outside skilled support people and/or agencies should be added and included as needed during the crisis/disaster. Examples of support people and agencies are Fire Department, Forestry Department, Medical Agencies, Police, Military, Environmental Agencies, others as required.

Purpose

- Provide emergency services in the event of all natural disasters.
- Function analytically and provide alternative options for all emergencies.
- Provide support to those on the front line, execute thoroughly, safely, and quickly.

Assumptions

- Do not assume roles of responsibility. Define a roadmap of the team's objectives and goals and each team member's role/ responsibility.
- Clearly set guidelines on how we will conduct and display our disagreements and that no decision is made unless the team agrees (consensus of course).
- Clarify assumptions about teamwork—how they might interfere and why it is important to clarify in a team's structure. I.e. Dept. "X" contact Police, Fire, and Ambulance. Dept. "Y" contacts . . . Dept. "W" coordinates . . .
- Recognize people will panic and thinking irrationally. Have panic plan in place for various disasters.
- Assume the worst scenario and develop an action plan for the most obvious change. I.e. Weather conditions.

Key Success Measures

- Take the necessary time to respond to tasks. Do not rush a decision.
- Take measures to avoid a disaster.
- Establish a reaction time based on nature of disaster.
- Ensure teams know what, when, who, where and why in a disaster. They know their place.

- Ensure all teams prioritize their time and are available to react to a disaster.
- Regular progress assessments should be maintained by the lead for that disaster.
- A follow-up meeting or meetings will be established by the lead for that disaster as required.
- During disaster situation try to avoid causing any disruption to day-to-day operations as much as possible. Avoidance of down time.
- There should always be a focus on avoiding any unnecessary risk of injury or casualties.
- A situational report and structure shall be established by the lead for that disaster.
- A measurable reaction time to a disaster should be established.
- A monthly report will include test scenarios by activity and specific disaster.
- A monthly communication shall be distributed to each team for up to date information and events.
- Ultimately no casualties.
- KPI's (Key Performance Indicators)
    - Reaction time
    - Teams in place
    - Available for action
    - No down time

R & D Process

- Emergency Response Training for all areas to better understand the nature of each disaster and action steps.
- Team leads will be established according to the nature of the disaster.
- A measurable response time to each disaster shall be established.
- A disaster may require the use of more than one leader depending on the nature of the disaster.

- A defined set of responsibilities and hand off procedures shall be established according to the disaster.
- Define the gaps within team members and arrange for appropriate training.
- Visit and revisit purpose as team runs into challenges.

Leadership

- Team leads will be established according to the nature of the disaster.
- A disaster may require the use of more than one leader depending on the nature of the disaster.
- A defined set of responsibilities and hand off procedures shall be established according to the disaster for each leader.
- Across function/department, interaction and collaborative work ethic shall be established.
- A leader shall establish a follow-up meeting or meetings for the specific disaster as required.
- A leader shall empower members of his team or other teams in an effort to resolve a disaster.
- Monthly meetings shall be held with leaders in each department.
- Establish skills and abilities of each team member and identify the gaps. I.e.:
    - stress levels
    - collaboration skills
    - problem solving skills
    - decision-making skills
    - communication effectiveness
- Maximize on individual expertise.
- Empower and encourage team member to take leadership roles, particularly if their styles of communication are different.
- Rotating leadership roles according to the demands of the situation can help spread the load and enhance innovation.

Process

Ground Rule & Actions

- Turn off all cell phones prior to start of meeting.
- Respect the other members of the meeting, do not interrupt, & listen to what they have to say.
- Participate in the discussion.
- Have an agenda & be prepared to deal with topics.
- Have predetermined roles for members, (i.e. Chair, Minutes, etc.).
- Before meeting is over, take 10-15 mins. to review session so that all know what is expected.
- No one person has blame for failure & no one person has praise for completion. One for all, & all for one.
- When good & productive ideas are offered, mold & praise the person so that you build favorable responses in the future.
- During meetings, a section, or block of time needs to be set aside for round table discussions, each member have the opportunity to say or not to say anything.
- Regular training/re-training for all members of the team. Set an amount of time between evaluations and all members need to stick and abide by the timeline.
- Have "Night's off" outings. The team goes out for dinner/drinks to build trust & faith in one another.
- If a certain member's ideas are implemented, recognize that (i.e. Publications, Report, etc.).
- Regular reviews by co-members:
    - Learn from mistakes
    - Learn to take criticism
    - Builds trust
- Start meetings off with 5 mins of new idea session after minutes from last meeting are read.

- The roles of the team will have to be determined by members' strengths and weaknesses.
- The Chair & Minute taker should remain the same but an incident leader should be identified and it needs to be based on their strengths for the issue (i.e. Fire Marshal for a fire, etc.).
- Set-up times frames for meetings and training.
- Set-up what type of meetings need to happen, face to face or conference calls, weekend retreats?
- Set-up time frame and outline of meetings.

Managing Meetings Effectively

- Before meetings, an agenda is sent out to the members for review.
- Come prepared & ready to discuss the topics.
- 1st 5-10 mins should be a review of the previous meeting's minutes and then another 5-10 mins should be a round table of "New Ideas," opportunity for everyone to bring new ideas forward for the group to evaluate.
- Egos will be left at the front door before you walk into the meeting.
- Listen and respect one another.
- Do not interrupt other members when he/she is talking.
- Ideas are all thrown out onto the table and group evaluates all ideas, prioritize them if necessary, and discuss pros/cons. This is done through discussions by all to build consensus and if that cannot be completed a vote will be in order with majority ruling.
- Meetings must be kept to the order and period set out in the ground rules.

Understanding Skills and Needs [personal and group]

Constructive feedback

- Team members must have an open mind and be open to other's opinions and be open to changing their mind.
- Acknowledge need for feedback.

- Contract for the feedback.
- Know when to give feedback.
- Understand the context.
- Focus on the needs of the receiver.
- Must always show respect.
- Thinking must be proactive.
- Good listening skills are critical.
- Always be looking for opportunities for improvement.
- No laughing at others when they are speaking.
- Create a supportive environment.
- Remember the goal is important when giving feedback.
- The end state is what matters, not individualism.
- Restrict feedback to things known for certain and things that can be changed.

When providing feedback to other team members, the Constructive feedback model is to be applied.

- Ask for permission to speak.
- Check your perception of what the person is trying to communicate.
- Interpret the data provided.
- Check if your own interpretation is correct.
- Express your own feelings.
- Express your own intentions.
- Suggest actions to bring the situation to resolution or problem into focus.

This model can also be applied when dealing with conflict. When providing feedback, team members should:

- Not try to evaluate the other person.
- Describe.

- Not use labels.
- Speak for your own self, use “I” rather than “you.”
- Phrase the issue as a statement, not a question.
- Not exaggerate the statement of the facts and issues.

Active listening

- Listen to an entire point before commenting or interrupting.
- Listen with interest.
- Be in the moment, do not start thinking about your answer before speaker has finished.
- Allow everyone to fully present their views.
- Allow the person to finish before airing out our thoughts.
- Ensure the point has been completed and understood before moving on.
- Listeners must remember that no thought or idea is a bad one and should be considered.
- Understanding is more than listening.
- Use the words like "What I hear you saying is" when appropriate.
- Speaker should check for understanding.
- Poll each team member on the topic when needed.
- Ask someone from the group to summarize to ensure a group understanding is at hand.
- Ask for clarification if unsure.

Conflict resolution (ten rules for crowd control)

- Everyone is Equal (titles are left at the door).
- One Speaker at a time.
- One Subject at a time.
- Use Sentences.
- Binary: Yes or No (no gray areas).

- Unanimous agreement.
- Do not duck it (tackle tough issues and problems).
- No Speeches.
- Ideas, thoughts, positions, are important. Spelling and grammar will be corrected later.
- No interruptions (if someone leaves the session, they agree that they will abide by the conclusions reached by the team).

Consensus building

All team members must understand the decision, accept it, and can explain why the decided choice is the best. Requirements to do this are as follows:

- Time (dedicated to discussion and decision-making).
- Active participation of all team members.
- Active listening.
- Conflict resolution.
- Facilitation skills.
- Creative and open-mind thinking.
- Emphasize the positives.
- Find out how serious the negative are.
- Keep summing up the areas of agreement.
- Commit to action.
- Encourage all participants to have a full say.

Handling change

Two biggest mistakes people make when confronted with change are:

- Being a victim.
- Trying to control the uncontrollable.

Dealing with change involves

- Understanding individuals' fears.

- Understand reasons for resistance.
- Leaders must have a clear direction.
- Explain what is going to affect people.
- Adequate training

One of the biggest mistakes that are made in trying to introduce change is not understanding the reasons for resistance. What people don't realize when introducing change and communing up against resistance is the following:

People do not resist change, they resist being changed . . .

Culture

Building Trust

- By communicating your strengths and weaknesses in the work place to the group, people can find way to relate to the other members. Open communication should always be encouraged and welcomed regardless of the nature of the news. Members should maintain consistency—"walk the talk." You must prove your competencies by always doing your part of the work when you say you are going to do it. Remaining positive throughout this entire process will also help to grow the trust within the group.

Team Rituals

- Developing team rituals are important as it motivates the team to be the best that it can be. One ritual would be to acknowledge the accomplishments of the team. There is no greater satisfaction (not even money!) than recognition amongst your peers. Each team should brainstorm to develop their own rituals—as this will give commonality to the group and its members and spark enthusiasm in doing the job!

Diversity and Creativity

- Partnerships built on mutual empowerment and unconditional support ensures that diverse perspectives, ideas, and experiences are included. Optimizing diversity is extremely effective for increasing collaboration, performance, creativity, learning, and teaching. Optimizing each team member's uniqueness brings the power of diversity into your team.

Politics

People and Behaviour

- All members expected to be open minded to other's opinions.
- Challenge each other, but with respect.
- Support team atmosphere, "one for all and all for one."
- Majority rules.
- Have non-directed discussions so people can open up, get to know each other.
- Moreover, understand everyone's values and different perspectives.
- Evaluate the mix of team members to determine skills and competencies for problem solving and decision-making.

People demonstrate four distinctive behavioral styles. Listed below is a summary of each and the "Do's and Don'ts" on how to effectively manage and prepare you for such styles.

- With a *driver*, you need to be brief, specific and to the point. Don't chitchat. Come prepared to the meeting, plan your presentation to present facts clearly, ask specific "what" questions, if you disagree, take issue with facts not the person. You finish your business move along quickly. Don't waste their time, ramble on, leave loopholes, appear disorganized, messy, speculate wildly, direct or order them around.
- With an *expressive*, you must support their hopes, dreams, intentions, leave time for socializing, talk about goals and what is stimulating, deal with the big picture, ask for opinions and

ideas, offer special deals, extras and incentives. Do not try to legislate, be cold, aloof or tight-lipped, leave things hanging in the air, dream with them if time is of the essence, talk down to them, be dogmatic.

- With *amiables*, you must start with some personal comment to break the ice, show sincere interest in them as people, find areas of commonality, listen and be responsive, be non-threatening, casual, and informal, define individual contributions, provide back-up support. Don't rush headlong into business, stick to business constantly, debate about facts and figures, be patronizing, offer assurances you can't live up to.
- With *analyticals*, prepare your information in advance, be direct, stick to your knitting, present specifics and do what you say you will do, follow through if you agree, be accurate, realistic, provide tangible practical evidence. Try not to be disorganized, casual, informal, loud, fail to follow through, waste time, provide personal incentives, threaten, cajole, wheedle, coax, whine, or be manipulative.

Motivating Contributions

- "Bright Ideas Award" incentive program. If implemented, cash bonus payout.
- Team Recognition Program in the way of a plaque for all company associates to view.
- Newsletter updates on team's progress and assignments, acknowledging outstanding performers/heroes etc.
- Mutual accountability for success.

Task Allocations

- Appointed and unchangeable initiator, who will call on experts as required, i.e. Director or President.
- Depending on the emergency/disaster SME's will be appointed from all units with the most experience to lead the team
- Rotation of SME's will also be necessary depending on the emergency/disaster

Moreover, their skill sets.

- Whoever's department the emergency effects the most, will assume a "leadership role" in assisting the SME in assigning tasks.

Accountability

Measuring Effectiveness

- Establish period for first line response team to call each other. From first call of an emergency, the first line team has 30 minutes in which to contact all of the rest on their ERP team. All contact names and numbers, home, work and cell are to be documented. First line team then determines which department will respond. First line team determines if outside emergency personnel need to be notified. This could be fire police ambulance or military.
- The second line or departmental ERP team then steps into their action plan. Clear timelines are set out. They then have 30 minutes to be sure all of their team is on board and ready to roll out action plan.
- Depending on the emergency clear steps are set out to follow. Each phase will have a period established. A full ERP response plan will have an overall period. Example; In 24 hours all steps in the departmental ERP plan will have been implemented.
- All ERP plans will have periods. Examples would be:
  - All computers are down IT has 1 hour to have all main frames up and Running
  - Bad product has been shipped into the market place-all product must be off shelves in North America in 48 hours.
  - The team must be fully packed and assembled and at a specific location ready to go at 0800 for dispatch to the Tower Fire.

Rewarding Success

- KPI are set up on individual performance plans. It is part of a bonus calculation.

- The whole team depends on each other to complete the ERP plan and in turn achieve their individual goals.
- If the team pulls together and successfully completes the ERP plan in the period specified the success is measured.

See attached performance document.

Team TOP Group Management Evaluation 2004

Annual Base Salary	$0
Percentage of salary possible to be earned	10%
Total $ Possible	$

Name:

Date:

Position:

Performance Measure	Weighting % of total $	Payout Potential	Actual Achievement
1) Be part of a highly effective ERP Team Having achieved 100% on time ERP roll out	10%		
2) Other goals listed			
3) "			
4) "			
5) "			

October, 2003.

CHAPTER 9

COPYRIGHT ISSUES IN ONLINE COURSES: A MOMENT IN TIME

Lori-Ann Claerhout
Athabasca University

Introduction

Copyright, in Canada and throughout the modern technological world, is now in a state of flux. Since its promulgation in 1924, the *Canadian Copyright Act* has survived many new technological advances: the photocopier, radio and television broadcasting, audio- and video-recording equipment, and the advent of mainframe and personal computers. Now, further technological advances in telecommunication, such as the Internet, are stressing the Act to its fullest capacity. As they embrace new electronic technologies, online educators are in a position to lead advances in copyright law. Through involvement in Canada's copyright consultation process, online educators are already setting the stage for this rights-balancing drama. By following proper copyright procedure in online course development, educators can sensitize their students to the traditional rights of creators and users, and the intellectual property ownership issues emerging in the electronic world.

Copyright Law

What Isn't Yours Doesn't Become Yours When You Take It from a Web Site

Most pro-public-domain Web sites will argue that the true function of the Internet is to present freely available material to any viewer, who can then use that material for any purpose. Compare this view to that of pay-for-use Web sites, which see this medium as another cash-generating venue.

In Canada, copyright arises when original material is captured in a fixed form. Along with paper, audiotape or videotape, canvas, and photographic paper, Web or e-mail pages are fixed forms. Therefore, when original material is uploaded, written in an e-mail, or posted to a Web site, copyright arises. If no statement to the contrary is given, it can be considered a violation of copyright to use material presented on a Web site or contained in e-mail for any purpose other than direct viewing. There is no need for any statement asserting this right.

Jurisdiction and Fair Use

In online and other forms of distance education, the law of the institution's country is the law considered. Nevertheless, copyright law in Canada is often confused with American law. The American doctrine of "fair use" is often cited as a reason to use material without permission.[1] Fair use is not a Canadian concept and does not apply in this country. Canadian law draws from larger frameworks.

As have most other nations, Canada has signed the Berne Convention (1976), which offers a common ground for copyright basics. The World Intellectual Property Organization (WIPO) offers best practice recommendations to treaty signatories (Canada is one) to promote international understanding on copyright issues. The United States has responded to the 1996 WIPO treaties by implementing their much-publicized and debated *Digital Millennium Copyright Act* (DMCA).[2] The government of Canada is in the process of considering changes to the *Canadian Copyright Act.*

Copyright Law in Canada—Changes

The Speech from the Throne of October 2002 promised work to bring the *Canadian Copyright Act* in line with current thinking on digital copyright issues. Industry Canada's report, titled *Supporting Culture and Innovation: Report on the Provisions and Operation of the Copyright Act* (2002) (hereafter referred to as 2002 *Report on the Act*), outlines areas of the Act to be examined.[3] Issues that

[1] For information on American copyright law, see the Library of Congress copyright site, retrieved October 9, 2003, from http://www.loc.gov/copyright/

[2] For more information on the DMCA, see Casey Lide's "What Colleges and Universities Need to Know about the Digital Millennium Copyright Act." Retrieved October 9, 2003, from http://www.educause.edu/ir/library/html/cem9913.html

are not clearly addressed by the present (1924, revised) Act include Web-linking (or hotlinking) and Internet server liability. The 2002 *Report on the Act* also raised expanding the scope of "fair dealing" to include more exceptions—much like the U.S. fair use doctrine. Obligations to comply with 1997 amendments to the *Canadian Copyright Act* and to WIPO's copyright treaties[4] have kept *Canadian Copyright Act* evaluation in step with developments in more than 150 other Internet-active countries.

Michael Geist argues that

> digital copyright will take centre stage as the government identifies technical-measures protection (which uses encryption techniques to limit copyright of digital work) and ISP liability as key issues. Moreover, the copyright concerns of photographers and educational issues have catapulted to top priorities. (2002)

Other issues to be tackled in the Canadian debate include the term or lifespan of copyright protection, private copying, copyright attached to traditional knowledge, and database protection (Industry Canada, 2002).

The struggle within copyright law centres on a balance between rights of the creator and rights of the user of copyright-protected materials. As described in the 2002 *Report on the Act:*

> Copyright is the right of the creator of an original work (and certain other subject matter) to authorize or prohibit certain uses of the work or to receive compensation for its use. It may be an exclusive right to control certain uses such as reproduction or a right to receive compensation such as the communication to the public or performance in public of a sound recording. Remuneration and control for rights holders, and the dissemination and access to their works, are the two fundamental principles underlying Canadian copyright policy. (Industry Canada, 2002).

The original *Copyright Act* of 1924 remained effective for more than 75 years. To be equally effective in a rapidly changing digital environment, revisions to the Act must be fair to both producers and consumers of copyright-protected material, and must address the capabilities of current technologies and not-yet-created technologies. Economic considerations must also be at the forefront of

[3] The full report is available online. Retrieved October 9, 2003, from http://strategis.ic.gc.ca/epic/internet/incrp-prda.nsf/vwGeneratedInterE/rp00863e.html

[4] The texts of the "Agreed Statements Concerning the WIPO Copyright Treaty" are available online. Retrieved October 9, 2003, from http://www.wipo.int/treaties/ip/wct/statements.html

[5] The Canadian Intellectual Property Web site (English language version) can be found at http://strategis.gc.ca/sc_mrksv/cipo/welcome/welcom-e.html

In particular, search http://strategis.gc.ca/sc_mrksv/cipo/cp/cp_main-e.html for copyright-related information. Both pages retrieved October 9, 2003.

discussion about compensation to copyright creators and affordability to consumers. National economic interests are at stake:

> In 2000, the gross domestic product (GDP) of the copyright-related sectors (publishing, film, music, software, visual arts, etc.) was estimated at $65.9 billion or 7.4 percent of Canadian GDP. Between 1992 and 2000, the value of these sectors increased by an annual average of 6.6 percent, compared with 3.3 percent for the rest of the Canadian economy. Together, these sectors formed the third most important contributor to the growth of Canada's economy. (Industry Canada, 2002)

Applications to Distance Education

Industry Canada recognizes "the importance of copyright reform to the management of knowledge" (Industry Canada, 2002), and recognizes that both users and consumers want clear rules for operating in the current electronically mediated world. Currently, there are no provisions in the Act for management of knowledge in distance education or for education outside classrooms or face-to-face settings.

At Athabasca University, where traditional distance education methods have been employed since the early 1980s, the body of practice from print copyright is often the default when dealing with new online issues. The bottom line is always due diligence. Each third party copyright item in a course has its own paper permissions files, and, since the mid-1990s, an electronic permissions file as well. The files are stored for historical reference (i.e., to provide information about a course) as well as for legal protection.[5]

Usage

The Linking Debate

The use of hotlinks from course materials to Internet sites has transformed distance education learning materials. At the time of writing, there is no Canadian law to deal with issues of linking or deep-linking to another site. The controversy, however, is international, and outcomes could set boundaries for how material is accessed through online courses. Corey Murray, assistant editor of *eSchool News,* writes that "so-called deep-linking occurs whenever a teacher or some other person provides a Web link that bypasses another site's home page and goes directly to a specific article deep within that internet site" (2002; see also, Delio, 2002a). Murray acknowledges that although some online publishers have implied otherwise, U.S. law does not currently address the deep-linking issue. "Opponents of deep-linking argue that it costs sites in valuable advertising revenue if visitors are not required to visit the home page first" (Murray, 2002).

Murray interprets intellectual property lawyer Harvey Jacobs's predictions for lawsuits against deep-linking as follows:

> he sees two possible strategies for those who would challenge the practice in court: first, that deep-linking is a form of trespassing [and second] that visitors who enter a site by way of a deep link cannot knowingly agree to the terms and conditions of that site, which are normally listed on the home page. (Murray, 2002)

Critics argue that the non-linear design of the Internet precludes the type of hierarchy implied by the term "deep-linking," as Web pages are not stacked as such: each page stands alone, yet is connected to other pages.

In *Kelly v. Arriba* (2002), the Ninth Circuit Court of Appeals in San Francisco found that "a search engine that linked to copyrighted material by 'framing' it in a new Web browser window infringed on the copyright owner's rights" (Delio, 2002b). Framing, however, is technically quite different from linking. Framing imports the third-party Web page into the offender's Web page, instead of just leading to the third-party Web page, as is the case in linking.

A recent and defining case in linking practice is *Danish Newspaper Publishers Association v. Newsbooster.* The Danish Court ruled that Newsbooster violated copyright laws by deep linking to articles on Danish newspaper sites (Delio 2002a). The legal firm Hale and Dorr report five bases for the Danish Newspaper Publishers Association's injunction. Listed reasons include "repeated and systematic extraction" of portions of news headlines, avoiding

[6] Hale and Dorr's October 2002 listing of deep linking rulings is at http://www.haledorr.com/publications/pubsdetail.asp?ID=133761032002 (retrieved November 16, 2003).

Note that, at publication, previously available translated transcripts of court proceedings and the general Newsbooster site (www.newsbooster.com) were unavailable.

advertising on the linked-to site, and financial gain.[6]

At Athabasca University, the course Web creator is advised to send a notice to the Web administrator of the linked-to site, informing them of our intent and purpose (see Figure 9-1). Responses have ranged from angry e-mails asking us to please stop wasting their time (as the Internet was developed to enable free information distribution), to requests not to link to the site, and even ecstatic notes because someone is interested in linking to their site. As well, some responses request Athabasca University to reroute through a more descriptive or main page. Sending these messages has also resulted in notifications of Web address changes.

Policy

It is important for any educational institution to have clear copyright policy that outlines who owns course material, and how the course material can be used by others.

Under Canadian law, copyright resides with the creator of original material captured in a fixed form. The major exception occurs when the creation is done under employment or using an employer's facilities or machinery. As the lines of what constitutes "under employment" are indistinct (particularly in the university environment, where work may be done on non-employer computers and hours of work can be erratic), internal policy and agreement are necessary. In most traditional universities in Canada and elsewhere, the university explicitly returns copyright for educational and academic materials to the employee-creators (normally the faculty members).

Athabasca University was created as a single-mode distance education institution in the early 1970s, and from its origin has had a much different policy in regard to ownership of instructional content. Contributors to Athabasca University courses often include visual designers, instructional designers, and editors, along with the content developers or faculty members. With each profession contributing to the whole course, rights are dispersed. In response, the University has developed and maintains policy stating that the University owns the copyright on all course materials created by any and all University staff. In the electronic environment, course

Attention: Webmaster

RE: Your Internet site, as located at ___________

Athabasca University would like to provide an option for students enrolled in our course, ________, to visit your Internet site. A hotlink from the course Web page would enable our students to reach your information quickly. We trust that this will meet with your approval.

Athabasca University is a public, government-supported, non-profit distance education institution. Enrolled students may choose from two basic delivery modes: individualized study (print-based or online-enhanced) or grouped study (classroom or e-Class®). Each delivery mode implements different learning methods, including online and online-enhanced courses, classroom instruction, e-Class®, tele- and video-conferencing, telecourses, home labs, and computer-mediated instruction.

Thank you for your consideration.

Figure 9-1. Hotlinking letter.

Source: Athabasca University Copyright Web page. Retrieved October 9, 2003, from http://emd.athabascau.ca/html/copyright.html

production methods have changed and new technological positions have been added; however, Athabasca University's original rights ownership policy (created primarily for print-based courses) remains the same. Athabasca University's goodwill agreement with staff creators does allow material originally written for their courses to be used in other academic publications, provided that reference is made to the employer.

Simonson et al. describe a hybrid model of ownership as another possibility. In this model, the institution owns the course and the faculty member owns the content.

> In this situation, if the faculty member accepts a position elsewhere, she or he can take the course content to the new campus and use it there. However, the course itself, including the content, also may be used by the former institution, with a new instructor assigned to teach the course. (2003, p. 137)

Simonson et al. (2003) also describe policies specifying royalty payouts to each party working on the course, including faculty and instruc-tional technologists.

Student Expectations

Professors are eager to use new online options, and so are students. Student essays are no longer static documents written on paper—they now include audio and video material, and links to Web sites. Dynamic "papers" are being created and submitted, and with them, a new set of rules is emerging. New citation formats are developing and becoming established.[7] The growth of full-text database and e-book accessibility enables students to use others' works more easily and accurately. With this accessibility, though, comes the risk of improper use of others' materials.

Plagiarism—the Risks Increase Online

Students are expected to submit original work. Plagiarism, however, has become technologically much easier. Online teachers must be more diligent about explaining plagiarism and intellectual honesty to students, and must be familiar with plagiarism search tools. The University of Alberta Web site "Guide to Plagiarism and Cyber-Plagiarism" is an excellent source for information on online plagiarism, examining subtopics such as "Why Students Plagiarize," "Preventing Plagiarism," "Detecting Plagiarism," and "Paper Mills," and including resources and links to other Web sites or software that can help identify plagiarized material.[8]

In "Why Students Plagiarize," University of Alberta authors comment that

> Plagiarism is a difficult concept to define because it encompasses a wide range of actions, from merely writing incorrect citations to the wholesale theft of someone else's work or ideas. Also, the type of plagiarism—deliberate or unintentional—have an impact upon the perception of the offence for both faculty and students. The exact causes of plagiarism are complex, but worth examining. (University of Alberta, 2002)

[7] See (1) the "Electronic References" section of the American Psychological Association Style.org Web site. Retrieved October 9, 2003, from http://www.apastyle.org/

(2) the "Frequently Asked Questions about MLA Style" page. Retrieved October 9, 2003, from http://www.mla.org/style_faq

[8] Retrieved October 9, 2003, from http://www.library.ualberta.ca/guides/plagiarism

Students enrolled in an Athabasca University course such as [course name] are considered to be responsible scholars, and are therefore expected to adhere rigorously to the principles of intellectual honesty. Plagiarism is a form of intellectual dishonesty in which another's work is presented as one's own, and, as is the case with any form of academic misconduct, plagiarism will be severely penalized. Depending on the circumstances, penalties may involve rejection of the submitted work; expulsion from the examination, the course, or the program; or legal action.

Students sometimes commit plagiarism inadvertently. To avoid doing so, make certain that you acknowledge all your sources, both primary and secondary, in a full and consistent manner. All direct quotes (quotations from an original work) and indirect quotes (paraphrases of ideas presented in an original work) must be acknowledged either through in-text citations, footnotes, or endnotes.

Whatever system of documentation you use, you must provide the author's name, the title of the work, the place of publication, the publisher, the year of publication, and the page number from which the quote or information was taken. Full bibliographic information on each source cited must also be given in the bibliography at the end of your essay.

Figure 9-2. Intellectual indebtedness and plagiarism statement.

[9] The Web site of the Canadian copyright licensing agency, Access Copyright, is given below. Retrieved October 9, 2003.

http://www.accesscopyright.ca

To encourage intellectual honesty, and to contribute to education on plagiarism, every Athabasca University course contains a notice like that shown in Figure 9-2, under the heading "Intellectual Indebtedness and Plagiarism" (Athabasca University, 2002).

Practical Guidelines

Collective Licensing

Collective licenses, such as those administered by Access Copyright in Canada and the Copyright Clearance Center in the U.S., have been helpful to post-secondary educational institutions. Collective licensing agencies work with creators to administer rights payments for reproduction of creators' work.[9] Users of collective licensing agencies benefit from the "rights clearinghouse" effect of collective licenses. That is, where certain rights are allowed, users pay per-student and per-page fees to reproduce creators' works. The collective then distributes collected funds to the copyright holders. Collective licenses are only beginning to work for users wanting to reproduce materials electronically, and such licensing arrangements are not nearly as efficient as they have been for print reproduction. At Athabasca University, more than two-thirds of print-based reproduction occurs under a collective license, whereas nearly all electronic reproduction rights are negotiated directly with the copyright holder.

Timelines

Twenty years ago, the Athabasca University copyright office cleared rights to reprint third-party copyright holders' material by using the telephone, fax machine, and Canada Post. In a best-case scenario, rights would be granted in about two weeks. The worst case scenario occurred when the suspected copyright holder, who could only be reached by regular mail, turned out not to be the actual copyright holder, and other contacts had to be tried and negotiated with. This process could and often did take a year. Recently, for online courses and electronic reproduction, copyright clearance turnaround timelines are similar to the print-based ranges of the early 1980s (six months to a year), but current collective licensing arrangements can make rights permission for print-based reproduction instantaneous. With cooperating individual copyright holders, print and some electronic-based permissions have been hastened by the use of e-mail and online forms. For examples, see the Web sites listed below.

- Thomson Learning's site at http://www.thomsonrights.com/permissions/action/begin
- Pearson Education Canada's online form at http://www.pearsoned.ca/highered/permission.html

- Public Works and Government Services Canada provides their preferred form online at http://cgp-egc.gc.ca/copyright/application-e.pdf
- Ivey School of Business forms can be found under "Permission/Order Forms" at http://www.ivey.uwo.ca/cases/cps.asp?pvar=Main
- Prentice Hall (Pearson U.S.) forms are at http://www.prenhall.com/mischtm/permissions.html

The (American) Copyright Clearance Center will grant electronic rights to Canadian requesters on behalf of affiliated copyright holders, and Canada's Access Copyright is also now trying this strategy as well.

Public Domain

With the lack of an efficient mechanism for collective licensing for electronic use of materials, the public domain becomes much more important to online course creation and delivery. Materials in the public domain are not subject to copyright restrictions. In Canada, textual material automatically enters the public domain on January 1 of the 51st year after the creator's death. The situation is different in the United States, which is currently debating the length of time required before materials enter the public domain. According to John Bloom (2002), the original term of copyright in the U.S. was 14 years, with an added 14 years if the author were still alive. Bloom goes on to note that

> we have gradually lengthened that 14-year limit on copyrights. At one time it was as much as 99 years, then scaled back to 75 years, then—in one of the most anti-American acts of the last century—suspended entirely in 1998. The Sonny Bono Copyright Term Extension Act of that year says simply that there will be no copyright expirations for 20 years, meaning that everything published between 1923 and 1943 will *not* be released into the public domain. (2002)

The maximum term of copyright in the United Kingdom is currently life plus 70 years. Canadian federal and provincial documents are also protected by copyright, with the 50-year rule applying from the date of creation.

Some online creators now place their work in the public domain on creation. Using public domain material means that negotiating rights is not necessary—material can be used as-is and immediately, an attractive combination in online courses, where production time is minimized (no printing, binding, collating, and shipping) and the temptation is toward just-in-time creation. Note, however, that materials in the public domain still require appropriate citation; using them without acknowledgement constitutes plagiarism.

Scenarios: Online Course Production

Case A: Professor Rush is working on a course that she expects will be entirely online. Her course start date is in two months, and she has just decided to add some online readings. Best practice dictates that she check the online journal databases for these readings first. Most university libraries now register with many online journal database providers. Copyright on articles within the databases has already been licensed for the university user community. A link to the proper reading can be embedded in the course, and when students are ready for the reading, clicking the link will take them there directly. Course creators can also link to a search term, journal database search page, or library general search page. If Professor Rush's requested readings are not available through online journal databases, it may take several months for clearances. Professor Rush must then decide if she wants to wait to get permission to reproduce these readings or choose other applicable readings from those available in journal databases.

Case B: Professor Allbusiness has written a business administration course centering on several business cases. This professor is continually on the cutting edge of business practice and requires the most recent cases. Two of the largest creators of business cases, however, still do not allow certain of their materials (such as new cases) to be converted to electronic files and delivered to students, no matter what the format (e.g., password-protected site, CD-

ROM, in pdf format on their own Web site). In this situation, it is simplest to get permission to reproduce these materials in print format, and mail them to the student in a printed reading file.

Case C: Professor Tacitus has worked in distance education for 30 years, and has several established and comprehensive humanities courses in print form, some with accompanying music cassette tapes. Professor Tacitus is interested in new technologies and now wants all of his material to be available online. In this case, much of the third-party material may already be in the public domain, and therefore can be used in the alternate format of online publication. Other materials, for which permissions have been obtained for print use, will require new permissions for electronic use. Clearing the rights for the music requires more research. Some tunes will be in the public domain, but their performances and the production of the songs will not be. In this case, performers' and producers' rights must be considered. It may take up to a year to secure permissions to reproduce all of this material for a Web site that may be technically ready in only days.

Processes

The Athabasca University Copyright Office uses a collection of form letters to initiate and maintain contact with copyright holders. An initial contact letter is shown in Figure 9-3. Prior to making any contact, searches are made to identify a copyright or permissions administrator to whom the letter should be addressed. Often, e-mail will be the easiest primary method of contact. A sample e-mail response to a standard faxed request is shown in Figure 9-4.

Traditional Knowledge

Although not directly related to issues of copyright for online materials in Canada or systems for negotiating copyright permissions, traditional knowledge is another issue that online course developers must be aware of. Before using stories, ideas, images, or sounds from an Indigenous group, consideration must be given to

Figure 9-3. Sample initial contact letter.

Our File # XXXX XXX RF/X October XX, 20XX

Journal Title

Copyright and Permissions

Address
Address **Fax: XXX-XXX-XXXX**

Dear Xxxx Xxxx:

RE: Author's Surname, First Name or Initial. "Article title" as found in: Journal Title at www.xxxxxxxxx.xxx. Date of posting. Location: Copyright Holder, page range.

On the understanding that you own copyright, this letter is to request permission to reproduce the above material. We have designed a course titled Course Number: Course Title, and would like to use this material in our course package. This course package will be in electronic format, stored on a server owned and maintained by Athabasca University. This server is key and password protected, accessible only to registered students. We are requesting non-exclusive world rights.

Athabasca University is a public, government-supported, non-profit distance education institution. Enrolled students may choose from two basic delivery modes: individualized study (print-based or online-enhanced) or grouped study (classroom or e-Class). Each delivery mode implements different learning methods, including online and online-enhanced courses, classroom instruction, e-Class, tele- and video-conferencing, telecourses, home labs, and computer mediated instruction.

We look forward to your faxed reply. Thank you.

Sincerely,

Lori-Ann Claerhout
Copyright Officer

Permission granted for reproduction as described above:

Credit Statement:______________________

Name_________________ Position_______

______________________ ______________
Signature Date

Hello XXXXX,

Thank you, I have received your fax requesting permission to use the electronic copy of XXXXX, for the above course which begins in September. A PDF copy of the case is now posted for you on our private case pick-up site. To access this file please go to our site at:

xxxxxxx

Enter your email address as above and the password XXXX####.

You have access to the file until August 7th.

Your authorization to use the case will be sent to you by fax. An invoice for the PDF master and the permission will follow by regular mail 60 days from the start date of the course. Please let me know before then if the number of copies used changes.

Please be sure to contact me if you have any questions.

Kind Regards,

Xxxxxx

Xxxxx Xxxxx,

Account Representative,

Xxxxxxxxxxx Publishing, Xxxxxxxxx

Source: Adapted and reproduced with permission from copyright holder.

Figure 9-4. Sample e-mail response.

traditional forms of intellectual property transmission and credit. In practice, Canadian Indigenous Elders' knowledge has been held by the community. Who owns these rights within the community is not always clear.

Athabasca University's Centre for World Indigenous Knowledge and Research (CWIKR) works within a larger community of world Indigenous leaders. CWIKR consults with four decision-making groups. Three of them are CWIKR's consensus-based Nehiyiwak Caucus, an Internal Advisory Committee, and an External Advisory

[10] Athabasca University's Centre for World Indigenous Knowledge and Research provides more information online. Retrieved November 16, 2003 from http://www.athabascau.ca/indigenous

Committees, which primarily make planning decisions and identify key issues for the program. The fourth group is an Elder's Committee, which provides guidance on all issues, and sits on all other committees. These committees consider issues of appropriation, knowledge ownership, and usage; and must be consulted before traditional knowledges are used.[10]

Conclusion

Everyone who can access a computer is a potential creator and user of copyright-protected material. The establishment of new technologies demands that new creators learn about copyright laws and best practices for use of materials presented electronically. To maintain the balance between creators' and users' rights, the governments of Canada and other countries must adapt their copyright laws. Until laws find a way both to protect creators' rights and to allow easy use of electronic materials, the potentials of new technologies in online education will not be realized.

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CHAPTER 10

VALUE ADDED—THE EDITOR IN DESIGN AND DEVELOPMENT OF ONLINE COURSES

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Introduction

The editor has traditionally played a key role in the design and development of instructional and educational materials. As both the Web and the technology and processes for delivering instructional materials on it have evolved, so too has the editor's role in course design and delivery. The typical "Web editor" has a broad and changing range of responsibilities, from editing and verifying course content to evaluating the efficacy of online instructional tools, from unsnarling copyright issues to testing and applying new multimedia applications. One aspect of the editor's role, however, has remained unchanged in the course development process—the editor adds value to the course development value chain by improving course material quality, enhancing students' learning experiences, and ensuring that course quality standards are set and maintained for the delivering institution.

Our model for defining and studying the online editor's role in the course development process is the School of Business at Athabasca University. The School of Business has taken a leadership role in delivering distance education courses online (e-Class® mode), as well as in providing online enhancements to existing print-based courses, and converting these courses to online formats (online individualized study mode). The multimedia instructional design editor (MIDE) is a key member of the School's online course design, development, and production team. The job title, MIDE (and the particular configuration of skills and duties associated with it), is unique to the School of Business, combining, as it suggests, the tasks of integrating multimedia instructional components into online course materials, applying instructional design principles, and editing course materials. However, although the MIDE is unique to the School of Business, many of the duties and responsibilities of the job are typical of other online course development projects.

The School of Business developed the job of MIDE to achieve a number of course development objectives. First, to ensure that standards of product and pedagogical quality are achieved (an institutional objective), the MIDE is responsible for editing course materials before they are delivered to students. Second, many School of Business print-based courses make use of online enhancements or are adapted for online delivery, so the MIDE is charged with increasing the use of multimedia components and online interactivity tools, while ensuring that they accomplish meaningful instructional purposes. Finally, the MIDE has been given responsibility for applying instructional design principles and strategies to online courses and course enhancements. Although most School of Business courses were instructionally designed when written for print-based delivery, converting them for online delivery raises further instructional design issues.

The MIDE's role adds value to the delivery of online courses to School of Business students in three ways: first, by linking other participants in the value chain, and so increasing the effectiveness and efficiency of the entire process; second, by increasing the ability of value chain participants to produce effective online learning experiences; and third, by providing a measure of quality control to ensure that online courses are consistent, technologically innovative, and pedagogically sound.

Distance Education and the Online Instructional Environment

School of Business courses are delivered at a distance. Course materials for distance education, whether online or print, "take a learner-centred approach, rather than the traditional content-centred approach of textbooks" (Swales, 2000, p. 1). According to Swales, this learner-centered feature enables students "to become involved and motivated by the materials and to take ownership of the skills and knowledge that they acquire" (p. 1). That distance education course materials must motivate, engage, direct, and support students means that the course editor makes an important contribution. The hybrid role of the MIDE is particularly well suited to enhancing distance delivery, especially when courses are delivered online.

In the case of online delivery, the *learning environment* becomes a particular and important consideration. Kuboni notes that the term learning environment has emerged "as one of the key metaphors associated with teaching and learning through the new telecommunications and computer-networked technologies" (1999, p. 3). As a context in which learning takes place, the online learning environment has several features; for example, it encourages a reduction in the emphasis on the didactic role of the teacher, while emphasizing collaboration; it enables the development of process skills and knowledge building, rather than information and knowledge acquisition; and it supports collaborative group activities (Kuboni, 1999).

If the online instructional and learning environment presents challenges and opportunities not found in conventional face-to-face or traditional distance delivery, so too do the multimedia tools used within it.

Nunes and Gaible (2002) contend that multimedia is "the most effective and egalitarian of computer-based resources available" (p. 95). Multimedia, and the online learning environment that delivers and supports it, provide for "artful interaction between learners and content" (p. 95). As with conventional distance delivery practice, it is possible to offer "learning in different locations . . . for students working at different rates and levels, [as well as] repetition when repetition is warranted" (p. 95). Nunes and Gaible state that multi-media is especially well suited to "dynamic fields" and that "Web-based multimedia contentware is itself dynamic" (p. 95). That multimedia and the online environment are dynamic seems an obvious conclusion when we imagine the myriad ways learners can interact with content in text, visual, audio, animated, and other forms, through graphic and other interfaces. This conclusion is reinforced by the online environment's possibilities for learner interaction with teachers and other learners, at any time, and from any place.

As defined in *The Concise Oxford Dictionary,* the word *dynamic* means the opposite of static; it is the reverse of "stationary; not acting or changing; passive" (Thompson, 1995, p. 1361). As dynamic entities, multimedia and the online environment offer opportunities for various kinds of interaction and active learning, and for "the chance to work with current and even cutting-edge knowledge" (Nunes & Gaible, 2002, p. 95). Rather than confine the design, development, and delivery of learning content to technical and production experts, it may be possible to "engage all stakeholders in the education system . . . in the development of multimedia learning resources" (p. 95).

However, the dynamic nature of the online environment also presents unique challenges for course developers and editors. Web content, links, and interactive elements are ever changing, and require constant vigilance to maintain their currency. Moreover, taking full advantage of the many multimedia and graphic enhancements available in this dynamic environment comes at a price. A simple-looking but effectively designed multimedia tool often requires many resources and a significant amount of time to produce and test, and increases the workload and knowledge level required of instructional, technical, and production staff to implement and maintain.

The online environment has the *potential* for fast and easy interaction among diverse and distributed users, a fact that raises a number of issues about how this interaction is accomplished, when it is appropriate, and how it is managed. Similarly, although a myriad of learning experiences and opportunities are available through the online environment, questions of how much diversity to offer, what instructional purposes each tool serves, and how to manage the tools selected also become important. In the School of Business, the MIDE addresses these issues from a learner's (student's) perspective in both the multimedia and instructional design components of their role. However, course content experts and the technical, production, and other learning support staff also have needs that must be met as this interaction with learners takes place. The MIDE must consider these needs when determining the effectiveness of online learning and interactive tools and technology.

These varied demands present great challenges for the MIDE, who must apply precise editorial and instructional design standards across the various course components. Increasing the number of people engaged in the development process, and the number of times learning content is subject to revision or change, makes it difficult to achieve and maintain control over these standards.

Furthermore, the MIDE requires an ever-growing range of skills, as well as flexibility in defining the scope of their duties, in order to check and evaluate the diverse components that make up an online course, and faces a constant challenge in balancing the learning needs of students against technological and course production constraints and requirements.

Course Development in an Online Environment—the Role of the MIDE

Multimedia

In their capacity as editors, School of Business MIDEs develop an intimate knowledge of the content of each course. They are one of the final links in the content chain, and review all online course components when they are ready to be integrated into the Web-based delivery template. The MIDEs occupy a unique position in the design and development process, far enough along that they see a course in its entirety and can clearly identify good locations for using particular multimedia and interactive components, but still early enough that there is time to develop and integrate those components and explore new ideas for enhancing educational materials.

As a means of making course production more efficient, and in keeping with a general trend toward collecting and reusing effective multimedia tools, the MIDEs play an important role in identifying online components and tools that have widespread applicability and can be used in several courses. The School of Business is still exploring ways to store these components and simplify their use across an array of course materials, and the trend at Athabasca University, and in online learning in general, toward storing and reusing multimedia applications, learning objects, and databases presents many choices and opportunities for research. The MIDE is a vital link in this research, working as a liaison between School of Business academics and production teams and other departments throughout the university that are developing data and learning object storage strategies (e.g., the Library, the Educational Media Development department).

Instructional Design

All new or significantly revised online courses are submitted to School of Business instructional staff for a preliminary assessment of their design, content, and learning objectives. At this point, the MIDE performs a cursory instructional design (ID) assessment on the proposed course. At this stage, too, a dedicated School of Business instructional designer also reviews the proposal and offers ideas for improving the course's instructional efficacy to the course author. However, as courses and their constituent elements often undergo a significant transformation between proposal and delivery, the bulk of the ID evaluation performed by the MIDE is necessarily done after the course has been written or revised, when it is submitted for editing and production. Although this strategy can shorten the amount of time available for evaluating and testing new ideas for ID and multimedia tools in a course, it is, overall, a good use of limited resources. New courses are reviewed by the School of Business instructional designer, but existing courses (often high enrolment courses) that are being revised or converted for online delivery might or might not have had the benefit of ID at some point in their development (the School has only one instructional designer, and many new courses that require ID). In many cases, the content of a course has been revised regularly, but issues related to its instructional efficacy have not been systematically addressed in the revisions. This is where the ID role of the MIDE, and its late application in the production process, is especially useful in assessing and dealing with instructional quality issues without returning a course to the beginning stages of development.

As part of their instructional design role, MIDEs also check and evaluate course design and layout for instructional efficacy, providing input to authors and production staff. The MIDE ensures that all resources are relevant, linked, and coordinated. It is essential that course components intended to present and deliver information are clearly differentiated from learning activities which are designed for application or practice. The purpose of the learning activities must be clearly presented, and it must be obvious to learners what action the learning activities require, as well as how and where to obtain feedback. The MIDE also determines if the learning resources work, if they work as they are intended to, and if the instructions for their use are clear. This function is particularly crucial with multimedia components.

While working with existing courses, and in the instructional design role, the MIDE reviews course components at a number of levels (Swales, 2000). At a course level, the MIDE determines if the course components support and conform to course objectives. At the unit level, it is essential that unit objectives support, build toward, and align with the larger course objectives. Each learning objective in each unit or lesson is assessed to ensure that it is clear, unambiguous, measurable, and related to the content in the lesson or unit. The MIDE determines whether or not the lesson and review activities, as well as technical elements, such as multimedia components and interactivity tools, contribute to the ability of learners to meet the learning objectives of the course, and to see for themselves that they have done so. In online courses, as with traditional distance delivery, this "seeing" must take place in the absence of same-time and face-to-face interaction with a teacher.

Editing

The MIDE's primary role in course development is as an editor. In the online course development and production process, the MIDE is situated at the same point as editors in more traditional course development models. The MIDE reviews all course materials and components, revising, and in consultation with course authors, clarifying content, and ensuring that the text is grammatically correct, concise, and online-ready. As do all editors, the MIDE ensures that the tone of the course materials is appropriate for the audience, and for the purpose of helping learning to happen, and that coauthored materials communicate either a consistent voice or a clearly defined set of individual voices, as desired by the authors and suitable for the content. Editors ensure that course materials are not biased and do not contain plagiarism, and that all necessary copyright clearances have been obtained. Finally, Web-ready content is copy edited to ensure that all i's are dotted and t's crossed, and that the rules of grammar and punctuation have been correctly and consistently applied.

As editors, more so than in their other roles, MIDEs serve as proxies for the learners who will work through all components of the online course. The MIDE ensures that information about assignments, including instructions to students, assignment questions, guidelines for assignment marking, and examination guidelines, is correct, consistent, and readily available to students. Well-edited course materials anticipate and address learner concerns and needs for information, and so prevent work at the "back-end" of the course delivery process (instructor and technical support assistance calls), and build student confidence in and satisfaction with School of Business online course materials.

Adding Value—The MIDE in the Design and Development Process

The MIDE, then, contributes to many aspects and levels of course design and development, and at each level affects the online learning value chain. The effects of this contribution, however, are difficult to measure empirically. The MIDE works in the design and development component of the online learning value chain, between upstream logistics (described in earlier chapters as infrastructure for online learning, technology choice, and attributes of various media) and downstream logistics (to be discussed in subsequent chapters, and including learner supports such as tutoring, call centers, and electronic library and other digital resources). Their interactions with the other participants in the value chain help to highlight the contribution that MIDEs make to the online delivery process (for a full discussion of the concept of "value chain," see the Chapter 3 of this volume).

In each role—instructional design, multimedia development, and editing—the MIDE is concerned with facilitating communication between the author and the learner, and between the author and the technical staff who create the multimedia tools and instructional technology used in course delivery. The MIDE explores new resources and opens lines of communication between the many participants in the design and development value chain, and looks for solutions to instructional issues that will satisfy technical staff, academic experts, students, and upstream and downstream support resources. The MIDE searches for and evaluates ways to enhance the overall instructional efficacy of each course, and thus works constantly to bring the various elements of the online delivery value chain together as efficiently and effectively as possible.

But just as the MIDE brings together elements and participants in the value chain, they also add value to the course development process by enhancing the ability of other participants to produce effective online learning experiences. Rowntree (1990) refers to this role in course development as the *transformer*, "a skilled communicator who can liaise with any subject specialists whose writing is obscure, winkling out their key ideas and re-expressing them in ways learners will be able to understand" (p. 21). The MIDE helps authors to refine and distil the material they want learners to grasp, and looks for the best tools and techniques for presenting this material concisely and effectively. MIDEs review and evaluate each element in the content and design of a course, so they have an opportunity to share their expertise and knowledge with the course development team and to facilitate communication and knowledge sharing among authors, production and support staff, and technical personnel. This knowledge sharing benefits everyone in the process, and enhances the ability of all value chain participants to make an effective contribution to course development.

The MIDE's most important contribution to the course design and development value chain is quality control. The quality control function has become more critical as courses have come to contain multimedia components and to move into the online learning environment. McGovern (2002) points out that "trillions of words are published on millions of websites [and] much of this publishing is of appalling quality." On the surface, online publishing, which has eliminated the highly technical tasks of typesetting, printing, and distribution, appears deceptively simple. In particular, revising online material seems to be quick, simple, and straightforward. And in many ways, it is. Open the source document, use a simple text editor, save the changes to the server, and every course can contain what Nunes and Gaible (2002) refer to as "cutting-edge knowledge" (p. 95). If consistent presentation and appearance were the only issues to address, this capacity for multiple participants to revise courses "on the fly" would be a serious enough concern for the MIDE. But "technology is founded on the promise of automation [and] you simply can't automate the creation of quality content” (McGovern, 2002). Putting poor content into the online learning environment can have especially serious consequences, both for students and for the delivering institution.

As do editors in any course development project, MIDEs ensure that all course materials are complete and functional, and that they meet instructional, aesthetic, and editorial standards as established by Athabasca University and other educational and publishing institutions. With the course learning goals in mind, the MIDE critically evaluates course materials from the learner’s perspective, and considers the learner’s needs and likely responses to the information presented in the course. The MIDE ensures that all the pieces of a course work toward the same goal, and that the pieces fit together in a unified whole that provides effective instruction for students. By ensuring that the course materials delivered to students are of consistently high quality, the MIDE contributes to students’ confidence in School of Business courses, removes material-based obstacles to their learning, and enhances Athabasca University’s reputation as a credible, learning-centered distance education institution.

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PART 4

Delivery, Quality Control, and Student Support of Online Courses

CHAPTER 11

TEACHING IN AN ONLINE LEARNING CONTEXT

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Introduction

This chapter focuses on the role of the teacher or tutor in an online learning context. It uses the theoretical model developed by Garrison, Anderson, and Archer (2000) that views the creation of an effective online educational community as involving three critical components: cognitive presence, social presence, and teaching presence. This model was developed and verified through content analysis and by other qualitative and quantitative measures in recent research work at the University of Alberta (for papers resulting from this work see Anderson, Garrison, Archer & Rourke, N.d.) (http://www.atl.ualberta.ca/cmc).

Learning and teaching in an online environment are, in many ways, much like teaching and learning in any other formal educational context: learners' needs are assessed; content is negotiated or prescribed; learning activities are orchestrated; and learning is assessed. However, the pervasive effect of the online medium creates a unique environment for teaching and learning. The most compelling feature of this context is the capacity for shifting the time and place of the educational interaction. Next comes the ability to support content encapsulated in many formats, including multimedia, video, and text, which gives access to learning content that exploits all media attributes. Third, the capacity of the Net to access huge repositories of content on every conceivable subject—including content created by the teacher and fellow students—creates learning and study resources previously available only in the largest research libraries, but now accessible in every home and workplace. Finally, the capacity to support human and machine interaction in a variety of formats (text, speech, video, etc.) in both asynchronous and synchronous modalities creates a communications-rich learning context.

To provide a mental schema for thinking about learning and teaching in this context, Garrison, Anderson, and Archer (2000) developed a conceptual model of online learning that they referred to as a "community of learning" model. This model (see Figure 11-1) postulates that deep and meaningful learning results when there are sufficient levels of three component "presences." The first is a sufficient degree of *cognitive presence,* such that serious learning can take place in an environment that supports the development and growth of critical thinking skills. Cognitive presence is grounded in and defined by study of a particular content; thus, it works within the epistemological, cultural, and social expression of the content in an approach that supports the development of critical thinking skills (McPeck, 1990; Garrison, 1991). The second, *social presence,* relates to the establishment of a supportive environment such that students feel the necessary degree of comfort and safety to express their ideas in a collaborative context. The absence of social presence leads to an inability to express disagreements, share viewpoints, explore differences, and accept support and confirmation from peers and teacher. Finally, in formal education, as opposed to infor-mal learning opportunities, *teaching presence* is critical for a variety of reasons discussed in this chapter.

In a work on teaching presence, Anderson, Rourke, Archer, and Garrison (2001) delineated three critical roles that a teacher performs in the process of creating an effective teaching presence. The first of these roles is the design and organization of the learning experience that takes place both before the establishment of the learning community and during its operation. Second, teaching involves devising and implementing activities to encourage discourse between and among students, between the teacher and the student, and between individual students and groups of students and content resources (Anderson, 2002). Third, the teaching role goes beyond that of moderating the learning experiences when the teacher adds subject matter expertise through a variety of forms of direct instruction. The creation of teaching presence is not always the sole task of the formal teacher. In many contexts, especially when teaching at senior university level, teaching presence is delegated to or assumed by students as they contribute their own skills and knowledge to the developing learning community.

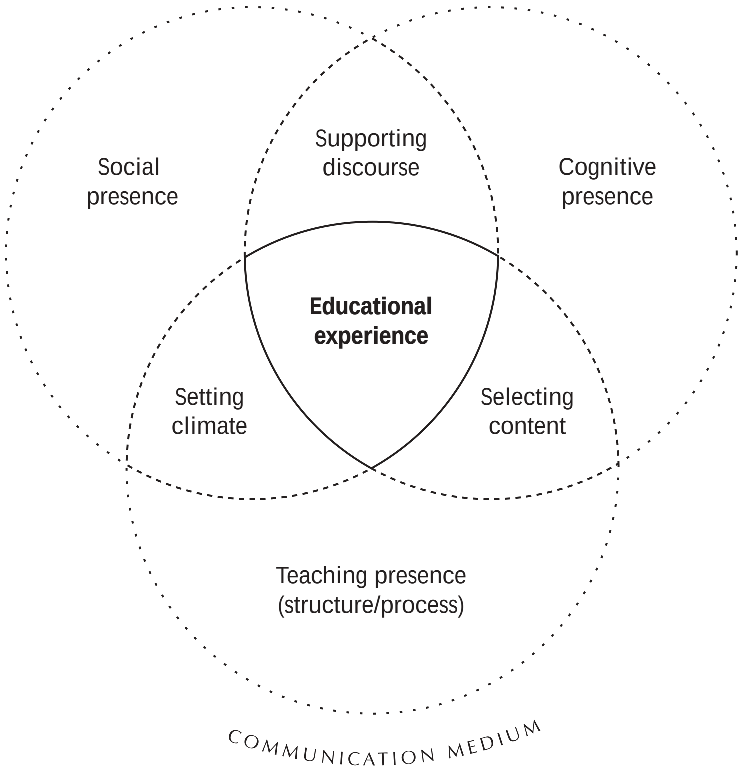

Figure 11-1.
Community of inquiry.

In addition to these tasks, in formal education, the institution and its teacher employees are usually fulfilling a critical credentialing role that involves the assessment and certification of student learning. This chapter focuses on these component parts of teaching presence, defining and illustrating techniques to enhance this presence, and providing suggestions for effective teacher practice in an online learning context.

Designing and Organizing the Online Learning Context

The design and construction of the course content, learning activities, and assessment framework constitute the first opportunity for teachers to develop their "teacher presence." The role the teacher plays in creating and maintaining the course contents varies from that of a tutor working with materials and an instructional design created by others, to that of "lone ranger," in which the teacher creates all of the content. Regardless of the formal role of the teacher, online learning creates an opportunity for flexibility and revision of content in situ that was not provided by older forms of mediated teaching and learning. The vast educational and content resources of the Net, and its capacity to support many different forms of interaction, allow for negotiation of content and activity, and a corresponding increase in autonomy and control (Garrison & Baynton, 1987). Teachers are no longer confined to the construction of monolithic packages that are not easily modified in response to student need. Rather, the design and organization of activities within the learning community can proceed while the course is in progress. Of course, such flexibility is not without cost, as customization of any product is more expensive than mass production of a standardized product. Thus, the effective online learning teacher makes provision for negotiation of activities, or even content, to satisfy unique learning needs. However, within this flexibility, the need to stimulate, guide, and support learning remains. These tasks include the design of a series of learning activities that encourage independent study and community building, that deeply explore content knowledge, that provide frequent and diverse forms of formative assessment, and that respond to common and unique student needs and aspirations (see Chapter 2, this volume).

The design of e-learning courses is covered in greater detail in earlier chapters of this book, but this design process provides opportunities for teachers to instil their own teaching presence by establishing a personalized tone within the course content. This is done by allowing students to see the personal excitement and appeal that inspires the teacher's interest in the subject. Borge Holmberg (1989) first wrote about a style of expression, referred to as "guided didactic interaction," that presents content in a conversational (as opposed to academic) style. This writing style helps the learner identify, in a personalized way, with the teacher. Techniques such as illustration of content issues with personal reflections, anecdotes, and discussions of the teacher's own struggles and successes as they have gained mastery of the content have been found to be inspirational and motivating to students.

Activities in this category of teaching presence include building curriculum materials. The cost of creating high quality, interactive learning resources has led to renewed interest in reusing content encapsulated and formally described through metadata as "learning objects" (Wiley, 2000). These objects are then made accessible in repositories such as Multimedia Educational Resource for Learning and Online Teaching (http://www.merlot.org) or the Campus Alberta Repository of Educational Objects (http://www.careo.org). Creating or repurposing materials, such as lecture notes, to provide online teacher commentaries, mini-lectures, personal insights, and other customized views of course content, is another common activity that we assign to the category of teaching presence. We anticipate that work on educational standards for describing, storing, and sequencing of educational content, and for formally modeling the way in which learning activities are designed, will significantly change the design role of many teachers from one of content creation, to one of customization, application and contextualization of learning sequences (Koper, 2001). Finally, this design category of teaching presence also includes the processes through which the instructor negotiates time lines for group activities and student project work, a critical coordinating and motivating function of formal online course design and development, and a primary means of setting and maintaining teaching presence.

Getting the Mix Right

The modern Web supports a number of media, each of which can be incorporated into the design of an online learning course. However, getting the mix right between opportunities for synchronous and asynchronous interaction, and group and independent study activities remains a challenge (Daniel & Marquis, 1988; Anderson, 2002). There are two competing models of online learning, each of which has strong adherents and a growing body of research and theoretical rationales for its effective application. The first, the community of learning model, uses real-time synchronous or asynchronous communication technologies to create virtual classrooms that are often modeled, both pedagogically and structurally, on the campus classroom. This model evolved from telephone-based audio (and later video) conferencing. Its evolution to the Net has allowed for delivery directly to the learner's office and home, thereby bypassing expensive remote learning centres that were a feature of older virtual classroom models. More recently, popular Web-based computer conferencing systems allow for asynchronous collaboration among and between student and teachers. The synchronous virtual classroom model has advantages, in that it is a familiar educational model with a great deal of similarity to teaching and learning in campus-based classrooms. It provides increased access by spanning geographic distance; however, it constrains participants in terms of a single time that they must be present. This problem is compounded when a class spans many time zones. The asynchronous version of the virtual classroom overcomes the temporal limitations, but can result in a shortage of coordination and reduce opportunities for students to feel "in sync" with the class (Burge, 1994). Designing effective online courses will increasingly involve judicious selection of combinations of media and format that balance the differential capacities of media to support the creation of social and cognitive presence, with the educational need for variety, the special communications characteristics demanded of particular content, and the cost, access, and training requirements of the media.

The second model of online learning involves independent learners who work by themselves and at their own pace through the course of instruction. This model maximizes flexibility, but it challenges the institution's capacity to facilitate group social or collaborative learning activities. The "independent study model" is almost always selected in online learning models that allow for continuous enrolment or "just-in-time" access to educational content. It is very challenging to create collaborative learning or social activities when students are at very different places in the curriculum.

Fortunately, it is possible to combine synchronous, asynchronous, and independent study activities in a single course. In my own discussions with online students over the years, I have noticed a deep division between those who yearn for the immediacy of real-time communication, and those who are adamant that they have chosen online learning alternatives to avoid the time constraints imposed by synchronous or paced learning activities. Thus, many institutions, including Athabasca University, are developing both paced and unpaced models of delivery to accommodate student learning preferences and needs. Within a single class, it is possible to offer optional synchronous activities, and I usually build a real time Net-based audio graphic session into the beginning section of my classes. This session allows me to get to know the students from both a personal and professional viewpoint, explore their aspirations for the course, outline my own interests in the subject, discuss assessment activities, and provide an opportunity for students to ask any pressing questions. Synchronous activities are also useful for guest interviews, for special activities such as debates and presentations, and of course, for holding the end of class social gathering—parties held in asynchronous time never seem to work! These activities can be "canned" and streamed for viewing by students in independent study mode.

Even if one's course design or the available technology precludes synchronous interaction, there are still opportunities to inject more than text-based lectures and discussions into the course. Online learning provides an opportunity for the teacher to build in video or audio presentations of themselves to enhance their presence to distributed learners. I have created two five-minute video productions that I link to my courses. The first provides an introduction to myself, focusing on my professional growth within the discipline that I teach. The second discusses my own research agenda, and not only helps establish my academic credentials, but also, I hope, conveys my excitement for the research process within my discipline.

Thus, the challenge for teachers designing and organizing the online learning context is to create a mix of learning activities that are appropriate to student needs, teacher skills and style, and institutional technical capacity. Doing so within the ever-present financial constraints of formal education systems is a challenge that will direct online learning design and implementation for the foreseeable future.

Facilitating Discourse

The second component of teacher presence is the critical task of facilitating discourse. We use the term discourse rather than discussion, as it conveys the meaning of relating to the "the process or power of reasoning" (*American Heritage Dictionary,* 2000), rather than the more social connotation of conversation. Discourse not only facilitates the creation of the community of inquiry, but also is the means by which learners develop their own thought processes, through the necessity of articulating them to others. Discourse also helps students uncover misconceptions in their own thinking, or disagreements with the teacher or other students. Such conflict provides opportunity for exposure of cognitive dissonance that, from a Piagetian perspective, is critical to intellectual growth. In fulfillment of this component of teaching presence, the teacher regularly reads and responds to student contributions and concerns, constantly searching for ways to support understanding in the individual student and the development of the learning community as a whole.

The first task of the e-learning teacher is to develop a sense of trust and safety within the electronic community. In the absence of this trust, learners will feel uncomfortable and constrained in posting their thoughts and comments. We usually facilitate this trust formation by having students post a series of introductory comments about themselves. It is useful to request specific information, and to model an answer to the response request yourself. For example the e-teacher may request that students articulate their reasons for enrolling in the course or their interest in the subject matter. I have seen this technique very successfully extended at the beginning of regular online synchronous sessions by asking each student to respond spontaneously to a content-related "question of the week" that sets the tone for growth of both social and cognitive presence.

Many online courses rely extensively on a model of discourse wherein the teacher posts question or discussion items relevant to readings or other forms of content dissemination. I have found that over-reliance on this form of discourse soon becomes boring, and allows much of the learning to be focused on responding to teacher-initiated items, rather than challenging students to formulate their own questions and comments about course content. We have seen much greater levels of participation, motivation, and student satisfaction when such discussion groups are led by student moderators (Rourke & Anderson, 2002). However, it cannot be assumed that students have the necessary skills to undertake successful moderation of class discussion, so role modeling by the teacher for the initial discussions is usually helpful.

Assessment in Online Learning

No element of course design concerns the student in a formal educational context more than that related to assessment. Effective teaching presence demands explicit and detailed discussion of the criteria on which student learning will be assessed. A teacher who cultivates a presence of flexibility, concern, and empathy will reflect these characteristics in the style and format of assessment. In an earlier work (Garrison & Anderson, 2003), my colleague Randy Garrison and I discussed assessment in online learning in greater detail. Here I summarize the main features of assessment, and provide two examples of frameworks for the challenging task of assessing contribution to the online learning community.

We know, from research on assessment, that timely, detailed feedback provided as near in time as possible to the performance of the assessed behavior is most effective in providing motivation and in shaping behavior and mental constructs. For this reason, machine evaluations, such as those provided in online multiple-choice test questions or in simulations, can be very effective learning devices (Prensky, 2000). However, most models of online learning also stress the capacity for direct communication and feedback from teacher to the student (Laurillard, 1997). This feedback is provided as an integral part of the discourse facilitation function of the online teacher.

A commonly used technique in formal online education is to require students to post comments as a component of the student assessment. This practice has been hotly debated on online learning discussion lists. In their discussion of college students studying online, Jiang and Ting (2000) report that students' perceived learning was significantly correlated to the percentage of grade weight assigned to participation, and their resulting participation in discussion. However, for some, the practice of marking for participation seems only to recall the onerous practice of attendance marking that rewards the quantity and not the quality of participation (Campbell, 2002). Others counter that in the absence of incentive for participation, a community will not be created. Palloff and Pratt (1999) argue that, given the emphasis on the process of learning in a social context that defines much constructivist-based learning design, participation in the process must be evaluated and appropriately rewarded. Most online students are practical adults with much competition for their time; thus they are unlikely to participate in activities that are marginalized or viewed as supplemental to the course goals and assessment schema. Many courses I have reviewed have assessed participation in online activities as a component of the final mark, usually with a weighting of between 10% and 25%.

Student assessment of any kind requires that the teacher be explicit, fair, consistent, and as objective as possible. The following examples illustrate how two experienced online learning teachers assess participation, and thereby enhance their own teaching presence.

Assessment Frameworks

Susan Levine (2002) has developed a very clear set of instructions that describes her expectations for student contributions to asynchronous online learning courses that she has used in graduate-level education courses. She posts the following message to her students.

1. The instructor will start each discussion by posting one or more questions at the beginning of each week (Sunday or Monday). The discussion will continue until the following Sunday night, at which time the discussion board will close for that week.
2. Please focus on the questions posted. But—do bring in related thoughts and material, other readings, or questions that occur to you from the ongoing discussion.
3. You are expected to post at least two substantive messages for each discussion question. Your postings should reflect an understanding of the course material.

4. Your postings should advance the group's negotiation of ideas and meanings about the material; that is, your contributions should go beyond a "ditto." Some ways you can further the discussion include:

- expressing opinions or observations. These should be offered in depth and supported by more than personal opinion.
- making a connection between the current discussion and previous discussions, a personal experience, or concepts from the readings,
- commenting on or asking for clarification of another student's statement,
- synthesizing other students' responses, or
- posing a substantive question aimed at furthering the group's understanding. (Levine, 2002)

Notice how these instructions guide students on both the quantity ("two substantive postings" per discussion question) and the quality of contributions expected. Levine then goes onto to describe qualitative aspects of a substantive posting. Notice also the "teaching presence" that emerges from this posting of requirements. Levine reveals her teaching presence as structured and explicit, yet appreciative of qualitative outcomes associated with deep learning and critical thinking.

Nada Dabbagh (2000), from George Mason University, offers a slightly more prescriptive set of recommendations for posting.

- Postings should be evenly distributed during the discussion period (not concentrated all on one day or at the beginning and/or end of the period).
- Postings should be a minimum of one short paragraph and a maximum of two paragraphs.
- Avoid postings that are limited to "I agree" or "great idea," etc. If you agree (or disagree) with a posting then say why you agree by supporting your statement with concepts from the readings or by bringing in a related example or experience.
- Address the questions as much as possible (don't let the discussion stray).

- Try to use quotes from the articles that support your postings. Include page numbers when you do that.
- Build on others' responses to create threads.
- Bring in related prior knowledge (work experience, prior coursework, readings, etc.).
- Use proper etiquette (proper language, typing, etc.).

Criterion	Excellent	Good	Average	Poor
Timely discussion contributions	5-6 postings well distributed throughout the week	4-6 postings distributed throughout the week	3-6 postings somewhat distributed	2-6 not distributed throughout the week
Responsiveness to discussion and demonstration of knowledge and understanding gained from assigned reading	very clear that readings were understood and incorpo-rated well into responses	readings were understood and incorporated into responses	postings have questionable relationship to reading material	not evident that readings were understood and/or not incorporated into discussion
Adherence to online protocols	all online protocols followed	1 online protocol not adhered to	2-3 online protocols not adhered to	4 or more online protocols not adhered to
Points	9-10	8	6-7	5 or less

Table 11-1. Evaluation criteria for facilitating an online/class discussion (Dabbagh, 2000).

Table 11.1 shows Dabbagh's sample framework for assessing messages on a weekly basis. Note that one of the protocols is the use of proper etiquette, including language, typing, and, I assume, spelling. The imposition of a requirement to adhere to particular protocols or standards is a hotly contested question among e-learning teachers. Some suggest that new forms of expression, grammar, and even spelling are arising in this medium, and that the lack of common tools (such as spell checkers) that plague many conferencing systems should allow for a much more relaxed form of expression. Others argue that requiring high standard of written communication helps students learn to communicate effectively in the online learning academic context. Given my own problems with spelling and the growing number of online learning students whose first language is not the language of instruction, I tend to be much more tolerant of language informalities in postings than I do when marking formal academic papers for term assignments.

Notice how Dabbagh requires more frequent posting than Levine, and further stipulates that the messages should be spread through the week. The second set of criteria (responsiveness and demonstration of understanding) illustrates the way the online discussion is used to motivate students to complete the weekly readings. Finally, the adherence to a list of online protocol categories links grading explicitly to quantitatively measurable student behaviors.

Both of the above instruction and marking schemes provide extremely valuable guidance to learners and make clear and explicit the requirements of the teacher. But what are the costs of such evaluation? Assuming 20-30 students in an online learning class, the weekly assessment proscribed by Dabbagh could be a very time consuming activity. The amount of time required for assessment depends, in part, on the tools available to the online teacher. A good online learning system facilitates the display of the weekly postings by each student. An exemplary system would incorporate a number of active teacher agents that would

- scan the postings for spelling and grammatical errors.
- total the number of words.
- allow the display of preceding or subsequent postings and the location of the posting in its thread to help assess "responsiveness."
- graph the posting dates to allow quick visual identification of the timeliness of each contribution.
- present a grade book for easy entry of weekly scores.
- when appropriate, provide assistance for the teacher to create and automatically mark a variety of multiple choice, matching, and fill-in-the-blank type questions for student self assessment.
- automatically alert students when a grade has been posted or altered.

Finally, it should be noted that creating a teaching presence is a challenging and rewarding task, but cannot be a life-consuming one. Research on assessment in distance education has shown that rapid feedback is important for both understanding and motivation to complete courses (Rekkedal, 1983). However, the instantaneous nature of online learning can lead to an unrealistic expectation by learners that teachers will provide instant feedback and assessment on submitted assignments. The virtual teacher has to lead a real life, so setting and adhering to appropriate timelines helps students hold realistic expectations and relieves the teacher of the unrealistic expectation of providing instantaneous, 24-hour-a-day feedback. In addition, online learning teachers must become ruthless time managers, guarding against the tendency to check online activity constantly, and to do everything to support the learners that can be done, rather than everything that can be done within the constraints of a busy professional and personal life.

Some online teachers, especially those teaching at graduate levels, may be uncomfortable with the prescriptive nature of the guidelines presented above. These teachers are often more comfortable with subjective assessments of student contributions to the online community and demonstration of their individual learning. This type of assessment presents challenges to both students and teachers as a result of the subjective nature of the assessment and the time required to review all contributions made during a course in order to assign a grade. For these reasons, a number of authors have written about ways in which the student's own postings can be used as the basis for student assessment (Davie, 1989; Paulsen, 1995). Typically, these self-reflective assessments require students at the end of the course to illustrate both their contributions and evidence of learning by composing a "reflection piece," in which they quote from their own posting to the course. They should be given guidance to help them extract quotations that illustrate their contributions. Obviously students who have not participated will not be able to provide any transcript references from their own postings, and thus, will generally receive lower evaluation scores on this project. Alternatively, a vicariously participating student (i.e., a lurker) may still be able to show learning by selective extraction of relevant postings from other students.

In summary, giving directions for and modeling effective online discourse is a critical component of creating effective teaching presence. Assigning a portion of the assessment for the class to participation is a common practice in online learning courses. If participation is to be a formal and assessed requirement of the course, then developing and implementing an explicit assessment framework are essential, but potentially time-consuming, teacher tasks. Some online learning teachers make this assessment into a more reflective task by assigning students the task of using their posting in the class conference as evidence of their understanding of content concepts and intellectual growth during the class. This type of assessed learning activity forces students to make quality contributions, and then to reflect on them. This strategy moves the locus of responsibility from the teacher to the student, a solution that can save teacher time while contributing to student understanding and metacognition.

Provision of Direct Instruction

In this final category, teachers provide intellectual and scholarly leadership, and share their subject matter knowledge with students. The online teacher must be able to set and communicate the intellectual climate of the course, and model the qualities of a scholar, including sensitivity, integrity, and commitment to the unrelenting pursuit of truth. The students and the teacher often have expectations that the teacher will communicate content knowledge. Ideally, this knowledge is enhanced by the teacher's personal interest, excitement, and in-depth understanding of the content and its application in the context of formal study. The cognitive apprenticeship model espoused by Collins, Brown, and Newman (1989), Rogoff's (1990) model of apprenticeship in thinking, and Vygotsky's (1978) scaffolding analogies illustrate a helping role for teachers in providing instructional support to students from their position of greater content knowledge. Although many authors recommend a "guide on the side" approach to teaching in e-learning, this type of laissez faire approach diminishes a fundamental component of teaching and learning in formal education. A key feature of social cognition and constructivist learning models is the participation of an adult, or expert, or more skilled peer who "scaffolds" a novice's learning. This role of the teacher involves direct instruction that makes use of the subject matter and pedagogical expertise of the teacher. Some theorists have argued that online teaching is unlike classroom-based teaching, in that “the teacher must adopt the role of facilitator not content provider” (Mason & Romiszowski, 1996, p. 447). This arbitrary distinction between facilitator and content provider is troublesome. Garrison (1998), in a lively exchange, focused on differentiating so-called teacher-centered and student-centered instruction, makes the point that “the self-directed assumption of andragogy suggests a high degree of independence that is often inappropriate from a support perspective and which also ignores issues of what is worthwhile or what qualifies as an educational experience" (p. 124).

Gilly Salmon (2000) describes the role and functions of an “e-moderator.” In this model, the teacher’s role in online conferencing is that of facilitator of learning. Her description suggests that the e-moderator does not require extensive subject matter expertise; she writes “they need a qualification at least at the same level and in the same topic as the course for which they are moderating” (p. 41). Such minimal subject level competency seems to be less than that expected by learners and peers in higher education settings. Anderson et al. (2001) write

> we believe that there are many fields of knowledge, as well as attitudes and skills, that are best learned in forms of higher education that require the active participation of a subject matter expert in the critical discourse. This subject matter expert is expected to provide direct instruction by interjecting comments, referring students to information resources, and organizing activities that allow the students to construct the content in their own minds and personal contexts.

Often, students hold misconceptions that impair their capacity to build more correct conceptions and mental schemata. The design of effective learning activities leads to opportunities for students themselves to uncover these misconceptions, but the teacher’s comments and questions as direct instruction are also invaluable.

Although teaching presence is most commonly set in synchronous or asynchronous activities of the virtual classroom, it can also be set through fixed formats such as access to “frequently asked questions” databases or audio-, video-, or text-based presentations. Direct instruction can also be provided through an instructor’s annotations of the scholarly work of others, including reviews of articles, textbooks, or Web sites.

Finally, the teacher may be asked to provide direct instruction on technical questions about access to Net-based resources, manipulation of the networking software, operation of other tools or resources, and other technical concerns related to effective use of subject related resources.

The Process of Building Teaching Presence

Salmon (2000) has developed a model for e-moderators that demarcates the progression of tasks that the online teacher moves through in the process of effectively moderating an online course. The process begins with providing students with access and motivation. In this stage, any technical or social issues that inhibit participation are addressed, and students are encouraged to share information about themselves to create a virtual presence, as described above. In the second stage, Salmon suggests that the e-moderator continues to develop online socialization by "building bridges between cultural, social and learning environments" (p. 26). In the third stage, referred as "information exchange," Salmon suggests that the teaching task moves to facilitating learning tasks, moderating content-based discussions, and bringing to light student misconceptions and misunderstandings. In the fourth stage, that of "knowledge construction," students focus on creating knowledge artifacts and projects that collaboratively and individually illustrate their understanding of course content and approaches. In the final "development" stage, learners become responsible for their own learning and that of their group by creating final projects, working on summative assignments, and demonstrating achievement of learning outcomes.

Salmon's model provides a useful guide and planning tool for online learning teachers, however it should not be considered prescriptive. For example, students may be entering the online class with a great deal of technical and social experience of the online learning environment. In such cases, technical and social issues may have been resolved some time ago. Alternatively, a heterogeneous group may have some very sophisticated and experienced students, and some novices new to the online learning environment. Busy adult students may be anxious to avoid what they see as unproductive "ice breakers" associated with Stages 1 and 2, and to proceed to more content rich and potentially more meaningful learning activities associated with later stages. Thus, Salmon's model must be customized to the unique needs of each online learning community.

Qualities of the e-Teacher

This chapter concludes with a discussion of the three sets of qualities that define an excellent e-teacher. First and primarily, an excellent e-teacher is an excellent teacher. They like dealing with learners; they have sufficient knowledge of their subject domain; they can convey enthusiasm both for the subject and for their task as a learning motivator; and they are equipped with a pedagogical (or androgogical) understanding of the learning process, and have a set of learning activities at their disposal by which to orchestrate, motivate, and assess effective learning.

Beyond these generic teaching skills is a second set of technical skills. One does not have to be a technical expert to be an effective online teacher. However, one must have sufficient technical skill to navigate and contribute effectively within the online learning context, access to necessary hardware, and sufficient internet efficacy (Eastin & LaRose, 2000) to function within the inevitable technical challenges of these new environments. *Internet efficacy* is a personal sense of competence and comfort in the environment, such that the need for basic troubleshooting skills does not send the teacher into terror-filled incapacity.

Finally, during this early period of creation and adoption of this new learning context, an effective online learning teacher must have the type of resilience, innovativeness, and perseverance typical of all pioneers in unfamiliar terrain.

Conclusion

This chapter has outlined the three major components of teacher presence, and provided suggestions and guidelines for maximizing the effectiveness of the teaching function in online learning. I have not provided a lengthy list of do's and don'ts for online teaching in a cookbook fashion; rather, I have attempted to provide a broad theoretical model focusing on the three main tasks of the online teacher.

The context of online learning is still very much in a fluid and changing state. The Web itself and the technologies that underlie it are evolving rapidly to create a second Web—the "Semantic Web" (Berners-Lee, 1999). The development of teacher and student agents, the structuring of content into learning objects (Wiley, 2000), and the formal expression of learning interactions (Koper, 2001), are creating a new educational Semantic Web that will provide new capabilities and challenges for online teachers and learners. As yet, we are at early stages in the technological and pedagogical development of online learning. But the fundamental characteristics of teaching and learning and the three critical components of teaching presence—design and organization, facilitating discourse, and direct instruction—will continue to be critical components of teaching effectiveness in both online learning and classroom instruction.

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CHAPTER 12

CALL CENTERS IN DISTANCE EDUCATION

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Introduction

In the past decade, call centers and contact centers have evolved to become the front line for customer interaction in many types of organizations. As such, they have a critical importance in the implementation of organizational strategy (Evanson, Harker, & Frei, 1998). Call centers have application in many industries offering customer service, as they can provide customers a single access point to diverse services. Many organizations use call centers to solicit clients or customers for new sales or donations and contributions. They can also be used to accomplish surveys of customer satisfaction or public opinion. Call centers can be divided into groups: those that focus on outgoing calling; those that focus on incoming calls, such as customer information and help areas; and those that are established to accomplish multiple tasks.

In education, call centers can be useful to the educational institution in many ways, ranging from simple provision of information to prospective students, to fundraising, collection of survey data, and even provision of instructional services (Hitch & MacBrayne, 2003). In distance education in particular, the call center concept can be an effective communication tool, enabling the institution to provide and improve service to students in many areas, including instruction (Adria & Woudstra, 2001; Annand, Huber, & Michalczuk, 2002).

At Athabasca University, call centers are used in a number of contexts, and show a good deal of potential for expansion and consolidation, to take advantage of economies of scale in technology. After a brief introduction to the place of call centers in business theory and practice, this chapter uses Athabasca

University's practice and potential as an example in its exploration of call centers and distance education.

Call Centers in Organizations

Call centers have particular significance in three areas: in customer service and retention, in direct marketing, and as sources of management information and customer feedback (Friedman, 2001).

- *Customer service and retention:* In business operations, call centers have become the primary contact point with customers, and serve as the means by which the organization creates a long-term relationship with individual customers and maintains customer satisfaction. Customer satisfaction will generally lead to retention and to word-of-mouth recommendations. In distance education, call centers can help create the same type of relationship. In the context of a university's service standards for processing applications, marking assignments, or answering calls and messages, call center staff are the consistent point of contact with the student, and become their advocate.
- *Direct marketing opportunities:* The support provided by a call center is increasingly seen as a service that customers expect to find integrated with product offerings, and to be available by phone and on the Internet. This contact with the customer (who, in the case of online or distance education, is a student) may result in opportunities to help the student choose additional products (programs or courses) and services (e.g., advising, counseling, tutorial).
- *Source of management information and student or customer feedback:* A call center with good software accumulates a great deal of information about customers or students. This information is collected by analyzing call documentation data, or by directly presenting questions to the customer or student. Distance education institutions should make the collection and analysis of information a major call center goal.

Organizational Strategy and Call Centers

Strategy and strategic decision-making have long been areas of active academic and practitioner inquiry. Chandler (1962) studied the development of American corporations in the early twentieth century, and postulated that corporate structure was designed to implement strategy; in other words, that structure followed strategy. Many other scholars followed with theories of their own. Mintzberg and Lampel (1999) identify ten "schools" of theory about strategy, and note that recent work has begun to cut across these schools or historical perspectives. Much recent work (Eisenhardt, 1999; Markides, 1999; Pascale, 1999; Kim & Mauborgne, 1999) studies strategy as a dynamic that emerges from the competitive environment, evaluates that environment in an ongoing manner, and flexibly adjusts the corporate course when necessary. Organizations compete on the edge, adjusting their deployment of employees and other resources as necessary strategic changes are made (Hamel & Prahalad, 1994).

Over the past 20 to 25 years, experience has shown that information technology is an increasingly important potential contributor to an organization's productivity, and that organizations experience maximum value when information technology investments are strategically driven. Davenport and Short (1990), who studied the relationship between information technology and business process redesign, postulated an enabling link between, on the one hand, the development of strategic vision and process objectives, and on the other, successful, IT-driven process redesign.

Call centers provide an example of the application of these concepts. Call center design has been enabled by the use of telecommunications technology and its ongoing integration with information technology. Call center concepts are becoming integral to the redesign of business processes (particularly informational processes as distinguished from those focused on physical objects), and where call center implementations are strategically driven and aligned, their value to the organization is the greater.

It is important that objectives established for a call center support and further the organization's strategic direction. For example, a call center focused on routing telephone calls to the appropriate staff member or department has a relatively narrow task; it will be suited to an organization that needs to be able to give short, concise answers to a high call volume. An inbound telemarketing call center focused on sales will allow longer calls, focusing on minimizing waiting times and maximizing sales impact. However, if the organization as a whole were strategically focused on the creation of customer loyalty, the call center would be a primary means to achieve that goal, and both of the examples above would fall short in contributing to this corporate strategy (Holt, 2000).

Many call center managers are looking for ways to build cost-effective, competitive operations using industry benchmark information.

> We've become obsessed in this industry with mass comparison. We survey and benchmark and publish averages, quartiles and percentages. These numbers get proclaimed as "industry standards" that your call center should aspire to match. (Cleveland & Hopton, 2002).

However, as these authors go on to note, surveys reveal that "customers are, overall, not happy with service." Given the diversity of mission and function of call centers, it is likely that what fits one will not fit all. It is much better to examine what the organization is trying to achieve, and to build processes and systems that help achieve these goals in effective and efficient ways.

Call centers can very well be a strategic asset for organizations, as they can be used to strengthen customer relationships, and can enable the organization to learn more about customers, so as to serve them better. Adria and Chowdhury (2002) make a strong case for using call centers to improve an organization's ability to serve its customers. They argue for empowerment of call center managers and employees to enhance customer service, and they note that the main responsibility for workers in a call center operation is to maintain and enhance the reputation of the organization. That is, the organization's carefully developed customer service culture is at risk during each customer interaction.

Critical Success Factors for Call Centers

Distance education shares the trends affecting many firms in financial service, telecommunication, and technology industries. A dominant trend is the increasing distance from the customer (or student). Phone companies, utility providers, and banks once operated many small outlets, scattered throughout cities and present in every small community; now, however, there are a few large facilities (and increasingly, online services) backed up by call centers. For call centers to be successful and productive in any field, including distance education, a number of critical success factors must be in place. Successful call center implementations require the development of effective processes and policy, the implementation of appropriate technology, and effective human resource management processes (Evanson et al., 1998).

Processes and Policy

Once a call center business strategy has been developed, and the processes required to carry out the designated objectives have been adopted, it is crucial that those processes be evaluated. A key part of this evaluation involves looking at the types of contacts the call center is receiving, how contacts are routed, and how contact processes are managed. The call center should also establish polices and standardized operational procedures. Most importantly, quality monitoring and reporting processes must be in place, so that the call center can continue to meet established objectives.

Call centers are particularly effective, and had their genesis, in organizations that received large volumes of calls from customers who were experiencing uncertain results as they attempted to find the individual or department that could deal with their issue. Staff in such organizations were also frustrated, and not utilized effectively, as they forwarded calls or tried to help in areas outside their experience. The direction of calls to one area allows call center agents to handle queries in volume. Only calls requiring additional expertise not available in the call center are referred on to other areas of the organization. Call centers become a collection point for organizational information as databases are created to allow agents to handle a wide range of queries. Thus, over time, the expertise and information available to a call center is expanded, so that it can handle more of the calls coming to it without resorting to referrals and call backs.

A call center concept also can be used to allocate and distribute workload in the organization. Without such a center, highly paid professionals are often used to handle tasks that underutilize their expertise. A call center with good call routing processes can distribute calls to the individuals or automated agents most qualified to handle them.

Ideally, all relevant information about a customer and their issues is documented and available to all agents within a call center. In addition, with collaborative systems, more than one agent can simultaneously work out a particularly thorny issue with a customer, with each staff member contributing their particular expertise.

Organizations that are customer-focused use call centers most successfully (Evanson, et al., 1998). However, many firms seeking to become more customer-oriented purchase and install elaborate customer relationship management (CRM) software suites that track and record service transactions. If this installation occurs without significant planning, because managers are dazzled by the promises of the technology, the implementation is often a failure. Rigby, Reichheld, and Dawson (2003) emphasize that CRM installations work if the organization starts with a customer strategy, then realigns its structure and processes to fit the strategy, and finally selects the technology that is appropriate for the chosen strategy and processes. Whether implementing CRM technology, call center technology, or both, the organization must first ensure that its strategy is appropriately customer-focused, and that the technology being considered fits with that strategy (Hitt, Frei, & Harker, 1998; Rigby, et al., 2003).

CRM products have helped call centers organize some of their customer contact processes, and have also helped increase efficiencies and quality of service. According to John Kiska (2002), a new approach must be added to follow up on CRM processes. Customer experience management, or CEM, is emerging as a means to retain valued customers. It is widely know that retention of current customers is cost effective and highly profitable for an organization (Reichheld, 1996). This can also be true for a distance education organization that benefits from program or long-term students. A CEM process begins by identifying key measures for customer satisfaction and retention. The statistics it gathers can help organizations make sound decisions when it comes to call center operations and policies (Kiska, 2002). Holt (2000) holds opinions similar to Kiska's, indicating that customer loyalty and satisfaction are linked very closely to the success of the organization and call center.

> If call center operators used customer contact to understand attitudes to the company, to assess brand perceptions, to research responses to marketing activity, and to begin to unlock the secrets of long-term loyalty and advocacy, the value of that call center operation would increase immeasurably. It will enable other parts of the organisation to assess the relevant issues and take the necessary action. (p. 11)

Technologies

Information technology is increasingly important to a wide range of firms, and is the enabling platform for call centers, the Internet, and other innovations. Earlier in this chapter, we noted work by Davenport and Short (1990) on the relationship between information technology and business process redesign. Hitt et al. (1998) investigated adoption of technology in the financial industry. They note that research on IT investment has found that it is a substantial contributor to productivity and productivity growth.

In the last ten years, various call center technologies have become available to the market, including voice-over-Internet protocol (VoIP), customer relationship integration tools, and Internet and Web communication tools and products. In their study of call centers in the financial services industry, Evanson et al. (1998) note the requirement for call centers to ensure that their technology is effective or appropriate for the call center's strategy. Krol (2002) indicates that while excesses in the adoption of technology were common in the recent technology-bubble firms, organizations are now returning to basics. That is to say, call centers are more interested in products that provide mission-critical services. Customer loyalty and service objectives should drive call center technology investments.

Technology is transforming the traditional call center, allowing staff to be in contact with customers in a number of different ways, including, but not limited to, e-mail, chat, Web browsing, and voice mail. Finding the right technology is not an easy task, but the first steps must be to determine the organization's needs, and to link customers with the information and services they require quickly. Knowledge databases, CRM or customer tracking, CEM or customer follow-up and retention, and handling of multiple contact media must be integrated into a system that is easily accessible to front-line staff, or to customers directly. Automated systems can match customer and call center staff, based on the customer's profile and the staff member's knowledge focus. The banking industry is experimenting with such "intelligent routing" to direct calls from the bank's best customers to particular representatives (Knowledge@Wharton, 2002).

The first generation of call centers focused on answering telephone calls from customers (students). As the Internet has become more widely used, call centers have made use of this technology as well. Internet technology allows feedback to customers or students to occur through either of these two channels, and the more flexible Internet media provide a variety of tools, including Web chat, asynchronous conferencing, video conferencing, and Web call backs.

Recently, call centers have also begun to make use of Web sites to provide their customers with more information. There has been a push to providing customers with "Frequently Asked Questions" (FAQ) pages, where customers can look up answers to their own questions. Intelligent question and answer systems can look up answers for clients, and provide them automatically (Brandt, 2002). Athabasca University has developed such a tool, called Ask AU (see http://www.askau.ca).

When considering any of the Web-based tools for use with a call center, it is important to consider their positive and negative aspects, and how they will affect call center operations. Since the Internet gives customers or students the power to seek out answers on their own, organizations have a challenge to develop integrated systems that allow delivery of services that are better and that operate faster than those that customers can find for themselves. In addition, people tend to like services that are "multi-channel"; they may use the Web site, but will also want direct contact with representatives. The channels should be viewed as complementary, not competitive.

The Internet is capable of providing vast amounts of information for call center staff as well as for current and potential customers or students. However, developing user interfaces that make this information quickly available in a format that satisfies the diverse needs of users is an ongoing challenge. A major impact of the new Internet-based technologies is that the service bar is being raised. If routine issues are handled on the Web through automatic agents, the call center must handle more sophisticated calls.

Human Resources

Bartlett and Ghoshal (2002) make the case that human, not financial, capital must now be the starting point and foundation for successful strategy. Financial capital and also technology are increasingly being commodified, and each is found in abundant supply. As a result, the skills, knowledge, and ability to innovate of an organization's staff will increasingly be the distinguishing factors for successful strategy implementation and value creation.

Customer service studies show that when something goes right, customers give credit to the individual employee dealing with the problem; when something goes wrong, customers usually blame the organization itself. This fact makes it crucial for any organization to have the right number of people, with the right skills, at the right place and the right time, ready to answer customer demands (Krol, 2002). In North America, personnel costs form 60% to 70% of costs in call centers.

Clearly, therefore, recruitment and hiring of front line and call center managers, training and coaching of staff, and ongoing performance management are very important to a call center's success. Call center staff are the front-line human element for the customer. They need to feel that they are a vital part of the organization in order to promote the reputation of the organization. Selection of staff with customer service skills, such as excellent communication skills, writing skills, and a positive attitude, is very important. It is also important to recruit personnel with appropriate experience and educational background, to ensure that they are capable of providing quality services to customers or students.

Training and ongoing coaching is also extremely important, as call center environments, technologies, processes, etc., tend to change rapidly. It is important that staff is involved in the changes, buy into the new processes, and have the information they need to be able to carry them out.

Assessment and performance checks are extremely important. What are the employee satisfaction levels? What are your customers saying about the service they are receiving? Retention of staff is as important as retention of customers, so that loyalty to the service is maintained. Rigby et al. (2003) note that the prime driver of customer loyalty is the loyalty of the organization's employees. Creating a positive and healthy environment for employees will improve the service they provide to customers. Evanson et al. (1998) found that institutions with customer service representatives recruited from within the organization experience lower turnover. Also, organizations that have fewer empowered employees have higher turnover. They also noted that institutions with higher employee empowerment tend to have higher overall customer focus, and that institutions with greater customer focus have higher average spending on labour.

Adria and Chowdhury (2002) argue that call centers can and should allow employees to upgrade their skills, make more and better decisions, and participate in team-based organizational culture. Skills training leads to higher employee satisfaction and higher productivity. Frontline staff should be corporate ambassadors for the organization. They also argue that organizations should pursue decentralization and team building: frontline employees are more productive if they are allowed to make decisions and provide input into the operation of the call center; and customer service is more effective if employees feel they are part of the common effort to achieve excellence.

Call Centers in Marketing and Promotion

Early uses of call centers included marketing and promotion, as well as the provision of technical assistance. There are two primary operating modes for these functions. The first is to field calls from current customers wishing to place more orders or discuss products, and from new customers directed to the call center number by advertising and promotional materials. This is the function that increasingly involves the Internet. The second operating mode for a call center is the outgoing cold call. A possible customer is identified by region, income, or other factor, and is called at home with an offer the organization's product, a solicitation of a donation, etc. A carefully prepared script is provided for the call center staff to use in their contacts. This is a very popular function for a call center for charities and long-distance phone companies. Call centers are also used to carry out surveys (Coen, 2001; Hitch & MacBrayne, 2003).

In education, the primary use of call center technology in marketing and promotion is to field incoming calls from students who have learned of the educational institution through advertising, word-of-mouth referral, Internet search, or other means (Hitch & MacBrayne, 2003). Many institutions accept volumes of queries, from prospective students and their parents, in which they provide information about their programs, both educational and extra-curricular. Often, large numbers of attendants are only needed during peak recruiting seasons. In distance education, where students are not on campus, there is additional pressure to fill the information needs of current students on a day-to-day basis, by answering questions about course availability, helping a student get information about their performance, and so on. Finally, the student advising function, in which an advisor works with a prospective or current student to work through program planning issues, is also an ideal candidate for application of the technologies and organizational format found in call centers. The question of cold calling to solicit customers or students is more questionable, but should perhaps not be dismissed out of hand. The structure of such calls and the criteria for initiation would require careful consideration. However, it is interesting to note that Evanson et al. (1998) found that employee turnover in call centers was lower when large calling campaigns were outsourced.

Call Centers for Provision of Technical Assistance

Many colleges and universities support multiple software and hardware platforms. With increasing offerings in online distance education, students will not only be calling with questions related to course content; they will also require technical assistance. Good service to students requires a single contact point for both technical and content related questions.

Helpdesk Meets Call Center

The helpdesk first emerged to help customers and staff of organizations deal with technical problems associated with computer use. Noel Bruton, a well known IT consultant in Great Britain, notes that the IT helpdesk took on its current form in the mid-1980s. The call center concept used today came later, in the nineties, to deal with issues and queries that are not related to technology (Bruton, 2002). According to Bruton, a key difference between a helpdesk and a call center lies in how the two functions deal with knowledge management. He contends that helpdesks, while they do impart prepared or premanufactured information, also require diagnostic skills from their staff

It is the experience of the authors that call center services to students engaged in e-learning require that call center staff have diagnostic skills that enable them to work with students to determine the nature of and solutions to their course content queries (tutoring), and to work through program issues (advising). To deliver a one-stop shop for students engaged in e-learning, it is important that the diagnostic skills offered by a helpdesk are combined with the directive and prepared services of a typical call center.

In a consolidated call center/helpdesk, the use of a knowledge base is important for both functions; however, with diagnostic situations, the bigger problem is usually trying to deduce the actual problem. The knowledge base built up for many course-related, program-related, and technical questions can be very straight-forward and can comprise simple questions and answers. The knowledge base for diagnostic questions must also include a step-by-step guide for asking questions to determine the nature of the problem, followed by steps for solving the problem. Learning to deduce the actual problem is a unique skill set and takes time to learn.

The staff of an online learning call center must incorporate skills from both call center and helpdesk environments, and have some specialists available to deal with particularly complex issues. Good skills within an environment such as this usually include strong communication skills, student (or customer) service experience, and an ability to adapt to new situations.

The call center manager can help staff answer all types of questions by ensuring that all staff are aware of any new technology being used. Demonstrations on how the technology works, and time to practise and become familiar with the application are important for the staff. A good set of "Frequently Asked Questions," complete with step-by-step solutions, should be made available to call center staff. And, as with course content queries, there should also be a technical expert available for more complex issues.

Brandt (2002) notes that only 14% of all helpdesk calls are new problems that require serious attention. The remaining 86% could all be resolved automatically, without human intervention, via Web-based features. It has also been shown that if end-users are equipped with better documentation or automated self-help Web-based facilities, calls to the call center or helpdesk can be greatly reduced (Hunter, 2000; Brandt, 2002; Lawlor, 2001). Lawlor (2001) points to surveys showing that organizations that reduced the number of helpdesk/call center calls by creating self-help options had a higher level of user satisfaction.

Doherty (2001) points out that help desks are typically organized in layers or tiers. Tiers can start at Web-based self-help which Lawlor (2001) designates as tier 0, and move up in hierarchy to the front line facilitator, tier 1; through the desktop analyst, tier 2; to the network specialist, tier 3. A consolidated call center/helpdesk in education will likewise be layered in tiers. Where possible, Web-based self-help (tier 0) should be developed, providing extensive FAQ files, bulletin boards, and conference and chat areas. Call center staff that are the first contact with students are tier 1, technical experts to whom questions are referred are tier 2, and the academics serve as tier 3.

Call Center Consolidation

Call center consolidation makes a great deal of sense for a number of reasons, including the rapid progression in technological advances enabling better access to organizational information for call center agents and customers. When there are similarities in the tasks performed and overlap in the services provided by currently separate call centers, there is an immediate potential for economies of scale. An agent in a large group can handle more calls at a given service level than they can in a small group. Mitchell (2001) points out that efficiencies can be achieved up to a center size of approximately 50 agents. After this point, incremental gains are minimal if they occur at all. While many call centers contain many more than 50 agents, the maximum optimal size for their subunits or teams is 50. Other motivators for call center consolidation include reduced equipment costs, simplified implementation of new technologies, better control over service quality, and reduced management staff requirements.

In the past, call centers segmented calls on the basis of skills. Consolidation can also occur within a call center by rationalizing the segmentation of some agent groups. For example, in a bank, commercial loans required different skills than personal loans. In other settings, technical help requires different skills than service, which requires different skill than sales. According to Mitchell (2001) knowledge management, process management, just-in-time training, and CRM all contribute to the tearing down of skills barriers to service. Mitchell notes that

> today's segmentation strategies no longer look to agent skills as the basis for routing calls, but instead focus on client value to determine what services to provide through what media. Low value customers get routed to self-service technologies. High value customers get high-touch service. No matter who or what the customer ends up interacting with, the agent, human or computer, has all of the services, corporate knowledge and process flows needed to handle the customer requests.

In an educational environment, the concept of "low value" and "high value" customers has no place; however, the concept of segmentation is potentially useful. Such segmentation would be based on student characteristics (program versus non-program, graduate versus undergraduate, area of study, etc.), as well as type of query. Many queries may be routed to self-service areas, while others are routed to specialized agents. Data collected within the call center will inform the segmentation. Improving data will allow each agent to handle more diverse and more difficult calls, and as more knowledge becomes incorporated into knowledge systems, training becomes more an exercise in teaching agents the "how to's" of developing customer relationships rather than focusing on each product or service offered.

Call Centers at Athabasca University

Athabasca University serves more than 24,000 students annually. Courses are offered primarily through independent study, in which students have the flexibility of time and place to set their own schedules, and so, in effect, to pursue part-time studies and a full-time career. The University strives to remove the barriers of time, space, past educational experience, and to some degree, level of income. Athabasca University's mission and mode of operation make effective methods of communicating with students and prospective students very important. Using the call center model to build student satisfaction is an attractive alternative for Athabasca University.

Over the past 10 years, Athabasca University has developed three unique call centers, described below.

- The Information Center, the call center operating as a first point of contact, was established in 1995. Information Center staff field all incoming calls not directed to a private line or to one of the other call centers, and determine the purpose of the call. Information Center attendants are well informed about the University's services, programs, and courses, and have access to a wide range of information. Many calls to the Information Center are redirected to student advisors, to the Office of the Registrar, to the Computer Services Help Desk, to the School of Business Call Center, or to course assistants. Prior to 1995, incoming calls came to a single telephone number in the Office of the Registrar, and many calls were lost. In addition, students expressed frustration with their experience in finding the right person in the institution to deal with their particular problem. Since 1995, many of these problems have been resolved, and the volume of calls, and students, has increased exponentially. In the past five years, the volume of e-mail queries has also risen rapidly, and an automated information system called "Ask AU" has been added to enable students to obtain answers to questions without intervention of a staff member.

- The Computing Services Help Desk, established in 1994, provides technical assistance primarily to help University staff obtain information and support for University computing resources; that is, it helps staff resolve problems with their Athabasca University equipment and supported software. The Help Desk does provide assistance to students in computing science and psychology courses, but students are generally referred to the academic units for courseware support.
- The School of Business Call Center was created in 1994 as a pilot project to investigate the feasibility of alternative tutoring methods. It has grown to include almost all School of Business undergraduate courses, which account for approximately 11,000 registrations or 30% of the University's undergraduate course registrations. The Call Center is the central focus of student support in the undergraduate School of Business, and is integrated with its online course delivery platform, which will be described in detail below.

Potential Developments in Athabasca University Call Centers

The Information Center has operated as an inbound call center and has not been used to make outward calls, except to return messages. It has been very effective in provision of information and facilitates the recruitment process in this respect. In the future, there is no reason why the Information Center could not expand its role to also make outgoing calls to students graduating from high schools and college diploma programs to inform them of opportunities at Athabasca University, should the University decide to pursue this recruitment strategy. It would, of course, be necessary to balance the drive for efficient outgoing call practice with the need for customer focus. When call center staff have underused time, they might be able to make outgoing calls, but they should focus on customer-retention calls (Evanson et al., 1998).

There is potential for consolidation of the three call center groups into a single organizational structure: together, they have less than 50 staff, and they do have some service overlaps. In addition organizational efficiencies are available. Even without consolidation of functions that involve direct student contact, significant improvement in the quality of functions can be obtained by centralizing operations such as center design, staff planning, network design and management, ongoing standards reporting, IT liaison, contact automation, quality assurance, and training. Consolidation can also simplify disaster recovery issues.

The three call centers have enough overlap to make the economies of scale attractive. Achievement of such economies would logically involve the widening of call center service to include all University academic units. Many of the calls handled by the Information Center deal with academic administration, and so mirror calls handled by the call center. The call center concept could also be extended to include functions served by the course assistants, who also answer student queries, relay mark and assignment information, and so on. As more of these functions, and those handled by staff from the Office of the Registrar, are placed online, the group of services eligible for call center service expands.

Call Centers in Distance Education and Distributed Learning

Can a call center be used as a vehicle for academic coaching and advising? In distance and online education, there is an automatic separation of the instructor and the student through the elimination of the classroom. The historical practice in distance education has been to prepare detailed and thorough learning packages to guide the students in their study, and to provide tutorial support by mail and telephone. The traditional tutor at Athabasca University is the focal point for student/institution contact, with the tutor answering many administrative queries and relaying marks, as well as directly helping in an instructional role.

In the early 1990s, the business faculty at Athabasca University developed a call center model as a one-window approach for its instructional tutoring (see Adria & Woudstra, 2001). The key to its success to date has been the development of a groupware call back conference, in which call center staff (called "undergraduate student advisors") post student subject matter queries they cannot answer, and requests by students to speak to the course academic. In this way, academics field only substantive, course-related questions or problematic administrative issues. This system can ensure that someone who can answer their questions and discuss the subject matter in depth quickly responds to students. The model also allows the separation of the tutoring and marking roles that are combined in the traditional tutor model at Athabasca University, and which, we contend, form a bottleneck in the effectiveness and efficiency of the instructional function, by preventing the use of economies of scale in marking and in the handling of administrative queries. In the traditional Athabasca University tutorial model, a tutor is responsible for all contacts for an assigned group of 28 to 40 students, and marks all assignments for this group. Tutors are generally available in three-hour blocks once per week. In the call center model, students in a given course are not broken into groups; administrative questions are answered by the undergraduate student advisors, who form tier one of the model; an academic expert role exists purely for answering students' academic content queries; and a specialist marker role has been created to handle marking duties.

Under the School of Business call center model, students in any course are able to call a toll-free central telephone number five afternoons and six evenings per week. The call center now provides about 60 hours of access to telephone and e-mail assistance each week to students, and can deal with 80% of the calls directed to it (Adria & Woudstra, 2001) referring to call back only the 20% of calls to which the course academic should respond. Course academics over a broad range of courses are freed from 80% of the calls they (or their tutors) would otherwise receive, and the student's queries are answered quickly, as received, rather than once per week during an academic's telephone contact hours.

It is anticipated that improvement of technology will allow the routing of calls directly to particular agents or academic area experts. The knowledge available to and level of expertise expected of selected staff will increase constantly, to allow direct answers to more of the 20% of queries now referred to academic experts. Call center staff will handle more challenging calls about academic content, as well as providing help with student program advising.

Prior to the implementation of call center model, payments to telephone tutors were one of the School of Business's largest expenses. Each academic advisor now handles calls from about three times as many students per week as an average telephone tutor previously did. As a result, student support costs have been reduced by approximately $100,000 annually in School of Business undergraduate independent study courses. The cost savings enabled the development of the call back conference. In addition, an online course development and delivery system incorporating the call center was developed for most School of Business undergraduate courses. The technology used was Lotus Notes®, a groupware software suite. Online course materials are continually being developed and improved, so that students can access course help through their course Web sites, as well as interact with call center staff and academics via the Web, using chat or discussion boards.

The call back conference database allows undergraduate student advisors and academics to track and resolve student queries online, a necessity once student support was spread among academic and support staff. The tracking in the call back conference only accounted for approximately 20% of student contacts that could not directly be answered by the undergraduate student advisors (Adria & Woudstra, 2001). However, beginning in the 2002-2003 academic year, a comprehensive Notes-based student tracking system has tracked all queries to the call center, including those handled by the call back conference, whether by e-mail or telephone. The system is Web-enabled and allows academics and other University staff to access the database from virtually anywhere, using a standard Web browser. The database is also able to produce reports and statistics on student contacts, for use, among other things, in improving courseware.

Each year, Athabasca University surveys a group of students about their satisfaction with the services they receive from the academic departments (see Athabasca University, 2002). These surveys point to areas in which the Call Center can be improved, or areas where it should continue doing those good things that are working well. The surveys show that the differences between direct tutor-to-student interaction and call-center-to-student interaction are very small, and the accessibility of the call center is an accepted and valued service to Athabasca University students. Reports such as these, and tracking information received from call center databanks, inform decisions about how services will be distributed to students. Problems quickly come to light in the call center environment, whereas long delays often occurred in the previous student-to-tutor model.

A factor requiring improvement in the School of Business call center model is the involvement of the full time academics as a group in the delivery of instruction and service to students. While the opportunity exists for their involvement, many have chosen to concentrate on their research activities, and to "buy out" their academic tutoring responsibility. Students ask for contact with the course academic, and then find their contact is delayed or does not occur as they had supposed. Inclusion of student contact requirements in negotiated annual workloads would easily solve this problem.

Conclusion

As Athabasca University takes the shape of a decentralized, network environment, as envisioned by the Strategic University Plan, the call center organizational format becomes more and more natural. There is considerable scope to expand the concept of call center service to the two thirds of undergraduate students not in the School of Business. Some of these students obtain some service from the Information Center; others, who have had experience with the School of Business call center, try to use it to obtain service when they study in other areas of the University. Furthermore, many of the services provided by the Office of the Registrar and by the University student advisors are candidates for consolidation into call center formats.

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CHAPTER 13

SUPPORTING ASYNCHRONOUS DISCUSSIONS AMONG ONLINE LEARNERS

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Introduction

Many universities now offer Internet-based education. Most research studies have determined that the Web is an effective teaching medium, with student learning outcomes at least equivalent to those of classroom-based students (see, for example, Gerhing, 1994; Golberg, 1997; McCollum, 1997).

Web-based courses generally reflect many features of the traditional academy: they generally have specified start and end dates and limited entry points, and they consist of cohorts of students who proceed through each course at about the same pace. This cohort model lends itself to a group-based, online learning experience. Commercial online learning management systems (LMSs), usually assume an underlying cohort-based learning model, and attempt to replicate many desirable features and activities derived from classroom-based learning contexts. This strategy, in turn, enables increased interaction and knowledge construction among learners. Not surprisingly, most research about online education is informed by these cohort-based learning experiences (see, for example, Arbaugh, 2001; Burke, 2001; McEwen, 2001; Rourke & Anderson, 2002).

However, there is also a long tradition of open education that addresses the needs of learners who for one reason or another do not fit the classic mould of higher education. In large open and distance education institutions, such as many of the "mega universities" described by Daniel (1997), or in smaller variants, like Athabasca University in Canada, the primary objective of the learning model is to provide a greater degree of flexibility for students. In the more flexible of these institutions, learners may enrol in courses throughout the year (continuous enrolment) and proceed through these courses at their own pace. Assignments and examinations can often be completed at any time and in any order. The relatively unpaced nature of this "individualized" model appeals to learners who have significant other responsibilities, such as full-time jobs and families, or who, for some reason, require flexible alternatives to acquire course credits to transfer into other external programs.

These two, somewhat divergent views of higher education appear to have resulted in differing conceptions of the relative importance of mediated, two-way communication in the distance education process, as discussed in the following section.

The Interaction Debate

Holmberg (1983) conceptualized distance learning as essentially an individual act of internalization. Thus, he saw instructional design that supported learner autonomy and independence as important for learners at a distance. He asserted that distance education institutions needed to provide open access and unpaced courses, and should not require group learning activities (pp. 64-65).

Keegan (1990) characterized effective distance education processes as "reintegrating" the teaching and learning acts; that is, replicating as many of the attributes of face-to-face communication as possible, yet maintaining learner autonomy. Interpersonal communication at a distance did not need to be limited to more direct forms of instructor-student interaction, such as telephone conversations or teleconferencing, but could also be recreated through appropriate design and use of printed instructional materials. In this instance, reintegration occurred when printed learning materials were easily understood, anticipated potential learner problems, provided carefully constructed course objectives and content, and contained ample practice questions and related feedback. Like Holmberg (1983), Keegan considered the more important characteristics of adult distance education to be learner independence and personal responsibility for educational outcomes and processes.

However, not all writers agree that learner autonomy and independence continued to be the chief hallmarks of adult learning after the advent of various forms of online communication.

Garrison (1988) expressed the need for a balanced approach between teacher-centered relationships found in face-to-face education, and to a lesser extent, traditional distance education, and the tendency to stress learner-centered relationships in the emerging electronic learning environment. The ability of instructors and learners to communicate openly and collaboratively, and to determine the appropriate, delicate balance between the needs, values, and perspectives of both parties were particularly strong and promising features of the advent of interactive electronic communication technologies (pp. 125-126).

Garrison (1989) argued that dialogue and debate were essential for learning, because these forms of two-way communication allowed learners to negotiate and structure personally meaningful knowledge. Teaching necessarily transmitted societal knowledge, but a rounded learning experience needed to foster critical analysis processes in order to bring personal perspectives to bear and create new understanding for both the teacher and student (pp. 7, 19).

Holmberg (1990) took exception to these assertions. He argued that the vast majority of distance education continued to be based on a correspondence model, characterized by student independence, separation in space and time, and the use of printed material as the primary means of instruction. This model could be supported with various means of two-way communication, depending in part on financial considerations, and in part on instructor and student preferences. Mediated communication had always been a primary characteristic of distance education, he maintained, but merely supplemented the traditional correspondence-based model of distance education. As a result, the nature of distance education may have evolved, but it had not been revolutionized with the introduction of online communication technologies.

Garrison and Shale (1990) responded that Holmberg's conception of distance education was deficient, because it relied on enabling technologies to define the phenomenon. Correspondence study, they argued, had arisen as a result of technological innovations—the mail and telephone systems. These systems were being replaced by newer, more effective, mediated two-way electronic communication systems. A more integrative, technologically independent view of distance education, one that focused on the essential educational feature of learning, was needed. Garrison and Shale defined this feature to be sustained, two-way communication between instructor and learner.

Various writers, including Jonassen, Davidson, Collins, Campbell, and Banaan-Haag (1995), developed this conception of online learning even further. To them, sustained two-way asynchronous communication not only enables greater instructor-learner communication, but most importantly, enables the social construction of knowledge among learners at a distance. This constructive effect occurs when online learning environments require, among others, "negotiation of meaning and reflection on what has been learned" (p. 21).

This relatively distinct divide between theorists appears to be essentially unresolved at present. One view (represented by both Holmberg and Keegan) conceptualizes the process of distance education as involving primarily flexible, unpaced learning that facilitates learner independence and autonomy. Others (such as Garrison) conceive the distance education process as now being transformed into one of sustained two-way communication, where significant, frequent interaction between instructor and learner and among learners is the essential, enabling learning feature. It is noteworthy that, in practice, this dichotomy appears to manifest itself in the degree of pacing incorporated into course and program structures. This factor is discussed further in the next section.

Technology and Types of Interactions in Online Learning Environments

The means of interaction among two or more people depends on their relative locations in time and space, as illustrated in Table 13-1.

Using this schema, and by definition, distance learning can only take place in quadrants 2 and 4. It is in these areas that teaching and learning activities occur in different places, requiring some form of technological mediation. Technologies that facilitate synchronous online learning (e.g., desktop video conferencing, chat, and audioconferencing) fall into quadrant 2 (different place, same time). Asynchronous technologies (e.g., computer conferencing, e-mail) fall into quadrant 4 (different place, different time).

However, this representation does not take into account the relatively paced or unpaced nature of online courses. “Place” is extraneous to the analysis if only forms of communication that must be used among physically dispersed individuals are considered. As a result, this variable can be replaced with “Pace,” to gives us the more descriptive schema of online learning shown in Table 13-2.

For instance, synchronous forms of technology-mediated communication, such as desktop video conferencing, generally occur in quadrant 1 (same pace, same time). Asynchronous forms

	Same place	Different place
Same time	**1**	**2**
Different time	**3**	**4**

Table 13-1. Types of interaction in learning environments.

	Same pace	Different pace
Same time	**1**	**2**
Different time	**3**	**4**

Table 13-2. Types of interactions in online learning environments.

of communication, such as computer conferencing, occur in quadrant 3 (same pace, different time).

In both paced and unpaced online learning environments, various types of interpersonal, mediated communications are possible: student to student, student to class, instructor to class, and student to instructor. However, Table 13-3 illustrates that, in practice, there are relatively few forms of electronic technology that are both supportable by the learning institution and suitable for the unpaced online learning environment.

Tables 13-2 and 13-3 illustrate that technologies exist to facilitate all forms of synchronous and asynchronous interaction in paced, online learning environments—the type of interaction envisioned by Garrison (1989, 1990) and Jonassen et al. (1995). However, facilitating interaction among learners in an unpaced online setting is still problematic, despite rapid advances in technology and online learning management systems, because most online learning systems have evolved from classroom-based educational models and group-based support systems. Although online technologies can be adapted to facilitate some forms of interaction—for instance e-mail to allow learner-learner communication—organizational and systems problems engendered by the rolling nature of student registrations may make these practices difficult to implement.

Presumably, other means, such as the use of carefully structured instructional material (whether online or printed) must be used at present to provide meaningful unpaced learning experiences to students at a distance. These strategies are very similar to those promoted by Holmberg (1983, 1990) and Keegan (1990). The failure to distinguish among relative degrees of pacing in distance education courses or programs, and the organizational and learning system differences that result, may account for varying conceptualization of the appropriate means to achieve "interaction" in the distance education literature.

As a result of this analysis, it also seems clear that unpaced online learning must address some important practical challenges. The balance of this chapter describes the development of an online learning system prototype designed to facilitate learner-instructor interaction, and a limited form of learner-learner interaction, in an unpaced online environment. The system appears to provide learners with maximal amounts of flexibility, yet to rectify an

Table 13-3. Technologies that facilitate interactions in online learning environments.

Interaction type	Enabling online technology	
	Paced	**Unpaced**
Student to student	e-mail telephone/pager/ voice mail online chat CMC	none[1]
Student to class	teleconference desktop audio/ video conferencing class e-mail discussion boards computer conferencing	none
Instructor to class	teleconference videoconference class e-mail discussion board computer conferencing	course Web site notices class e-mail[2]
Student to instructor	online chat telephone/pager/ voice mail e-mail	telephone/pager/ voice mail

1. Such technologies are not available, unless students are apprised by the institution of the means to contact other students; for example, given e-mail addresses and telephone numbers. In practice, this is difficult.
2. It is difficult in practice to determine the e-mail addresses of all active students in unpaced online learning environments.

important practical gap in unpaced online learning: the means to communicate effectively with peers and instructors, and thereby facilitate group-based learning. However, many of the features of this system can also be applied to paced online learning environments, thereby addressing some needs of learners and instructors that are common across all online learning models.

The ASKS System

Collaboration among students in an unpaced online learning environment is difficult because, by definition, they do not belong to a cohort, and their courses are designed to be self-paced. As a result, even two students who begin a course on the same day can quickly be at different points within it. Interactions among learners cannot be easily facilitated, monitored, or evaluated. Furthermore, increased interaction in unpaced online environments can significantly increase costs to the institution (Annand, 1999).

The ASKS (*as*ynchronous *k*nowledge *s*haring) prototype is designed to overcome these difficulties. It uses discussion boards with capabilities characteristic of most group decision support systems (Nunamaker, Dennis, Valacich, Vogel, & George, 1991). Learners and instructors access the system directly via the Web. The main student screen is divided into three areas, as shown in Figure 13-1: knowledge sharing topics in the left-hand pane, the

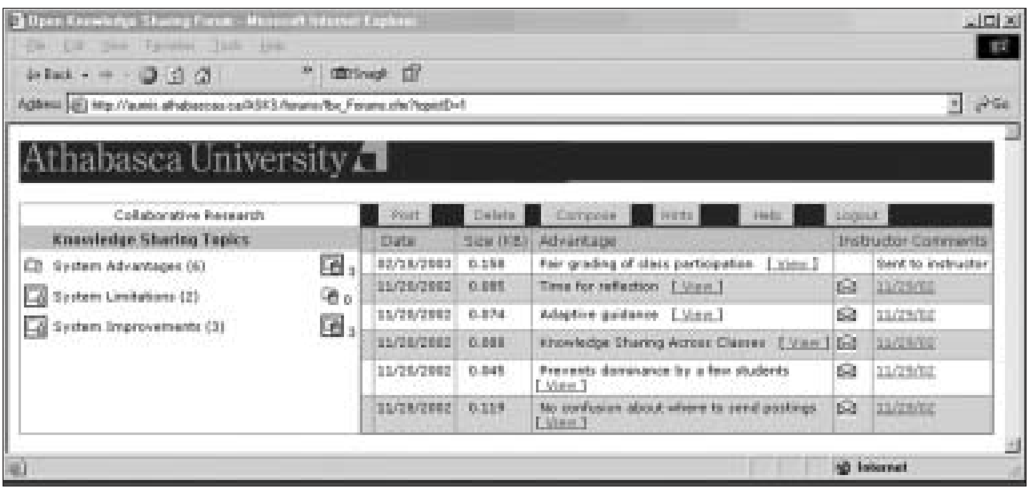

Figure 13-1.
Student main screen.

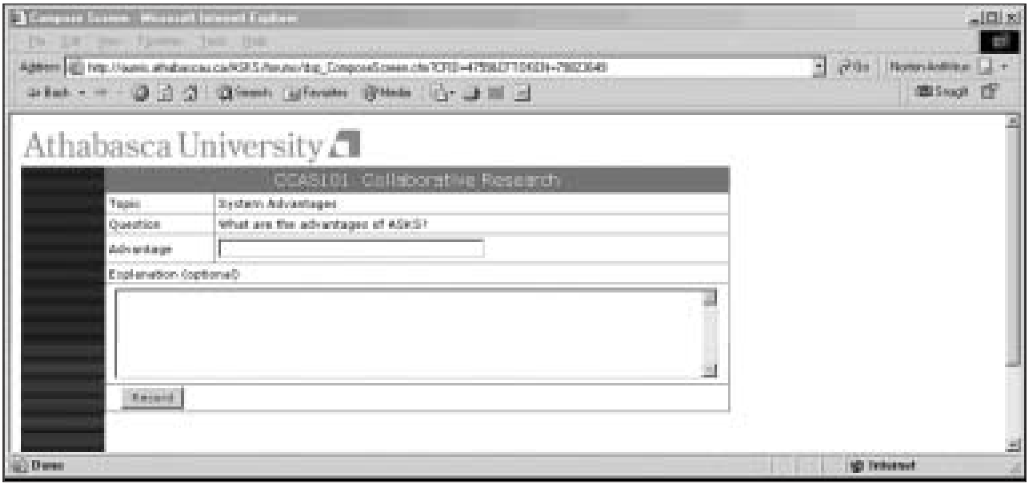

Figure 13-2.
Topic editing screen.

main menu in the top part of the right-hand pane, and the topic headings just below the main menu.

Each knowledge sharing topic has four parts: a closed or open file folder icon just to the left of the topic, the topic itself, the number of entries created by a student for the related topic (shown in parentheses), and a trash can icon showing the number of entries that have been deleted. Each knowledge sharing topic is described briefly, in a phrase similar to the subject line in an e-mail message.

When the file folder icon for an applicable topic is opened, the individual student's entries related to the topic are displayed in the right-hand pane. In this case, six entries have been made by the student related to the topic, "System Advantages." Each response to the knowledge sharing topic is accompanied by the date an entry was entered or last modified, the size (in kilobytes) of the response, a short description of the entry, and a link to a more detailed explanation.

Topic submissions can be created by clicking the "Compose" button. This action brings up the editing screen shown in Figure 13-2.

This screen has the look and feel of most e-mail systems. A subject line provides a brief description of the response. The "Explanation" area is similar to the main body of an e-mail. Students may compose their detailed responses to the given topic here, if they wish. If no explanation is entered, the system default reports "No explanation, point self-explanatory."

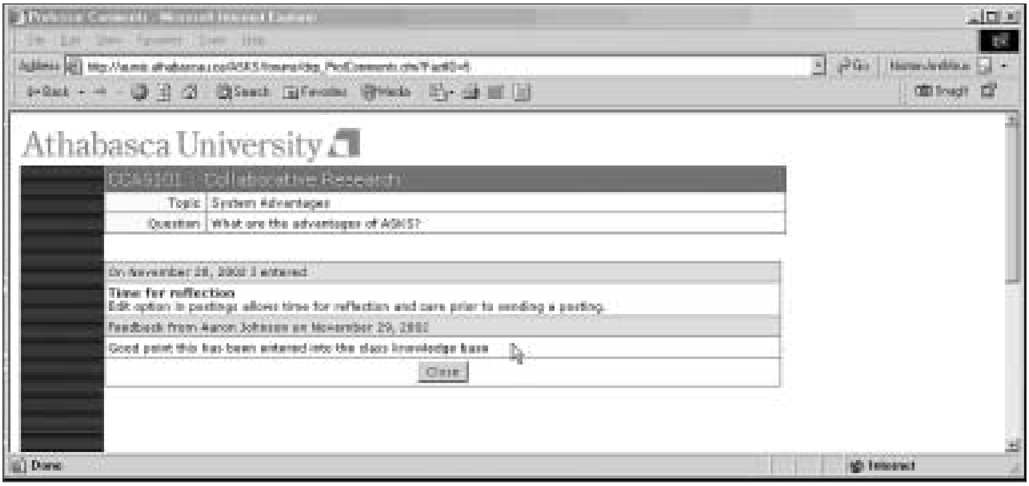

Figure 13-3. Instructor's comments on an individual entry.

A student cannot view others' responses to a knowledge topic until they have made and submitted their own. When entries are submitted, they are accessible to the instructor for reviewing, and unavailable to the originating student for further editing. Other students cannot view these submissions until the instructor has reviewed them.

The last item in the right-hand pane of the student main screen (Figure 13-1) is the "Instructor's Comments" section. If the instructor has evaluated an entry, a "new mail" icon and the date of the evaluation appear in this section of the originating student's screen. Entries that have been rejected by the instructor appear with a red "X" icon. Other possible instructor comments are "Not sent to instructor yet," for entries that have not yet been submitted for evaluation, and "Awaiting evaluation," for entries that have been submitted but not reviewed by the instructor.

Clicking the date in the "Instructor's Comments" column opens the screen shown in Figure 13-3.

This screen provides each student with the instructor's feedback on their submissions in a private workspace. If the instructor is not satisfied with the overall quality of submissions from a particular student, they can provide hints to the student. The "Hints" button is hidden until the instructor has commented on all entries made by the student. Clicking on this button brings up an instructor feedback screen like that shown in Figure 13-4.

Figure 13-4. Instructor hints.

The instructor's overall comments are shown in red. The summary of student Mary Swift's responses is shown in the left-hand column. In addition, a list of points not mentioned by the student, but submitted by others in the virtual cohort, is shown on the right-hand side of the screen. The instructor can choose the amount of other students' contributions disclosed to a participant. The student then submits additional responses until the instructor is satisfied. At this point, some or all of the student's responses can be viewed by others in the virtual cohort, and commented upon by peers if desired or required by the instructor. Viewing may be restricted by the instructor to new points not yet raised by the other students, to provide a more succinct knowledge base. As well, the cohort size can be restricted by submission date; for example, all contributions made in January in one course. This strategy creates online cohorts that are not based on a rigid schedule of submission deadlines, as in a paced environment, but rather are based on students' similar place in a course within a particular period of time. As a result, cohorts can be formed spontaneously and without instructor mediation.

The ASKS Instructor Environment

The main screen for instructors, Figure 13-5, shows the student submissions awaiting evaluation.

In this case, there are three related to the knowledge sharing topic, "System Advantages": one from Mary Swift, and two from John Doe. Clicking Mary Swift's name opens the evaluation screen shown in Figure 13-6.

The ASKS system streamlines the instructor evaluation process through several means. The upper left-hand part of the screen shows the student's submission to be evaluated. The upper right-hand part shows a summary of points already contributed by the cohort, as selected by the instructor in previous evaluations. The bottom left-hand part of the screen ("Evaluation") enables the instructor to judge a particular response in terms of those of other cohort members ("Class Matching"), clarity of presentation ("Articulation"), and the importance of the point to the knowledge sharing topic ("Relevance").

With respect to Class Matching, one of three possible evaluations is selected. The entry may be judged to be similar to a current class entry, to be a new entry for the cohort, or to be unacceptable in its current form. Selecting any one of the three options fills the feedback box in the bottom right-hand part of the screen with a randomly selected preset comment, suitable to the evaluation type selected. As a result, instructors do not have to type in comments for every entry they evaluate. However, the comments can be easily modified if the instructor feels that more descriptive feedback is needed.

After all the entries on a knowledge sharing topic are evaluated for a particular student, another comment screen automatically appears. This screen enables the instructor to enter an overall assessment of the student's entries, and also gives the student permission to view other students' contributions. The default setting enables access to all the entries. The instructor can choose to keep some entries hidden, as an encouragement to the student to come up with the missing points. Comments to the student can also be modified to assist this process. These comments are then posted, and become available to the student for viewing either in the "Instructor's Comments" section of the student screen, if the student's overall contribution is satisfactory (see Figure 13-1), or as "Hints" if it is not (see Figure 13-4).

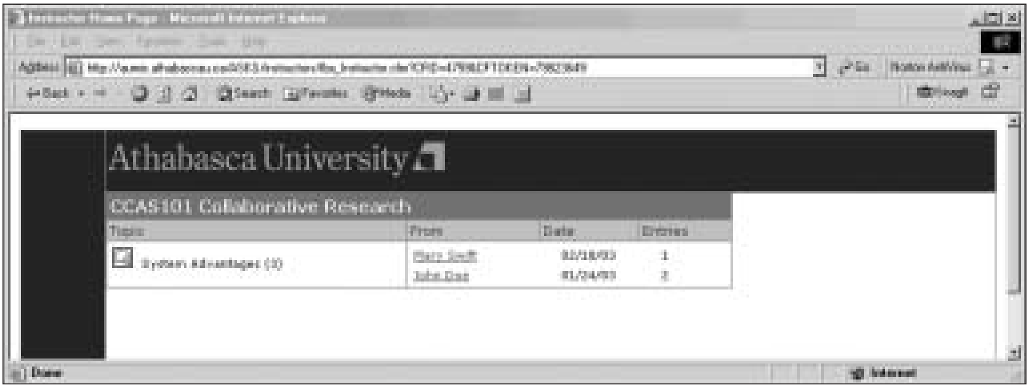

Figure 13-5.
Instructor main screen.

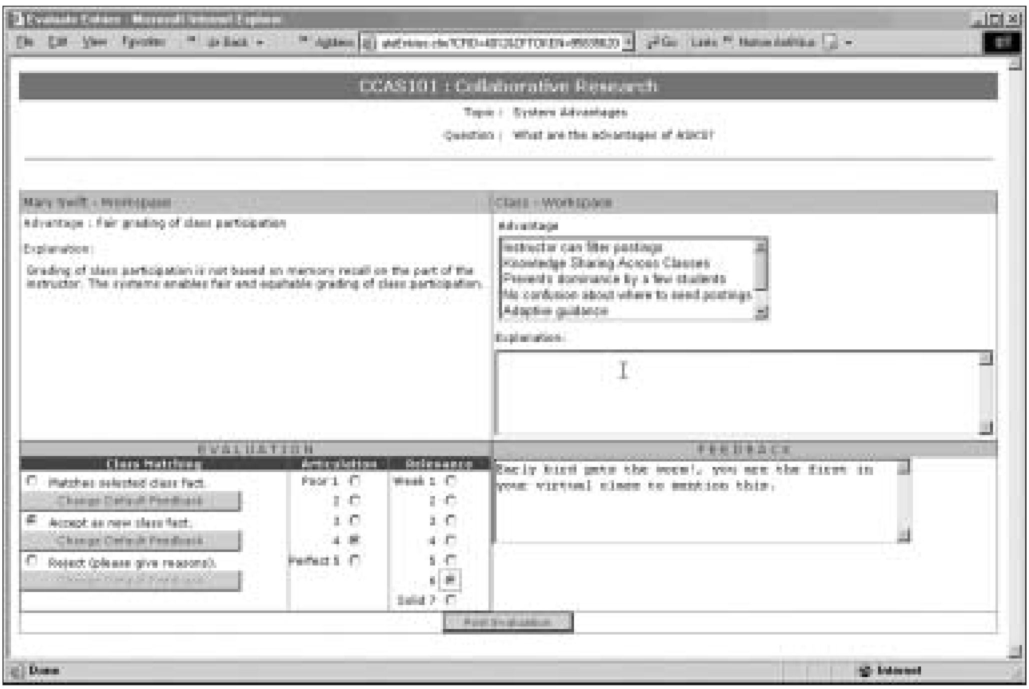

Figure 13-6.
Submission evaluation screen.

Table 13-4.
Criteria weighting.

Criterion	Weight
Attendance	10%
Participation	20%
Articulation	30%
Relevance	40%
TOTAL	100%

A student's overall class participation mark for a given knowledge sharing topic is automatically calculated by ASKS, and is based on four criteria: attendance, participation, articulation, and relevance. Relative weights are pre-assigned to each of these categories by the instructor. As an example, let us assume that the weights assigned by the instructor to the four grading criteria are as shown in Table 13-4.

The computation of individual student grades for a hypothetical class is illustrated below. The example assumes a class of three students and 10 critical thinking topics, with the class generating five unique responses for each topic. In reality, the class size, number of topics, and unique responses generated for each topic will vary. The assumed number of responses raised by each student for each topic are shown in Table 13-5. A black box indicates that a student did not contribute to a particular topic.

An attendance mark is awarded for each topic that a student addresses. In this example, Student 1 received 100% (10/10) for attendance because all topics were addressed. Students 2 and 3 received 90% (9/10) and 80% (8/10) attendance scores, respectively. These scores are then weighted according to the attendance factor assigned in Table 13-4 to form part of the student's overall mark. The formula is given below.

$$\text{Attendance} = \frac{TA}{T} \times W_a$$

where

TA = Total topics attempted by student
T = Total discussion topics for the course
W_a = Weight for attendance criterion

Topic	Number of responses			Class
	Student 1	Student 2	Student 3	
1	3	4	5	5
2	4	5	■	5
3	3	5	5	5
4	4	5	5	5
5	4	5	5	5
6	4	■	5	5
7	5	3	5	5
8	4	4	5	5
9	3	5	■	5
10	2	4	5	5
Total (*n*)	36	40	40	50

Table 13-5. Assumed student contributions to class responses.

STUDENT 1						
Topic	Class response					Total
	1	2	3	4	5	
1	■	3	5	■	5	13
2	4	5	4	3	■	16
3	3	4	5	■	■	12
4	3	5	3	4	■	15
5	4	2	■	3	5	14
6	■	5	5	4	4	18
7	2	2	4	4	4	16
8	5	1	5	■	5	16
9	4	■	4	■	4	12
10	■	■	5	■	3	8
Grand total						140

Table 13-6. Individual students' articulation scores.

Table 13-6. (continued)

STUDENT 2						
Topic	**Class response**					**Total**
	1	2	3	4	5	
1	3	■	3	5	2	13
2	3	4	5	5	2	19
3	3	5	5	5	3	21
4	4	4	5	2	3	18
5	3	3	5	4	3	18
6	■	■	■	■	■	0
7	2	■	5	■	3	10
8	■	5	5	2	4	16
9	2	3	3	3	4	15
10	4	3	4	3	■	14
			Grand total			144

STUDENT 3						
Topic	**Class response**					**Total**
	1	2	3	4	5	
1	1	3	3	3	3	13
2	■	■	■	■	■	0
3	4	4	1	2	3	14
4	1	1	3	1	4	10
5	2	1	1	3	5	12
6	2	2	5	1	5	15
7	1	3	2	4	3	13
8	3	5	5	1	1	15
9	■	■	■	■	■	0
10	3	4	5	5	1	18
			Grand total			110

Individual participation marks are awarded based on the number of responses raised by each student compared to those raised by the whole class. In the example above, Students 1, 2, and 3 raised 36, 40, and 40 responses, respectively. The class as a whole raised 50 unique responses. As a result, Student 1 received 36/50 or 72% for participation. Students 2 and 3 each received 80% (40/50). Each of these marks is then weighted according to the participation factor assigned in Table 13-4. The formula is shown below.

$$\text{Contributions} = \frac{n}{N} \times W_c$$

where

n = Total count of class or equivalent facts entered by student for all topics
N = Total count of class facts for all topics
W_c = Weight for contributions criterion

Articulation is a criterion for evaluating how well a student response has been written. Articulation marks for each student response submitted are awarded on a scale of 1 to 5 by the instructor at the time of submission. The articulation scores for the three example students for each of the ten topics are shown in Table 13-6. Black boxes indicate responses that a particular student did not raise.

To obtain the denominator used to calculate the articulation score for an individual student, the system multiplies the number of responses raised by the student by the highest possible score on the articulation scale. In this example, the highest possible score is 5. Therefore, the best articulation score for the 36 responses raised by Student 1 (see Table 13-5) would be 180 (36 x 5). To obtain the numerator, each student response is multiplied by the articulation value assigned to the response by the instructor. The final articulation mark is expressed as a percentage of the numerator and denominator. The articulation score for Student 1 would be 140/180 or 78%. Similarly, the best articulation score for the 40 responses that Student 2 raised would be 200 (40 x 5). The articulation score for Student 2 would be 144/200 or 72%. For Student 3, the calculation would be 110/200 = 55%. Each of these marks is then weighted according to the articulation factor assigned in Table 13-4. The mathematical formula is given below.

$$\text{Articulation} = \left(\frac{\sum_{i=1}^{TA} \sum_{j=1}^{n_i} a_{ij}}{n \times HA} \right) \times W_e$$

where

TA = Total topics attempted by student
n_i = Total count of class or equivalent facts entered by student for topic i
a_{ij} = Articulation score awarded to student for topic i fact j
n = Total count of class or equivalent facts entered by student for all topics
HA = Highest score on the articulation scale
W_e = Weight for articulation criterion

Relevance, or perceived substance of each submission from a particular student, is determined by the instructor on a scale of 1 to 7 at the time the response is reviewed (see Figure 13-7). At that time, it becomes a new class response. All other students who

Table 13-7. Relevance scores assigned to each class response.

Topic	Class response					Total
	1	2	3	4	5	
1	7	7	5	7	7	33
2	6	7	6	6	7	32
3	6	7	7	6	7	33
4	5	7	7	7	6	32
5	5	6	7	7	6	31
6	5	7	7	5	7	31
7	5	5	6	7	7	30
8	5	5	5	5	6	26
9	7	6	7	7	5	32
10	5	7	6	6	6	30

Table 13-8. Individual students' relevance scores.

STUDENT 1							
Topic	**Class response**					**Student total**	**Class total**
	1	2	3	4	5		
1	■	7	5	■	7	19	33
2	6	7	6	6	■	25	32
3	6	7	7	■	■	20	33
4	5	7	7	7	■	26	32
5	5	■	7	7	6	25	31
6	■	7	7	5	7	26	31
7	5	5	6	7	7	30	30
8	5	5	5	■	6	21	26
9	7	■	7	■	5	19	32
10	■	■	6	■	6	12	30
Total score						223	310

STUDENT 2							
Topic	**Class response**					**Student total**	**Class total**
	1	2	3	4	5		
1	7	■	5	7	7	26	33
2	6	7	6	6	7	32	32
3	6	7	7	6	7	33	33
4	5	7	7	7	6	32	32
5	5	6	7	7	6	31	31
6	■	■	■	■	■	n/a	n/a
7	5	■	6	■	7	18	30
8	■	5	5	5	6	21	26
9	7	6	7	7	5	32	32
10	5	7	6	6	■	24	30
Total score						249	280

Table 13-8. (continued)

STUDENT 3							
Topic	**Class response**					**Student total**	**Class total**
	1	2	3	4	5		
1	7	7	5	7	7	33	33
2	■	■	■	■	■	n/a	n/a
3	6	7	7	6	7	33	33
4	5	7	7	7	6	32	32
5	5	6	7	7	6	31	31
6	5	7	7	5	7	31	31
7	5	5	6	7	7	30	30
8	5	5	5	5	6	26	26
9	■	■	■	■	■	n/a	n/a
10	5	7	6	6	6	30	30
Total score						246	246

Table 13-9. Summary of individual students' marks.

STUDENT 1	**Score**	**Weight**	**Weighted**
Attendance	100%	0.10	10%
Participation	72%	0.20	14%
Articulation	78%	0.30	23%
Relevance	72%	0.40	29%
Overall grade			76%
STUDENT 2	**Score**	**Weight**	**Weighted**
Attendance	90%	0.10	9%
Participation	80%	0.20	16%
Articulation	72%	0.30	22%
Relevance	89%	0.40	36%
Overall grade			83%
STUDENT 3	**Score**	**Weight**	**Weighted**
Attendance	80%	0.10	8%
Participation	80%	0.20	16%
Articulation	55%	0.30	17%
Relevance	100%	0.40	40%
Overall grade			81%

subsequently mention this response are assigned the same relevance score. Table 13-7 shows the assumed relevance scores for the 50 class responses that the three students raised.

For each class response that a student mentions, the relevance score is tabulated and compared to the class total for that topic. The overall relevance score for a student is the average of the student's score for all the topics attempted. For example, assume that the relevance scores shown in Table 13-8 were assigned for each student in the class.

Student 1 would get an overall relevance score of 223/310 or 72%. Student 2 would receive a score of 89% (249/280). Student 3 would receive a score of 100%. (Note that this student mentioned all the class responses in the topics attempted and was awarded the maximum mark for relevance, even though not all topics were addressed.) This mark is then weighted according to the relevance factor assigned in Table 13-4. Mathematically, this value is expressed as

$$\text{Relevance} = \frac{\sum_{i=1}^{TA}\sum_{j=1}^{n_i} r_{ij}}{\sum_{i=1}^{TA}\sum_{j=1}^{C_i} mr_{ij}} \times W_r$$

where

TA = Total topics attempted by student
n_i = Total count of class or class equivalent facts entered by student for topic i
r_{ij} = Relevance score awarded to student for topic i fact j
c_i = Total count of class facts entered for topic i
mr_{ij} = Maximum relevance score awarded to student for topic i fact j
W_r = Weight for relevance criterion

A summary of the class participation marks for all three students is shown in Table 13-9.

This information is automatically prepared in report form for each student. Each report also contains an automatically composed summary of individual student performance. This summary is tailored according to where a student is located on two, 2 x 2 matrices. The instructor can set the parameters of this summary to dichotomize student performance as acceptable or unacceptable. ASKS then generates student-specific comments based location within these matrices.

Table 13-10.
Efficiency matrix.

Good attendance	participate in all or most of the topics, **1** but make few contributions in total	participate in all or most of the topics, **2** and make many contributions in total
Poor attendance	participate in a few of the topics, **3** and make few contributions in total	participate in a few of the topics, **4** but make many contributions in total
	Little participation	Significant participation

The first, or efficiency, matrix locates a student in one of four quadrants according to attendance and participation marks, as shown in Table 13-10.

The second, or effectiveness, matrix locates a student in one of four quadrants according to articulation and participation marks, as shown in Table 13-11.

Feedback is generated for each student in the form of a five-paragraph summary report. The first paragraph provides an overall comment on each student's contributions. The second paragraph provides a summary comment related to efficiency, and the third paragraph provides detailed suggestions or encouragement to improve articulation and relevance of the contributions. The fourth paragraph summarizes student effectiveness, and the fifth paragraph provides detailed suggestions for improvement in the areas of articulation and relevance. A copy of this feedback is also forwarded to the instructor.

Good articulation	**1** present less-relevant responses well	**2** present relevant responses well
Poor articulation	**3** present less-relevant responses poorly	**4** present relevant responses poorly
	Little relevance	Significant relevance

Table 13-11. Effectiveness matrix.

For example, recall the marks for Student 1 (Table 13-9). Assume the instructor programs ASKS to deem marks above 75% in a given category to be acceptable, and those at 75% or lower to be unacceptable. Based on this cutoff, Student 1 would fall into Quadrant 1 in the efficiency matrix (attendance = 100% = acceptable; participation = 72% = unacceptable), and would also be categorized in Quadrant 1 in the effectiveness matrix (articulation = 78% = acceptable; relevance = 72% = unacceptable). Detailed feedback would be provided as shown in Appendix 13A.

As currently implemented, the ASKS system is something of a hybrid between traditional group decision support systems and an automated system of “adaptive guidance” proposed by Bell and Kozlowski (2002). They proposed this technique as a means of enhancing learners’ self-regulation processes and to improve the efficiency of the learning process. Among other features, intelligent agents were proposed to monitor and assess learner progress, and provide tailored feedback. ASKS uses instructors as intelligent agents, but allows them to provide this adaptive guidance more efficiently. It provides automatic instructor access to prior group knowledge, streamlines an instructor's ability to assess student contributions, and provides tailored, automated responses to students as a result of this assessment process. In the near to medium term, this strategy may suffice to create a greater sense of instructor immediacy in the learning process, a factor found to increase student satisfaction in online courses (Arbaugh, 2001).

ASKS also provides a permanent and growing course knowledge base for students to access. Figure 13-7 illustrates such a knowledge base.

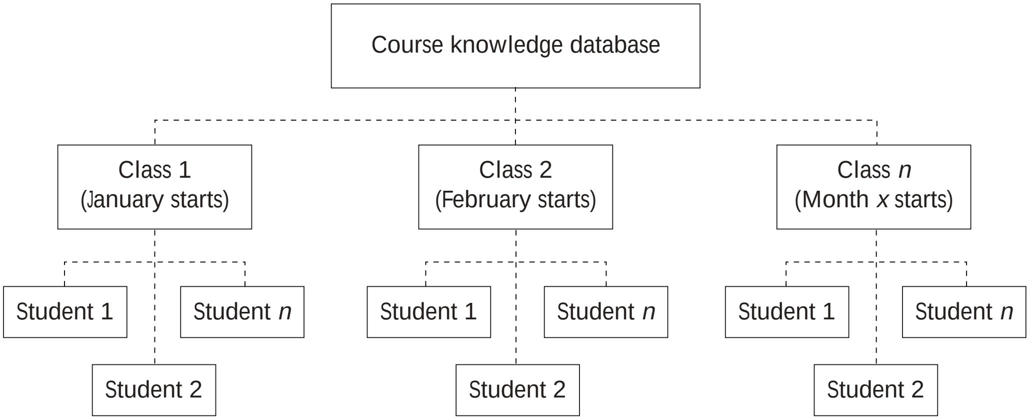

Figure 13-7. ASKS course knowledge database structure.

In the student evaluation example above, three students participated in one online class. Obviously, the number of students in each class can be expanded. However, the ASKS system also allows the group knowledge accumulated in a number of classes to be easily assembled into one large course knowledge database, made accessible to students as deemed appropriate by the instructor. In this way, an expanding and instructor-vetted database is made available to inform the learning processes of future students.

Future Plans

The ASKS system is currently being evolved within the School of Business at Athabasca University from a prototype system developed in Microsoft Access and Cold Fusion to a production-based system adapted to delivery via Lotus Notes and Domino. More groupware characteristics are planned. At present, students are not able to communicate easily with each other without instructor intermediation. Planned enhancements include the ability of unpaced students to be assigned arbitrarily to groups with other students at a similar point in a course. Students could then communicate within these groups before submitting group-based assignments. As currently enabled in ASKS, these group contributions could then be evaluated by the instructor and posted for other groups to review and critique.

The system needs to be evaluated to determine, for instance, to what degree it facilitates student-to-student, student-to-instructor, student-to-class, and instructor-to-class interactions; whether students and instructors consider it easy to use; whether it is perceived as fair by students in terms of evaluating individual contributions to online discussion groups; and whether it is cost effective. Davis (1989) showed that many of these factors are major determinants of the acceptance of new technology, and proposed an evaluation model. This model will likely be used as the basis for follow-up research with both instructors and students.

Conclusion

The ASKS system allows students in both paced and unpaced online learning environments to participate in grouped assessment activities. It also permits instructors to assess individual contributions quickly, and provides tailored, automated feedback to students, thereby increasing the immediacy of feedback and reducing instructor workload.

The ASKS system was initially designed as a means for students in unpaced online learning environments to participate in group discussion and knowledge-building exercises by creating online virtual cohorts. Although an unpaced online learning environment provides an important degree of flexibility for students, very few existing technologies are suitable for promoting interactions among learners in this model. By incorporating features such as adaptive guidance, instructor immediacy, and collaborative learning into both paced (cohort-based) and unpaced (individualized) online learning environments, ASKS may signal the establishment of online technologies that will reconcile differing perceptions about the role of interaction evident in the distance learning literature to date.

ASKS addresses some of the problems associated with group participation in any online environment. First, the system enables the instructor to build a repository of model responses that can easily be incorporated into tailored feedback for students. Second, the system allows the instructor to evaluate each contribution efficiently. Meaningful feedback can be constructed for each student from an existing database. Individual student contributions can be evaluated quickly, and the instructor does not need to recall either the frequency or quality of prior contributions from a particular student. This factor reduces the subjective element common to the evaluation of online discussions.

From the student's point of view, private workspaces allow individual students to create a permanent record of their ideas on a topic. The ASKS system also removes the advantage for students who make early submissions to online discussions. ASKS solves this problem by evaluating each students' submissions in a private workspace.

However, group knowledge building is facilitated when students are then given access to other cohort members' submissions. Students can view the cohort's common pool of submissions, build on this knowledge to create new ideas, and submit these for evaluation and further knowledge sharing. ASKS can also expand on this concept by allowing student access to course knowledge databases that can be vetted by the instructor, and created and expanded easily. Overall, the system promises to increase the amount and quality of interaction in both paced and unpaced online learning environments, and probably in a more cost-effective manner.

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Appendix 13A: Model Student Feedback

Dear (Name).

Your final mark for the discussion part of Course XYZ is 76%, calculated as follows:

	Score	Weight	Weighted
Attendance	100%	0.10	10%
Participation	72%	0.20	14%
Articulation	78%	0.30	23%
Relevance	72%	0.40	29%
Overall grade			76%

I hope that your learning experience has been an enjoyable one. Overall, you have addressed all the topics in the course and have presented your thoughts well.

However, though you touched on all the required topics, the overall number of your contributions was fairly limited. This adversely affected your grade.

In the future, you should consider addressing other aspects of each topic. For instance, one strategy would be to argue one particular point of view for a given topic, then counterbalance this with a somewhat opposing viewpoint.

Also, although you presented your points well, many of the themes of your responses were not directly relevant to the topic, or did not sufficiently identify some key concepts.

In the future, you should more carefully consider the given topic before responding. As well, you might spend more time reviewing pertinent information in the course material beforehand.

Regards,
Instructor X

CHAPTER 14

LIBRARY SUPPORT FOR ONLINE LEARNERS: E-RESOURCES, E-SERVICES AND THE HUMAN FACTORS

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Introduction

The growth in online learning or e-learning, in which education is delivered and supported through computer networks such as the Internet, has posed new challenges for library services. E-learners and traditional learners now have access to a universe of digital information through the information superhighway. New information and communications technologies, as well as new educational models, require librarians to re-evaluate the way they develop, manage and deliver resources and services.

Historically, librarians have sought to provide services to distance learners that are equivalent to those available to on-campus learners (Slade & Kascus, 1998), and this aspiration is grounded in the philosophical frameworks of the Canadian Library Association's *Guidelines for Library Support of Distance and Distributed Learning in Canada* (2000) (http://www.cla.ca/about/distance.htm) and the Association of College and Research Libraries' *Guidelines for Distance Learning Library Services* (2000) (http://www.ala.org/Content/NavigationMenu/ACRL/Standards_and_Guidelines/Guidelines_for_Distance_Learning_Library_Services.htm).

Both the Canadian and the American Guidelines recognize that distance learners frequently do not have direct access to the full range of library services and materials, and that in this situation, the goal of equity makes it necessary that librarians services that are more "personalized" than might be expected on campus. The library literature provides a rich record of service models and best practices, and there has been an explosion in publication as librarians consider ways to support learners in a networked environment (Slade, 2000).

What do e-learners need from librarians? Suggestions advocating change in librarians' roles in support of distance learning in the information age appear throughout the literature: librarians "must assert themselves as key players in the learning process thereby changing their roles from information providers to educators" (Cooper & Dempsey, 1998); they have become providers of technical support (Hulshof, 1999); and they have been transformed from "information gatekeepers" to "information gateways" (Haricombe, 1998). Lippincott (2002) advocates librarian involvement in learning communities: "The librarian can shift the focus from explaining library resources to meeting the ongoing information needs of the students in the broad information environment" (p. 192).

In responding to the need to provide ongoing online library support, librarians have worked at translating what they do in a traditional library into virtual or digital environments, while customizing their services and resources for e-learners. Traditionally, libraries offer circulation services, interlibrary loans, course reserves, an information desk, a reference desk, and library instruction. To serve learners connected to their institutional library primarily through a computer network, librarians are providing remote access to, and electronic delivery of, library resources, and are using communication technologies to deliver electronic reference services and instructional support.

When we speak of providing support to e-learners, we are referring to a wider community of learners than the term "student" suggests. An academic library's learners may include students, faculty, staff, researchers, and so on. The library is seen as a source of training and guidance to a community of learners who are concerned with navigating the complexities of locating and using digital resources and services. Moreover, the move toward an online environment has resulted in a shift from the systematic one-to-one information flow of the past to a new model in which the users and the providers of information are able to relate in a many-to-many, dynamic relationship. For example, in the traditional model, a librarian provides a bridge between learners and information providers by selecting and cataloguing resources and by providing assistance with these resources. In the new model, the library serves as a facilitator by offering ongoing support enabling learners to interact and exchange knowledge with others, to communicate directly with the publishers and vendors of information resources, and to participate in a collaborative endeavor to make available rich collections of online scholarly information resources.

This chapter examines how libraries are responding to the challenges of delivering core services to e-learners. We look at library practices and technologies being applied in the construction of virtual libraries. We also consider challenges and opportunities virtual libraries bring to the support of e-learners, as well as the importance of providing support within a collaborative environment, which stresses human factors, such as communication and interaction.

Defining the Virtual Library

Gapen (1993) defines the virtual library as

> the concept of remote access to the contents and services of libraries and other information resources, combining an on-site collection of current and heavily used materials in both print and electronic form, with an electronic network which provides access to, and delivery from, external worldwide library and commercial information and knowledge sources. (p. 1)

Additional terms for the virtual library include the "digital library," the "electronic library," and the "library without walls." Many libraries are hybrids, providing virtual access to electronic resources and services, while maintaining and supporting use of a physical collection housed in a library building.

With the tremendous growth of the Internet, e-learners have access to an overwhelming range of information sources available at the click of a mouse: library resources; government information; news sites; advertising; even whole Web sites devoted to Elvis sightings, crop circles, and JFK conspiracy theories. Librarians have traditionally selected and organized resources with great care. In building virtual libraries, librarians have the opportunity to provide e-learners with direction and to rescue them from information overload. A virtual library can link e-learners to library catalogues, licensed journal databases, electronic book collections, selected

Internet resources, electronic course reserves, and tutorials, and to forums for communication and interaction with librarians. The virtual library permits e-learners to access library and networked resources and services anytime and anywhere that an Internet connection and computing equipment are available.

The Landscape of Library Resources

Technology offers opportunities to be innovative, as the following discussion of electronic resources and services demonstrates, but it is important to bear in mind that not all e-learners are equal when it comes to access to computing equipment; the availability, speed, and stability of Internet connections; or the information skills that are needed to make optimum use of virtual libraries.

Access to print-based library materials continues to be important, because not all of the information resources that e-learners need are available in electronic format: many of our most valuable research materials are still print-based. The Digital Library Federation and the Council on Library and Information Resources commissioned a survey of the use of print and electronic scholarly information resources at institutions of higher education across the United States. The survey found that, although almost half of undergraduates report using electronic resources all or most of the time for their coursework, this was the case for only 35.2% of graduate students. Only 34.7% of faculty indicated that they use electronic resources all or most of the time for their research, and just 22.7% said this of their teaching (Friedlander, 2002, Tables 23, 17, & 20).

Although there has been a shift away from purchasing print materials to be housed in a physical building and toward providing access to licensed digital resources made available over a computer network, librarians continue to work to resolve issues pertaining to distance delivery of resources that are unavailable in digital format. Online catalogues and indexing and abstracting systems provide e-learners with convenient access to bibliographic information about valuable scholarly documents. When those documents are not available in full-text form online, a demand is generated for delivery from a library's print collection or from the collections of other libraries through interlibrary loans. Typical solutions for delivery of non-digital formats include the use of mail and courier services, the establishment of collections at designated sites, and the negotiation of agreements with other libraries through consortia.

Given that a growing number of learners are accessing library collections online, librarians are working to develop an integrated approach to providing access to electronic resources that facilitates retrieval and reduces confusion. A library Web site can function as an information gateway, an entry point to a range of online resources, with key components being the library catalogue and journal databases. Most online catalogues permit the integration of electronic books and electronic journals, enabling learners to locate items from digital and physical collections with one search. User services—such as the ability to check due dates, renew materials, and request materials online—are also provided. Gateways may also organize collections and incorporate directories like that provided by Athabasca University's Journal Databases: List Databases by Subject page (http://library.athabascau.ca/journals/subject.htm).

Librarians have become increasingly creative in enhancing their Web sites. Because not all e-learners have physical access to reference tools—the quick fact-finding tools that are the staple of library collections—libraries can perform a valuable service by providing pointers to online versions. Athabasca University Library's Digital Reference Centre (http://library.athabascau.ca/drc), for example, offers a digital version of an academic library's reference collection, including almanacs and directories, atlases and maps, data and statistics, and dictionaries and encyclopedias. Librarians select quality Internet resources to help e-learners navigate the Web. For example, the British Open University Library's ROUTES database contains quality-assessed, course-related Internet resources "selected by course teams and the Library's Information Specialists" (http://routes.open.ac.uk).

As libraries work to enhance their presence on the Web, a growing number are investigating the potential of electronic course reserves (e-reserves). The traditional course reserves desk of an academic library, with its limited copies, short loan periods, and high late fines, can be a considerable source of frustration for students. In the e-reserves model, the library makes available, through the World Wide Web, items that faculty have selected and "placed on reserve" for students in a particular course. San Diego

State University (SDSU) pioneered e-reserves in the early 1990s (http://ecr.sdsu.edu). SDSU uses Docutek's ERes, a system that provides access to course readings, chat rooms, and bulletin boards.

Many other libraries have initiated their own projects. Electronic delivery of course reserve material has become a hot topic in the library literature (Butler, 1996; Soete, 1996; Algenio, 2002; Wilson, 2002; Calvert, 2000; Lowe & Rumery, 2000). The Association of Research Libraries (ARL) maintains the Electronic Reserves Listserv, and an archive of the discussion can be accessed on the Web (http://www.cni.org/Hforums/arl-ereserve).

Most e-reserves operate on a password-protected model: one must be affiliated with the institution, or even registered in the course, to view course reserves. A typical e-reserve solution is to employ an electronic course reserve module that permits full integration with the library's online catalogue. Content in e-reserves databases varies. Scanning and mounting readings in portable document format (PDF) is time-consuming and requires copyright clearance. Other options for content include incorporating institution-produced materials (e.g., lecture notes and video or audio clips), using licensed digital resources through direct linking to items by means of a persistent URL, and including selected resources freely available through the World Wide Web.

Librarians can take a creative, pro-active approach to e-reserves. Athabasca University Library has developed a platform for e-reserves that operates on a somewhat different model than do other e-reserves systems. The Digital Reading Room (http://library.athabascau.ca/drr) offers a digital solution for course readings and supplementary materials. An in-house storage and retrieval system was developed for the DRR using open source software. The model operates along the principle of open access to collection creation tools, thus permitting course content creators, educational media developers, and librarians to develop a multidisciplinary knowledge database.

Each course in the Digital Reading Room has a Digital Reading File (DRF). The licensed contents, such as journal database articles, require authentication through the Library's proxy server, permitting only the Athabasca University community of users to access them; non-licensed resources, such as Web sites, are freely available to the public. A search engine permits e-learners to search across the DRFs, providing a multidisciplinary aspect to course reserves that is not typically encountered. By encouraging the inclusion of resources in a variety of formats, including text, graphics, video, audio, simulations, and games, the DRR supports a wide range of learning objectives and styles. The DRR accommodates the inclusion of non-digital resources by providing e-learners with a means to request them from the Library. The DRR is being developed using metatags that conform to the IEEE LOM standards and use the CanCore implementation guidelines to insure consistency and search capability across database collections such as MERLOT (http://www.merlot.org).

Managing the remote access and authentication issues involved in making digital resources available has become a significant area of support to users of the electronic library (Hulshof, 1999). Librarians may be called upon to respond to questions concerning log-in and password information, browser configuration, software installation, and a range of troubleshooting needs. Access problems are hugely frustrating for e-learners, and must be resolved quickly. Ensuring that front-line library staff are adequately trained, providing clear instructions on the library's Web site, and coordinating support activities with computing services personnel can contribute to effective technical support. E-learners also benefit from having a variety of means of contacting the library, including e-mail, Web forms, and a toll-free telephone number.

Library Services: Challenges and Opportunities

Reference

E-learners require more than access to e-resources. Traditionally, a reference librarian acts as an additional type of resource, one who can be counted upon to provide expertise in making sense of library systems and research tools, and to offer a helping hand along that often slippery path known as the research process. Virtual library users face additional challenges in mining relevant information out of a computer system that "obstinately" returns zero hits in response to a query that does not match the character strings in its database files.

The most common means of providing electronic reference services to remote users has been e-mail, the advantages and disadvantages of which have been well documented in the literature (Slade, 2000). The around-the-clock and around-the-world accessibility of e-mail allows users to connect with librarians beyond the walls of library buildings and outside the usual hours of operation. E-mail provides a written record of requests and responses, permits the electronic transmission of search results, and allows librarians time to reflect on requests. One of the most serious concerns about e-mail reference services is their impact on the traditional face-to-face reference interview, particularly the absence of the verbal and non-verbal cues that typically assist a librarian in effectively responding to a question.

Hulshof (1999) identifies three issues related to the use of electronic communication in serving virtual patrons (e-learners): immediacy, intricacy, and interaction. Because it is so easy for a learner to send a request electronically and have it arrive at the library instantly, there is a perception that the librarian's response will be as immediate. The learner may become frustrated, not realizing that the process of locating information and developing a response takes the librarian just as long when the request is made electronically as when it is made in person or in any other way. The more intricate or complex the request, the longer it will take for the librarian to clarify it and respond appropriately: a series of e-mail messages may be required, which will further reduce the immediacy of the e-mail request. Immediacy and intricacy relate to the lack of interaction: the opportunity to discuss and clarify inquiries that occurs in person or over the telephone is not so easily accommodated by e-mail.

There are ways to deal with some of these issues. A well-designed reference Web form, such as that provided on the Ask AU Library: Ask about a Research Topic Web page (http://library.athabascau.ca/contacts/refinquiry.htm), which encourages e-learners to include full identifying and course information, to describe clearly their research problem and search terminology, and to state the parameters of the assignment, can clarify requests for librarians and reduce the need to e-mail back and forth (Sloan, 1998). Automated replies, which are sent out by the e-mail program in response to the receipt of a message, can be used to reassure e-learners that their messages are being received, and can let them know what to expect in terms of service.

E-mail reference service can be enhanced and supplemented with additional technologies that raise the level of interaction with real-time or live communication. Chat technology allows e-learners and librarians to send text messages back and forth instantly, using a form of communication that is familiar to most Internet users. There have been a number of library experiments with Web contact center software, which is modeled on the private sector's online solution to providing customer support. Web contact center software provides a higher level of interaction than does basic chat software, allowing for queuing and routing of messages, as well as enabling librarians to "push" Web pages to users (Kimmel & Heise, 2001; McGlamery & Coffman, 2000). Providing e-learners with a toll-free telephone number remains an effective and convenient reference services strategy, particularly for intricate inquiries. The telephone reference interview works best when both librarian and e-learner are working in front of computers connected to the Internet.

Instruction

E-learners are frequently silent and invisible as they search and explore a library's online resources, and they do not have the same access that on-campus learners have to formal library instruction sessions. With the array of digital resources available to them, the multiplicity of interfaces and search tools, and the need for evaluation and critical thinking when using the Internet for research, "information literacy" skills are a must-have for e-learners. Information literacy refers to competencies with information sources in a variety of formats. According to the Association of College and Research Libraries (2001),

> an information literate individual is able to
>
> - Determine the extent of information needed
> - Access the needed information effectively and efficiently
> - Evaluate information and its sources critically
> - Incorporate selected information into one's knowledge base
> - Use information effectively to accomplish a specific purpose

- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally

Supporting the integration of information literacy skills training into the core curriculum has become an important issue for libraries (Slade, 2000). As an extension of their traditional role of providing library instruction sessions and developing instructional materials, librarians are designing online tutorials and courses that promote information literacy and encourage active learning. Particularly fine examples are the University of Texas System Digital Library's *TILT—Texas Information Literacy Tutorial* (http://tilt.lib.utsystem.edu); and Utah Academic Library Consortium's *Internet Navigator* (http://medlib.med.utah.edu/navigator), a multi-institutional online course developed by a team of librarians and Web developers. The British Open University Library has developed *SAFARI* (http://www.open.ac.uk/safari), a freely available interactive tutorial, as well as an information literacy course called *MOSAIC (Making Sense of Information in the Connected Age)* (Needham, Parker, & Baker, 2001).

Many libraries provide instruction to e-learners by making information available on their Web pages, including frequently asked questions, library glossaries, research guides, and "how-to" pages. Athabasca University Library's Digital Reference Centre integrates resources with contextual instruction and provides links to instructional resources, including a detailed guide to Internet searching that encourages e-learners to think critically about Internet resources (http://library.athabascau.ca/drc/intro.htm), and library research guides such as the *AU Library Guide to Researching Topics in Women's Studies* (http://library.athabascau.ca/help/wmst/intro_wmst.htm).

Online tutorials usually operate on a model in which the e-learner interacts in isolation with a computer. Their effectiveness can be enhanced by the addition of more interactive forms of instruction. The librarians at the Florida Distance Learning Reference and Referral Center, for example, have experimented with chat software to simulate a virtual classroom and open up "live" group instruction to e-learners (Viggiano & Ault, 2001). Librarians can also work with faculty to develop a library thread in a course discussion area, or to open a discussion forum on the library Web pages.

The Successful Virtual Library: Partnership and Collaboration

In reviewing definitions of the virtual library, Sloan (1998) identifies an emphasis on the technological and informational building blocks, and a neglect of human components, such as the service tradition and human interaction. The continuing changes in technology have been truly astonishing, and the scope for building new information services and new ways of representing content seem unlimited. However, it is very important to remember that investment in human capital is also a strategic investment, especially when introducing new technologies, procedures, and processes. Although technology is the key infrastructure of the virtual library—a tool used to support library goals—human factors are the most important determinants of the success of the virtual library.

The digital library serves mainly as a facilitator in organizing and providing knowledge and resources to its users. Sharing knowledge and information among library staff, researchers, faculty, students, and other departments within the institution encourages them to work together, develop their skills, and form strong and trusting relationships.

A focus on collaboration between the library and the faculty promotes a responsive approach to course design and supports teaching and learning objectives, particularly when this collaboration incorporates student contributions and feedback. All parties must have a common vision in which each one participates actively by contributing their skills and perspectives to the building of a genuine partnership. This new approach considers the library as an active partner of the learning community, helping learners to become “information literates” by integrating information literacy skills into the curriculum. For example, the library can help learners to evaluate critically the authority and authenticity of the resources they find, and to enhance their critical thinking skills. The library can also offer support to learners, and can mentor their work by offering one-to-one communication and interaction, and by achieving a deeper level of understanding of what learners need.

From a research perspective, a number of models can be involved in creating an environment that is responsive to the scholarly information needs of a diverse group of e-learners. Librarians locate, select and describe quality Internet resources, and provide access to journal databases and electronic book collections, providing e-learners with full-text content from a wide range of online resources and publications, including peer-reviewed journals. Within this framework, the library works with faculty, researchers, scholarly societies, and publishers in developing and managing a collection of enriched online scholarly resources. Such a partnership enables researchers to interact with others, exchange experiences, and publish their works online. The library role is thus transformed from simply being a provider of library resources, into meeting the ongoing support needs of the parties involved. The library also serves to foster research skills by encouraging students and other learners to search, investigate, discover, and take advantage of these valuable online resources.

Management support is as much a key to success in developing the virtual library as in any other project. Athabasca University's strategic plan incorporates a distinct section related to library strategies and projects, and explains how these strategies are aligned with the overall mission of the University. A virtual library should have a high profile leader, a key person who can work to obtain the support of the institution's management and promote a climate of change.

In addition, the leader must work with different groups within the institution to ensure that the project responds to their specific needs and goals. For example, when Athabasca University Library initiated the Digital Reading Room project as an enhanced electronic course reserves system, the Library entered into partnership with the Educational Media Development unit to ensure a best practices approach to Web- and visual-design aspects. Consultation with faculty has been an ongoing element of the project, with faculty selecting content and acting as consultants in evaluating the design and functionality of the DRR in relation to their course development and delivery needs.

All staff involved in providing library support to e-learners must be included in the partnership. Technological changes have been the dominant force reshaping library services. Instilling a culture of sharing, motivation, equity, and active partnering encourages library staff to respond positively to the changing roles, responsibilities, and skills that the integration and use of technology requires. A well-designed, ongoing training program enables library staff to upgrade their skills to their new assignments, and helps them to understand and control fear of change.

External partnerships, collaborative efforts, and consortia form another important bridge to the effective support of e-learners. Within Canada, university libraries extend in-person borrowing privileges to students, faculty, and staff from across the country through the Canadian University Reciprocal Borrowing Agreement (Council of Prairie and Pacific University Libraries et al., 2003) (http://www.coppul.ca/rb/rbindex.html). There are also initiatives to share virtual reference desks, such as the National Library of Canada's Virtual Reference Canada (http://www.nlc-bnc.ca/vrc-rvc), which allow learners to benefit from the range of information resources and staff expertise available at a variety of participating institutions. Consortial approaches to database subscriptions enable libraries to expand the scope of the electronic resources they are able to offer their learners in a time of shrinking budgets and escalating journal costs. The Canadian National Site Licensing Project (http://www.cnslp.ca) negotiates licensing agreements that permit participating universities across Canada to access a suite of research databases in the science, engineering, health and environmental disciplines.

Conclusion

In summary, library services are an essential component of a quality online learning system. As access to Internet-based courses grows, an increasing number of e-learners are dispersed around the globe, often in parts of the world where physical access to the collections of large academic and research libraries is impossible. These learners are largely dependent on the quality and academic usefulness of services that the library can offer electronically. The strength of virtual libraries and digital collections depends on the relationships libraries develop and maintain with the creators, publishers, and aggregators of e-resources, as well as with those who use, learn from, and evaluate these resources. Providing ongoing technical, reference, and instructional support to e-learners requires that libraries redefine their values and services, collaborate with their users, and approach their tasks creatively.

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CHAPTER 15

SUPPORTING THE ONLINE LEARNER

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Introduction

The ability and potential of online learning to enhance access to education, particularly higher education, is largely determined by the potential learner's circumstances, which in many ways define the learning environment. Not surprisingly, online learning's evolutionary predecessor, distance learning, has been applied to two situations in which access to education is problematic.

The first occurs when a very large population has access to a limited number of "seats" in conventional educational institutions. This situation gives rise to what Daniel (1996) refers to as "mega-universities"—distance teaching universities with 100,000 students or more. Indira Gandhi National Open University (IGNOU), with an estimated 500,000 students, is one example, and the Open University of Hong Kong (OUHK), with over 400,000 students, is another.

The second situation is one of sparse population—one in which the community of learners is spread over a wide geographical area. The fledgling University of the Arctic is an example of a response to this situation. In both of these cases, the learner's physical environment presented a need that online learning could address.

A third situation is emerging. Learners who wish to use technology to structure their learning environment are seeking out the means by which they can do so. In a sense, their preferred learning environment presents the access issue that online learning can address.

In all three situations, the challenge is to provide access to higher learning, determining what the learner brings to the environment, and what they need in terms of support. These factors can vary—after all, the first two situations are artifacts of geography, whereas the third has more to do with personal learning preference. That is why designing learner supports requires an understanding of the learners' circumstances.

This chapter discusses the importance of setting up a supportive learning environment for online learners, and provides some practical advice. Underlying this advice is a philosophy that encourages an environment that aims to develop the learner's independence, while ensuring that supports are readily available when needed. Student supports that are flexible, clear, and continuously available are described, and best practices outlined.

Knowing the Learner

It is a good idea to remind ourselves that the learning enterprise is not about us as educators: the focus should be placed on the learning, not the teaching. Similarly, in providing learner supports, we should focus on what the learner needs, not on what we want to or are able to supply, but it is surprising how easily this emphasis can be lost in our wish to help. We identify real needs best if we know our learners. Therefore, we must ask questions about the learner's readiness for online learning, access to and familiarity with the technology required, proficiency in the language of instruction, individual learning style, and educational goals, as well as about how aspects of the individual's culture can affect learning. These are some of the things that we need to understand about the learners; they are also things that the learners need to know about themselves in order to benefit from the learning experience.

Once the institution has this information, it must determine what supports are most critical for learners, and must establish priorities to ensure that resources, which are always limited, are directed to the most useful supports. In doing so, the institution must keep in mind that some learners will require more support than others, and that any learner may need more help at one point in their educational career than at others. So the institution must find a balance between "just-in-case resources" and "just-in-time resources" that recognizes that an online learner is often an adult with responsibilities other than their educational goals. Flexible, continuously available, easily accessible learner support systems are required, but such systems must be genuinely useful. Learners have been clear that they need to see the value added by a resource, or they will not use it; they have also let us know that supports should be available but not intrusive.

Learner Readiness for Online Learning

The learner brings a set of skills, experiences, and expectations to the learning environment. This section outlines the resources necessary, first, to assist potential online learners to make informed decisions about their readiness for this form of learning experience, and then, to provide advice for making specific program decisions. To encourage independence in the learner, the focus should be on self-assessment, although counseling backup should be available when needed. The list below presents a series of questions that learners who are thinking about post-secondary study online should ask themselves, and identifies the kinds of assessment tools that are available to answer them.

- Am I ready for university (or college)?—This type of online resource provides the opportunity for the prospective learner to determine their readiness from academic, financial, family support, and time perspectives. Such a self-assessment, which is Web-based and easily completed by the student, serves to highlight areas that might need special attention. It guides the learner through a series of questions in which they examine their own expectations and readiness. Once the assessment is complete, follow-up e-mail counseling complements the process. For an example of such a self-assessment tool, see the Online Resources section of Athabasca University's Services for Students Web site: http://www.athabascau.ca/main/studserv.htm
- Am I ready for studies in the English language (or other language of instruction)?—This type of online resource assists the learner to decide if their command of the language is sufficient to allow for success, and places the learner in specific language course levels. The learner may be directed to online remedial resources, and should always have the option of contacting an advisor. For an example of such a resource see http://www.athabascau.ca/main/studserv.htm

- Am I ready for online learning?—This type of online resource assists potential learners to determine if they have the necessary hardware and networking capabilities, and should help them to explore whether this learning environment is comfortable. Short sample experiences should be available to assist with the process. For an example of such a resource, see Deakin University's Learning Toolkit at http://www.deakin.edu.au/dlt

- What is my preferred learning style?—As does any form of learning, online learning makes demands on the learner. The institution can make many resources available in a variety of formats, to suit different learning styles and preferences. However, a learner may not have identified the format they find most useful, and it can be helpful if the institution assists the learner to examine their own learning style. Interactive tools are available on the Web to help the learner to do so; however, these tools vary in quality, and the institution can assist by providing an annotated evaluation of these resources.

- Am I ready for university-level mathematics?—Proficiency in mathematics, as well as in language of instruction, has proven to be a significant success factor, particularly for adult learners returning to the educational environment after some time away. However, mathematics can also be a significant stressor. Assisting the prospective learner to identify their strengths and weaknesses in mathematics, and making remediation available, can reduce this stress. An online self-assessment can be designed to help the learner to determine their readiness for particular mathematics courses, to recommend a mathematics course appropriate to the learner's level, and to identify remediation resources. For an example of such a tool, see http://www.athabascau.ca/main/studserv.htm

- Do I have the skills to be successful in my chosen program?—This type of online resource outlines what skills are needed for particular areas of study. The resource should be program-specific and should refer the student to online tutorials if needed. For a Web site that assists the learner to make program choices, see the Open University (UK) student pages at http://www.open.ac.uk

Matching Educational Programs to Career Interests

Often, potential learners will seek out online learning opportunities to create or enhance career goals. As educators, we may want to view the educational experience outside the context of career development, but as stated previously, the learning experience is not about us. The fact is that learners bring that context to their educational decisions, and we need to understand that they do so. Online resources designed to assist learners to determine their own interests and skills, and then provide a career map aligned with educational programs, is a reasonable expectation. After all, most of these learners will experience several career changes—some of them quite significant—throughout their working lives. The United Kingdom's Open University focuses on the learner's need to contemplate the future in making educational choices (see http://www.open.ac.uk). "Mapping Your Future" on the Athabasca University Services to Students Web site (http://www.athabascau.ca/main/studserv.htm) provides the learner with a means of exploring career clusters and the credentials required to pursue them. After an initial exploration, the learner may wish to communicate online with a counselor to refine their career goals. Once this is achieved, electronic "program plans" are designed by an advisor, taking the career goals as well as prior learning into account. It is important to have the learner explore first, and then have counselors provide assistance as needed.

Supporting the Learner

Well-designed course materials and strong academic and tutorial support are necessary in all educational enterprises, and the special considerations in the case of online learning are the subject of a separate chapter. This chapter deals with non-academic supports for the learner.

Having assisted the potential learner to make an informed decision to pursue online learning, we have enhanced their chances for success, but quite different support is now required. Once again, the balance between being available and being intrusive is important. Learners require support in different areas, and as providers, we must anticipate the array of needs, and then work with individual learners to clarify what is needed at a given time. Learners need to know exactly what they can expect in support, how to interact with the institution, what is expected of them, and how to determine when they need assistance.

Expectations

Learners need to know both what is expected of them, and what services they can expect to receive from the institution. Online learning may be a new experience for the learner, and it is important that service standards be clear and easily available: How long should it take to receive confirmation of my registration? How much time does it take to receive my examination grade? How quickly should I expect a response to e-mail? Who should I contact for library assistance? These standards should be published for all students to see, and can serve as benchmarks for service units within the institution.

Information and Administrative Support

Daniel (2000) points out that a key component of supported open learning is "effective administration and logistics." Institutions engaged in distance and online education know that smooth administrative processes can be as much a factor in learner success as the design of learning resources. The learners themselves report that flexibility of access and smooth administrative support are important to the learning environment. One would expect that learners who have chosen an online learning environment prefer to perform administrative functions (such as registration) online as well, and this is proving to be the case. Institutions that provide online learning report that students express a preference for having the control that online administrative processes afford.

Providing online administrative access is not without challenges, and improved technology, carefully designed Web pages and helpdesk support are crucial. Constant monitoring and updating of procedures is required, to find smoother interactions and to tease out administrative frustrations. Designing Web pages and then forgetting them is simply not acceptable. The following list outlines a process for the continuous improvement required:

- design the administrative Web page;
- test the technology and revise as necessary;
- observe the learners using the Web page and ask for feedback, then revise;
- monitor the use of the Web page regularly;
- look for enhancements and improvements, and incorporate them; and
- always have helpdesk attendants available to troubleshoot.

At the institutional level, regular learner satisfaction surveys can ensure that administrative interactions are not barriers to learning. Portals designed to individualize and personalize interactions enhance the learner's experience. Portal software is growing in popularity as more institutions become involved in online learning.

Technological Support

As noted above, the learner must know what technology is needed for the online environment, before they decide to register. A person engaged in online learning requires technological support that is clear and readily available. Drawing the line between technological support on the one hand and academic support on the other is often a challenge, and these types of support must be coordinated carefully. There are three common support formats: an information center provides institutional and program information; computing helpdesks troubleshoot technological issues; and call centers are frequently used to support a particular program area. All three must work together to support the whole learning process.

Successful information centers, helpdesks, and call centers have the following characteristics:

- reliable networks;
- asynchronous access "24/7";
- synchronous access at clearly identified times;
- quick response, with acknowledgment and follow-up;
- follow-through to resolution of the issue;

- simple, clear instructions;
- access by attendants to all critical databases and expertise; and
- the ability to identify problems with policies, procedures, or systems, and to suggest change.

Study Skills Assistance

The online learner may be returning to learning after some time away, may be new to post-secondary study itself, or may not have experienced online learning before. Assisting the learner to identify particular needs in the area of study skills can reduce stress and enhance the experience. For example, it is critical to understand that "life happens" and the learning experience may be just one of the demands that the learner faces. This is particularly true for adult learners. Some resources that may help online learners who was facing challenges to their study skills include

- Web pages designed to assist in the development of time management and study schedules;
- resources to help students learn to balance educational pursuits with other life demands;
- tools for facilitating "study buddy" connections for peer assistance;
- online strategies and exercises to reduce "exam anxiety";
- resources to assist in reading for comprehension;
- assistance in annotating online resources such as e-books;
- resources to assist in writing papers;
- clarification of rules for citation and avoiding plagiarism;
- assistance in searching library resources on line; and
- assistance in making critical analyses of information from online resources.

Online Educational Counseling

Well-prepared Web resources can be provided online, but asynchronous counseling assistance is required as well, particularly for learners who are experiencing difficulty. The online environment is one in which learners can "fall through the cracks" if assistance is not readily available. From time to time a learner may need someone to assist in keeping a positive outlook and determining if an intervention is needed. Learners need to know that help is there if they need it. The institution should provide this resource and all institutional staff should be trained to identify when a learner might benefit from a session with a counselor. It is important to remember, however, that while referrals can be made, the decision to pursue them belongs to the learner.

The work of the counselor in an online learning environment has three aspects. The first is to work with Web designers to develop online resources to help learners to identify and address barriers to reaching their educational goals. The second is to interact with the learners when an intervention is required. The third is to work with other institutional staff to ensure that processes and procedures enhance learning.

Educational and career counseling are well suited to the online environment, but personal counseling is less so. Personal counseling should be limited to immediate crisis resolution and referral. Counseling units need information about community resources to which they can refer clients.

Ongoing Program Advising

Distance and online learners are often adults and they frequently spread their learning over a number of years. They report that they need program planning that will help them achieve educational goals in an expeditious manner. Moreover, learners often transfer between institutions and jurisdictions, increasingly so in a global learning environment.

Learners need to plan their coursework based on particular programs, while remaining aware of course transferability. The role of advisors is to assist learners to understand program requirements, match courses they may be transferring into a program, and then plan the remainder of their program accordingly. Since the adult learner may change career and educational goals at any time during the process of completing a program, advisors need to be readily available and to have access to all program and transfer information. Software products are available to allow advisor and learner to navigate this process. Academics, counselors, and others within the institution need to know when to refer learners to an advisor.

The Digital Library

In the early years of distance education, providing library support to learners was a challenge. Courses were developed in print format, and comprehensive course packages were sent to each learner. The library typically developed a collection that was made available, by mail or fax, to the learner on request. Distance educators worried that learners were not gaining the library search experience that would enhance their studies and their research skills. Online sources of information have transformed libraries in distance education: where in the past libraries focused on holdings, they can now focus on access; where they used to be information repositories, they can now be gateways to information.

This transformation has allowed the library experience to be more profound for the learner and more integrated within the learning process. From a learner support perspective, a well-designed online library

- is easily found among other institutional Web pages;
- provides an up-front tutorial for the new learner;
- is integrated with the institution’s online courses;
- provides tools to assist with online searches; and
- provides access to personal assistance, if needed.

The transformation of libraries in distance education has posed some interesting fiscal issues for institutions. In the past, acquisitions budgets provided for purchasing holdings that became part of the collection, part of the assets of the institution. Annual funding was provided for collection development and updating. Even subscriptions to periodicals, an annual expense, resulted in a "holding." Subscriptions to online resources are another matter entirely. As libraries move toward becoming gateways rather than repositories, a new way of viewing funding is needed.

Access for Students with Disabilities

Online learning can enhance access for people with disabilities. New assistive technologies can allow access to learning opportunities previously denied to this population. Increasingly, the legal requirements to provide accommodations that allow access are being defined by the courts, and institutions are required to ensure that necessary accommodations are provided, without compromising academic rigor. In an online environment, the following services are expected:

- administrative accommodation with respect to timed assignments and examinations;
- alternative formats for learning materials;
- advocacy within the institution;
- advice about assistive technologies;
- advice about funding sources;
- referral for specific needs; and
- "reasonable accommodation" as outlined in law.

Student Rights and Access to Ombuds Services

Online learners have as much need of clearly articulated rights as do learners in traditional educational settings. An advocacy process designed for online learners is one in which the learner is made aware of student rights and responsibilities. An institution can fulfill its basic legal responsibility by making a student code of conduct available on the Web and in print on request. However, a prudent institution will go well beyond this demonstration of due diligence. Web sites that clearly outline intellectual honesty expectations should be readily available on the Web and should be referred to frequently. Reminders just prior to assignment preparation reduce the chance that the learner will fail to provide proper scholarly acknowledgment.

Traditions regarding what constitutes intellectual property and what is generally accepted common knowledge are not universal concepts, nor are they always understood. Cultural views about ownership of knowledge vary, and if the rules that are to apply within the institution are to be understood, then the institution must ensure that they are properly explained. For example, although many educators do not accept the idea, the reality is that students do not always understand the concept of plagiarism, much less how to avoid it. To address this problem, the University of Puget Sound has designed an excellent Web page that provides learners with exercises to enhance their understanding of the concept of plagiarism and to assist them in avoiding it (see http://library.ups.edu/research/guides/plagrsm.htm).

All efforts to provide smooth interactions between the learner and the institution notwithstanding, there will be situations in which the learner becomes ensnared and does not know where to turn. A highly visible ombuds office should be available. Moreover, from the institutional perspective, the ombuds office can assist in identifying policy and procedure problems that require attention within the institution.

The Online Learner's Role in Governance

Online learners have valuable contributions to make to an educational institution. Institutions that specialize in distance and online learning can provide opportunities for students to participate in institutional governance. Student government is possible in such an institution as well, but administration must make special arrangements to facilitate the process.

In many ways, the student union has the same issues in keeping in touch with its constituency as does the institution itself. Both are vying for the attention of a learner who may be juggling learning with other life demands. It is in the institution's best interests to have a healthy student union and to work with that union to meet the needs of the learners. Some means by which to achieve these goals include

- making networks available to the student union;
- providing one main institutional contact with whom student union representatives can interact;
- assisting in collecting student union fees;
- making information available, within the confidentiality guidelines;
- having student representatives on all decision-making bodies;
- having decision-making bodies meet through electronic means (video-conference, online conference, etc.) to maximize participation;
- keeping the student representatives and the student union apprised of significant events, initiatives, etc. (e.g., strategic planning, budgeting, tuition fee increases);
- engaging in shared initiatives with the student union (include them in convocation, copublish newsletters, etc.);
- seeking advice from the student union on important issues; and
- demonstrating appreciation for the work of the student union.

Learner Satisfaction Monitoring and Environmental Scanning

Regular monitoring of the learners' satisfaction levels and scanning of the student services environment assist the institution to make continuous improvements. Year-over-year comparisons are possible if the survey instruments are carefully designed. In this way, trends and areas in need of attention will become apparent.

Focus groups are being successfully conducted online by institutions that are at a distance from their constituents. Such groups can be used, for example, to test out the efficacy of a new course, program, or service.

A Case Study: University of the Arctic—Stretching the Limits

University of the Arctic is a virtual university in the real sense of the word (University of the Arctic, 2001). It is a consortium of universities and colleges from the northern countries known as the "Arctic Eight" (Canada, Finland, Greenland, Iceland, Norway, Russia, Sweden, and the United States). It was formed because there was a sense that these northern countries represented a community that transcended national boundaries by virtue of their "circumpolarity." There was also a sense that the northerly parts of these nations shared cultural, environmental, and learning issues with one another that the more southerly parts did not necessarily experience. The founding principles were based on notions of development "in the north, by the north, for the north." This university would develop an issues-based curriculum culminating in a Bachelor of Circumpolar Studies.

At the time of writing, five courses have been developed. The first, *Introduction to the Circumpolar World*, has been pilot tested in classroom format in one location, and as a Web-based offering involving learners from institutions from four of the Arctic Eight countries. The Web-based offering stretched the limits of online learning, and serves as an example of the potential of online learning to acknowledge a community of learning based, not simply on geography, but on shared realities.

Some Early Decisions

Language of instruction was one of the first decisions taken. It was decided to develop the courses in English and translate them at a later date. Subject matter experts from Russia, Greenland, Finland, Canada, Norway, and the United States wrote the curriculum in English, and the material was edited into fourteen modules.

Another early decision was that the online delivery would take place within a portal environment that would foster a community of learning. WebCT was used for delivery, largely because this platform was well recognized throughout the circumpolar world. The portal was designed to provide a supportive learning environment, and at the same time, an uncomplicated technical environment. The realities of the variability of technical resources across the Arctic became apparent, and the motto became "as inclusive as we must be, striving to become as innovative as we can be." It was important that no group be excluded from the project.

Reliability of networks was seen to be important, as was the need for a "Plan B." The course was housed on the server of the institution that was thought to have the most reliable server arrangement. In addition, learners were provided with print materials should any technological mishaps occur.

The pilot of the introductory course began in mid-February 2002, and lasted for fourteen weeks. Learners from Russia, Greenland, Finland, and Canada all worked with their local university or college. There was a site coordinator at each location, and the instructor was located in Canada.

The Community of Learning

Largely because of the instructor's skill, but also because the learners shared so many issues, a community of learning soon developed. Asynchronous discussions formed the basis for exchange, with informal study groups (often conducted in the local language) arranged by on-site coordinators. Because of the time zone issues, chat rooms were not initially designed into the portal, but the students asked that this utility be added. This was done, and a few hardy souls spent the wee hours of the morning communicating with colleagues across the North Pole. Learners shared resources via the Web, and each institution was expected to provide library and other student support resources.

Lessons Learned

The decision to keep the technology simple was a wise one. The simple portal and WebCT worked quite well, but a more comprehensive orientation to WebCT and online learning will be designed for the next offering. The best approach to the orientation is to have a training session with the site coordinators first, and have them, in turn, conduct an orientation with the learners. This strategy allows first-language assistance with the technology. Because of the variation in institutional resources, subsequent online offerings will include computing helpdesk access, which will be provided by the institution that is most experienced in online delivery of services.

Although it was expected that the up-front preparation by the curriculum developers, Web designers, and the instructor would be substantial, the workload for the instructor was excessive. This was partly because the volume of the learner postings was larger than expected. In addition, more of the learner activities could have been built into the course materials themselves.

A surprising outcome was the extent to which learners for whom English was not the first language felt quite comfortable participating. The concern that the sessions would be dominated by learners for whom English was a first language, was not borne out. The participating institutions had ensured that the learners had a sufficient command of the English language before registering them.

Attempts to incorporate traditional knowledge into the course materials were a challenge because of the large number of Aboriginal groups around the circumpolar world. In the end, this issue was best addressed by having students share information with colleagues. The result was somewhat serendipitous, but this strategy may be preferable to something more structured.

Attempts to ensure that all of the students had broad access to online library resources across all institutions were not successful, largely because of the language issue. It may be that in cases where such geographically and linguistically diverse groups are brought together, the provision of learner support in areas such as library, counseling, and so forth are best left to the "home" institution. This suggestion assumes that learners will inevitably be tied to an institutional setting. More investigation is required as these kinds of initiatives develop.

Conclusion

As the learning environment becomes a global community of learning, the cognitive sciences are merging with computing and telecommunications technologies to form what distance educators refer to as "knowledge media" (the term is attributed to Marc Eisenstadt of the Knowledge Media Institute, http://kmi.open.ac.uk/home-f.cfm). The Organisation of Economic Cooperation and Development (OECD) recognizes that these trends can provide more equitable access to higher education, and hence more social equity, as campus-bound and distance-education paradigms merge and complement each other.

There is an ongoing discussion about new terminology that should replace "distance education," but at the same time be more inclusive than "online education." Terms such as "distributed learning," "technology mediated learning," and "telematics" are often used in North America. Elsewhere, other terms are being used, such as "resource based learning" and "flexible learning" (Moran & Myringer, 1999). This discussion exemplifies the role that technology can play in placing the focus on making resources available for the individual learner.

Whatever we call it, however, online learning only enhances a focus on the learner as an individual within a community of learning if individual differences are acknowledged and addressed in the design of learner support services.

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CHAPTER 16

THE QUALITY DILEMMA IN ONLINE EDUCATION

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Introduction

With the proliferation of online learning providers and the challenges presented by the distance education sector to state regulators and accrediting bodies, it is not surprising that "buyer beware" is the watchword for students, institutions, and public agencies alike. In the current environment, it is incumbent on organizations to demonstrate the quality of their services in ways that are intelligible to potential students and their employers, faculty and staff, regulators, and government agencies. The admirable attempts to define quality standards and best practices for online education have done little to assuage the skepticism of representatives in the academy, who are more accustomed to face-to-face delivery directed to bounded communities. Fully addressing the roots of such skepticism is beyond the scope of this paper; however, its presence informs much of the technical discussion around quality assurance frameworks in higher education in general, and in online delivery in particular.

Purveyors of online learning programs maybe inclined to attribute a lack of broad acceptance among their colleagues to the paradigm shift that higher education has been undergoing in the past 15 years. In many cases, however, it must be admitted that potential of electronic delivery modes has not been fully realized in the execution of online courses. Some have suggested that these shortcomings are the result of trying to replicate the classroom environment, instead of maximizing the new configurations of knowing and community formation possible in an interactive online environment (Schank, cited by Caudron, 2001). Moreover, finding appropriate comparators for the efficacy of any particular mode of delivery is difficult when the broader questions of quality assurance in higher education are far from settled. An examination of definitional issues points to a long-standing conflict in values between business modeling and public services. It is important to acknowledge these tensions fully before turning to the more technical, but admittedly value laden, exercise of reviewing the standards proposed by different quality assurance agencies.

After a discussion of the contexts of quality assurance activities in higher education in general, and of the competing paradigms highlighted by online learning, this chapter examines quality standards that have been proposed for the delivery of online instruction in four jurisdictions. The full range of state licensing, voluntary accreditation, and market driven seals of approval reveals tensions between externally driven compliance and internally driven improvements. Although the regulatory frameworks for quality assurance vary dramatically in Australia, the United Kingdom, Canada, and the United States, there is still enough common ground to establish some general characteristics for a scholarly approach to online teaching and learning. At a basic level, the characteristics of quality educational delivery demonstrated in these frameworks include 1) providing clear statements of educational goals; 2) sustaining the institutional commitment to support learners; and 3) engaging in a collaborative process of discovery, which contributes to 4) improving the teaching and learning environment.

Another area of commonality is the fact that, while self-review can be a key component for any of the frameworks, to a large degree they are being driven by external demands. One area of contention, the degree to which quality assurance activities can or should be targeted to outcomes as opposed to internal processes, is addressed in a separate section. On a wider level, each of the projects seeking to establish quality standards for online education appears to aim toward inculcating a set of values that prizes management by measurement. Recognizing that the terms "quality" and "online education" are so burdened with assumptions as to create their own problematic is a necessary prelude to what follows.

Definitional Issues

The greatest challenge for trying to define quality in any product or service is that quality remains a relative experience, realized in large part through an individual's level of expectation. Since quality necessarily rests in the eye of the beholder, at first glance, systems developed around the concept must necessarily be exercises in systematic subjectivity. In higher education, quality is a construct

> relative to the unique perspectives and interpretations of different stakeholder groups (students, alumni, faculty, administrators, parents, oversight boards, employers, state legislatures, local governing bodies, accrediting associations, transfer institutions, and the general public). (Cleary, 2001, p. 20)

It follows, therefore, that the effectiveness of any quality improvement activities will be as much a function of the ability to foster agreement around common goals as of any substantive input or process adjustments attempted by an institution. Fostering agreement, however, is much more difficult when the term "quality" is burdened with the legacy of failed management fads.

In many circles, the term "quality" is understood as shorthand for Total Quality Management (TQM), or its close cousin, Continuous Quality Improvement (CQI). Some may believe that these fads peaked and retreated in the last century; however, recent modeling (Widrick, Mergen, & Grant, 2002), and examples of the pursuit, by individual institutions, of the Malcolm Baldridge Awards (Spahn, 2000) or ISO9000 recognition in distance education (Benjamin Franklin Institute, 2001) suggest that TQM still has a foothold in higher education, in spite of the problems posed by the fact that its language carries a corporate flavor (Banta & Associates, 2002). The International Standards Organization makes the central principle of the pursuit of quality clear—to establish processes that will maximize service to customers. The pressure to apply management techniques to higher education came from a perceived crisis in confidence with post-secondary systems, and from the growth of state-sponsored accountability systems.

For supporters it "has long been understood in organizations that when you want to improve something, you first must measure it" (Widrick et al., 2002, p. 130). But measurement systems are about much more than the technical specifications of various indicators—they are about control. The first iteration of TQM/CGI provoked a debate about its social as well as technical implications, and demonstrated the “disconnect between the philosophy of the management process and the purposes of the institution[s] for which it was being proposed” (Birnbaum, 2001, p.107). The engineering (or re-engineering) of systems designed to guarantee that manufacturing processes would meet technical specification might seem to imply a uniformity that may not be possible, or even desirable, in the dynamic and heterogeneous environment of higher education.

The annual race past the post in national press or government scorings, while clearly suspect, still draws a surprising amount of attention from audiences within the academy and government. This is a bitter pill for academics, who are accustomed to casting their institution’s function as being nothing less than to maintain the foundations of the civil state. From that perspective, the vision of customer satisfaction is a pale substitute for contributions to knowledge and community formation. It also suggests an ideological congruence with the reduction of “citizens” to “taxpayers,” and as the focus moves to “value added” activities, the terrain of the debate is being narrowed to shorter and shorter transactional terms. To many within the academy, the “learner as consumer/information as commodity” world presupposed by the business model of higher education remains antithetical to independent scholarship in pursuit of the advancement of knowledge.

If these observations hold true, then it is fair to ask why one would engage in a discussion of quality in relation to any form of education. Why not just stand on the self-evident virtues of the “sacred spaces” of the classroom, library, and laboratory? The answer to that question resides in how contested meanings can be both signals of power relations and tools of resistance. Traditionally, universities achieved quality in intellectual endeavors through the professionalism of academics, the principles of scholarship, and the rigors of peer review; and they gained standing in society by communicating those standards to political and social elites. More recently, massification, diversity, and cuts to funding, along with a wider political movement to demonstrate efficiency and responsiveness, have spawned different conceptions of accountability (Brennan & Shah, 2000). The attempt to lift the meaning of quality education to something beyond short-term fiscal efficiencies and taxpayer benefits is a matter of trying to regain some of the ground lost in previous decades. It is also an encounter with what has been represented as a paradigm shift in higher education that has been highlighted by the advent of online education.

It must also be admitted at the outset that, with the shift to wireless technologies, "online" education may well appear to be an outmoded shorthand for computer or Web-enabled activities. The term has appeal, however, since it carries the sense of a linked community of learners. It still resonates of bounded communities with the possibilities of transformative experiences, rather than the sporadic or strictly utilitarian viewing of information on screens. This feature distinguishes online teaching and learning systems from Web-based publishing. It also presumes a qualitative difference from the convergence of distance and face-to-face delivery techniques being experienced on many campuses. With the proliferation of easily accessed Web tools, mounting a course's syllabus on its own home page, directing students to relevant electronic journals or Web-sites, and accepting assignment submissions by e-mail are no longer enough to allow one to lay claim to providing a distinct online teaching and learning environment. Textbook publishers are adapting, providing an increasing range of electronically delivered content systems and customized companion Web sites to supplant traditional student guides. When these resources are coupled with course management systems, the online environment begins to take shape. Until students and instructors engage, however, it is still just a shell.

It has been suggested that online learning is best conceptualized as "an environment that integrates collaboration, communication, and engaging content with specific group and independent learning activities and tasks" (Sims, Dobbs, & Hand, 2002, p. 138). More particularly, the ability of students to engage in "asynchronous interactive learning activities" has been described as the "signature characteristic of this technology" (Phipps & Merisotis, 2000, p. 6). The importance of the flexibility inherent in asynchronous activities challenges the assumption that emulating the classroom constitutes best practice in online teaching and learning environments. However, the degree to which technology has driven, or simply enabled, the paradigm shift in higher education, is debatable. Whether their adherents have overstated the changes that have taken place as a result of Web-enabled learning technologies is another question worthy of consideration.

Paradigm Shift

Although there had been many examples of applications of computer technology in classrooms for at least a decade before 1995, Michael Dolence and Donald Norris have been credited with issuing a "wake up call" for higher education administrators. In *Transforming Higher Education,* they purported to offer ways for colleges and universities to survive the transition from the Industrial Age to the Age of Information. Even though their vision for the future has not be realized on a wide scale, it is clear that many of the conceptual juxtapositions they offered have gained currency in higher education. These juxtapositions include a shift from episodic access, to clusters of instructional resources, to integrated perpetual learning, with a separation of teaching and certification of mastery, and a reconceptualized role for faculty—from deliverers of content to mentors and facilitators of learning. The most pervasive of these changes is the shift from a "provider focus" to a "learner focus," with its attendent mass customization through individualized learning systems.

More recent elaborations on this theme have indicated that the capabilities of the Internet have overturned "the traditional roles of the college or university as the leading (1) research source and knowledge creator, (2) archivist and gateway to knowledge, (3) disseminator of advanced knowledge, and (4) referee and evaluator of truth" (Quinn, 2001, p. 32). If the production and dissemination of knowledge are no longer the restricted purview of higher education, the roles of postsecondary institutions in the worldwide network are increasingly vulnerable. The need to be more open and to promote capacities to analyze, interrelate and communicate about facts gleaned from network-based knowledge will become essential for students and faculty alike.

The traditional quality measures associated with accreditation or state administered quality assurance frameworks do not match this new climate of teaching and learning. One of the most common measures, and a unit of analysis for costing, is "seat-time," which does not translate to an online environment. Yet Lawrence N. Gold, higher-education director for the American Federation of Teachers, claims that the amount of time a student spends in class is still an important measure of quality (cited in Carnevale, 2002). Even when adapted to an online environment, other common measures rely on inputs (averages of entering students, number of students, qualifications of instructors, systems development) or outputs (numbers completing courses; satisfaction ratings by students and alumni; revenue generated from tuition, intellectual property, or commercial partnerships), but lack in measures to address the fundamental integrity of the online learning environment.

A recent article by Wallace Pond summarized some of the old and new paradigms for accreditation and quality assurance as follows. According to Pond the old paradigm measures could be characterized by the following words and phrases: teacher-institution centred, centralized, hegemonistic, "one-size-fits-all," closed, "us versus them," quantitative, prescriptive, time as constant with learning as variable, teacher credentials, consolidated experience, regional/national, static, single delivery mode, process, infrastructure. In contrast, the new paradigm measures can be seen as learner centred, local, deferential, tailored, open, collaborative, qualitative, flexible, learning as constant/time as variable, teacher skills, aggregated experience, international/global, dynamic, distributed delivery model, outcomes, services (Pond, 2002, p. 4). The degree to which these measures might apply is discussed the next section, but they do not address some of the other questions generated by the entry into online course delivery.

The first questions must relate to the degree to which online learning environments have delivered or can deliver on their promises. The greater access afford through Web-based delivery systems has been one of the key advantages cited by observers of the technological transformation in higher education. Whether depicted as an advantage in developing greater economies of scale for delivery systems or in ameliorating social inequalities, broader access has been lauded as a key feature of the new paradigm. However, electronic learning systems are not always as billed. From the perspective of Thomas Booth, president of the Canadian Association of University Teachers (CAUT), the access argument carries very little weight, because people who have less education to begin with are less likely to have access to the tools and services they would need to study online. He also suggests that “Students traditionally excluded from post-secondary education are the most dependent on face-to-face interaction and least able to deal with the frustration and isolation of Web-based distance education” (Booth, cited in CAUT, 2001). Another caution rests in the comparative completion rates between online and classroom delivery. If intended economic and social transformations are to be realized, access must be examined at more than just the point of entry.

The promise that economies of scale will make education more affordable is perhaps even less persuasive to most academics. That “proprietary institutions are likely to enter the market by contracting with the best professors to provide video-based courses with exclusive rights to their distribution and use” was a vision of higher education in the 1990s (Hooker, 1997, p. 8). It is painfully obvious that the proponents of such models have missed the significance of interactive technologies. Providing more efficient delivery of “lectures by famous faculty” would recreate in cyberspace the “world of the passive listener and single speaker that has marked much of what passes for higher education” (Lairson, 1999, p. 188). Making the doubtful system of mass lectures more efficient does not appear to be much of an advancement over the correspondence school’s traditional course-in-a-box. Another tension emanates from the fact that the bulk of what is delivered in the online environment consists of discrete training modules directed to particular job skills or competencies. While there seems to be slippage between what is being articulated in the realm of learning outcomes (the skills we expect graduates to demonstrate) and expectations around the values associated with the liberal arts, it is fair to say that higher education aims should be broader than the goals of the corporate training sector.

Critics such as David Noble have presented almost apocalyptic views on the incursion of educational technologies into the classroom (Noble, 2001). The Web’s “dark side” has been depicted as the “rapidly growing trend of university corporatism” and the exploitation of knowledge workers (Kompf, 2001). Challenges from the for-profit sector, the influence of corporate training agendas, and “the ‘rush to serve’ different clienteles” have been described as jeopardizing the position of the post-secondary sector as the "source of objective analysis of the society in which it exists" (Crow, 2000, p. 2). Acting as the conscience of civil society speaks to a much broader purpose than meeting the immediate training needs of corporations. If this ideal is taken seriously, then one should expect that faculty would lead the debate from a perspective broader than their own protectionist instincts.

An alternative vision of democratic ideals in the digital age would have education enabling "people to learn about, with, and beyond technology" to open the "doors of economic, educational, and personal empowerment" (Milliron & Miles, 2000, p. 61). The reconceptualization of higher education should be done by (not to) the academy. Establishing the terms through which online education should be assessed should not be left to the marketplace or to self-perpetuating bureaucracies. Taking back some of the momentum will be a challenge, however, since attempts to establish standards and best practices are well under way.

Standards from Four Jurisdictions

The formulation of quality assurance systems for online education, while most frequently regulated at a regional or national level, has in recent years been driven by international developments. The global reach of the Internet and the lack of ways to regulate transnational commercial activities allow fraudulent operators to spring up. One response has been the promotion of consumer education by sites such as AboutEducation (http://www.about.com/education); another possibility is free-lance course reviews from former students, similar to the book reviews found on the sites of online booksellers such as Amazon.com (Carnevale, 2000). Not surprisingly, the appetite for allowing the marketplace to determine the outcomes in a wide-open, for-profit model is not large. Simply stated, it does not seem either ethical or efficient to leave students to bear the full risks for the product testing of online education ventures. Alternative responses have involved trying to develop quality assurance and accreditation systems, or regionally harmonized systems, such as those proposed under the Bologna Declaration (see European Ministers of Education, 1999). Responses from national and local quality assurance interests have varied. Some of the differences rest in the degree to which state-sponsored quality auditing procedures have become entrenched in the past decade; others reflect the suspicions or traditions associated with distance education in general.

Australia has a national instrument, in the form of its Qualifications Framework, for protecting the quality of its educational and training programs. Even the use of the term “university” is restricted by State or Territorial legislation, and universities must demonstrate that they have appropriate quality assurance procedures in place. Within this framework, “universities are expected to engage in a pro-active, rigorous and ongoing process of planning and self-assessment which will enable them to ensure the quality outcomes expected by their students and the wider community” (Department of Education, Training and Youth Affairs, 2000). The Australian government policy framework has been presented as a marketing tool to address the advantages that global competitors enjoy by having “centralized, separate, and highly visible” bodies responsible for quality assurance (Vidovich, 2001). The rationale for the development of the national system was explicitly framed in terms of competitive challenges, domestic and international, and of policies that have encouraged the universities to “align themselves more closely with industry needs” (DETYA, 2000). Under the revised regime, creditable quality assurance systems providing evidence of the quality of service and skills of graduates were explicitly intended to make the universities more attractive to business investors. The systems include national qualification schemes that communicate expected standards for each level of post-secondary achievement.

Quality assurance for online offerings by Australian universities are within the self-accrediting models that include peer assessment processes. Registered training organizations (RTOs) have also been affected by quality audits, and draft guidelines have been developed for auditing online learning. The standards include statements on organizational commitment, learner support systems, learning designs, learning outcomes and assessments, and technology plans (Flexible Learning Advisory Group, 2002). Other features relate to managing risks by arranging for the stability of Web sites, and to cross-jurisdictional regulations. A key principle in this framework is that online delivery standards are incorporated within comprehensive criteria, and do not operate as stand-alone schemas.

A general institutional standard can easily encompass online learning; for example, having written policies and procedures to ensure that educational offerings and assessment processes are consistent with the scope of the institution. The full ramifications of these elements for post-secondary institutions will depend on how the audit processes and guidelines are implemented in Australia over the next three years.

The examples of quality assurance frameworks from the United Kingdom are all centered around open and distance learning, with e-learning issues being acknowledged variables within a spectrum of delivery mechanisms. Three different external approaches to assessing the offerings by individual institutions include licensing procedures under the auspices of a government agency, a voluntary accreditation association, and a scheme for certification through quality marks. Again, much of the drive to enhance quality assurance schemes has been presented in the context of potential regional and global competition. Each of these examples also demonstrates ongoing tensions between external regulatory approaches and internal aspirations for improvement.

It has been suggested that the Quality Assurance Framework in the United Kingdom is not just comprehensive, it is “the most complex anywhere in the world” (Brown, 2000). The Quality Assurance Agency for Higher Education (QAA) was incorporated in 1997, with the aim of reducing some of the reporting burdens created by a combination of external assessments by funding agencies, and quality assurance processes driven by peer review. Its mission is to “promote public confidence that the quality of provision and standards of awards in higher education are being safeguarded and enhanced” (QAA, 2000). The QAA has developed codes of practice for ten areas: postgraduate research programs; collaborative provision; students with disabilities; external examining; assessment of students; program approval, monitoring and review; career education, information and guidance; placement learning; recruitment; and admissions (QAA, N.d.a). Further regulation has developed in the form of benchmark information for different subject areas, linked to the national frameworks for higher education qualifications. These are the explicit learning outcomes meant to communicate to the public and to potential employers the attainments to be expected from program graduates.

The main thrust of the QAA guidelines for distance learning is integration between distance delivery and the general quality standards for teaching and learning activities expressed in the other codes of practice. While not addressing online education directly, the six sections of the guidelines (system design, program design, program delivery, student development and support, student communication and representation, and student assessment), include examples of questions that address electronic delivery systems (QAA, N.d.b). The guidelines (paraphrased in Table 1 of Appendix 16A), are notable in that, whereas the codes of practice for higher education apply equally in distance education, the guidelines are intended to deal with aspects of quality assurance that are "likely to require attention in a particular way" when study is undertaken at a distance (QAA, N.d.b). The elaborate state licensing approach has been depicted as excessive and a sign of the erosion of the autonomy of higher education. To some, these measures have demonstrated the drive to "harness the universities to perceived economic priorities" (Greatrix, 2001). In that light, it is interesting that the criteria of the state licensing agency have largely subsumed standards that had been developed for a peer review model of accreditation.

The QAA distance learning guidelines reference the work of the voluntary association in the United Kingdom's distance education sector, citing the Open and Distance Learning Quality Council (ODL QC) standards. These accreditation standards, revised in 2000, are organized into the following discrete operational areas:

- course objectives and outcomes (providing clear statements of what will be achieved on successful completion; having objectives that are compatible with the method of delivery);
- course contents (providing sufficient content to enable the target group of learners to meet the course objectives);
- publicity and recruitment (providing accurate materials and direct communication to give potential learners the best basis for deciding to take the course);
- admission procedures (communicating the terms of the course, including its scope and the requirements needed to realize the intended outcomes, and providing applicants with enough information to assess their own needs and level of preparation);

- learning support (monitoring student progress, providing appropriate supports, including supplementary material, and facilitating peer group interactions);
- open learning centers (identifying groups of users and ensuring that sufficient resources are available to serve them);
- learner welfare (maintaining accurate records, providing appropriate guidance, demonstrating learner satisfaction and appropriate completion rates);
- providers (having appropriate plans and resources to meet their mission, adopting good business and employment practice, adhering to relevant legal requirements, ensuring that staff have appropriate qualifications, monitoring performance);
- joint provision (specifying respective rights and responsibilities, including procedures to meet standards); and
- accreditation (having procedures for application, limitation, and review).

The operational recommendations around learning support resonate with the models developed by the Open University, and technical supports appear almost incidental in the entire scheme. This model demonstrates an integrated understanding of the practice of distance learning, in contrast with the market model for applying quality marks, which draws on more generic business process analyses.

The British Association for Open Learning (BAOL) is an external marketing agency that applies self-assessment and external review processes. Of all the frameworks summarized here, it is the one most explicitly tied to TQM precepts. Using the Business Excellence Model developed by the European Foundation for Quality Management, BAOL has developed five "enabler" criteria that cover how an organization is managed: leadership, people, policy and strategy, partnerships and resources, and processes. BAOL had also developed four "results" criteria: people, customer, society, and key performance results. Together, these nine generic aspects of an organization "contribute to and enable" the achievement of quality (BAOL, 2002). BAOL has developed quality marks to cover materials development, advice and guidance, learner support, and learning centers. It is claimed that earning these quality marks provides a market advantage for e-learning providers, especially as they face the prospects of competing internationally. BAOL targets a broader range of education providers than does the university sector, and so its criteria have points in common with the suggestions for the registered training organizations in Australia. The existence of BAOL is an explicit acknowledgement that the market sector can be a powerful external influence on attempts to inculcate internal quality assurance values.

With such an array of quality assurance prospects, it is noteworthy that, in their study of "borderless education," the higher education agencies in the United Kingdom have acknowledged that public accountability arrangements and elements of the credentialing or qualification schemes have been challenged by developments in for-profit, virtual, and corporate providers in the domestic and international higher education market. They have proposed that the quality frameworks addressing these developments would include

> currency and security of qualifications; audit of the system for design and approval of curricula or appropriate learning contracts; an internationally recognized system of educational credit; licensing of staff; security of assessment; adequate and accurate public information about learning opportunities; approved guidance and complaints systems for learners; transparent quality management processes for each agent in the educational supply chain; access to learning resources assured by the provider; and publication of guidance relevant to different modes of provision. (Committee of Vice Chancellors et al., 2000, p. 30)

It has also been suggested that the thinking on quality assurance will have to shift dramatically, from external "compliance-based approaches" toward "comparative benchmarking" and mutual recognition arrangements for international quality standards. Attempts to integrate an array of international standards have been made in other jurisdictions.

In Canada, the responsibility for education rests at the provincial, not the national, level. Each province has its own quality assurance framework or approach to determining whether post-secondary programs are eligible for student funding or to receive public money. The degree to which a province might regulate or even provide subsidies to private or for-profit educational institutions varies widely. It is fitting, then, that the Canadian example of quality guidelines originates with a private corporation sponsored by community and government-funded agencies (Barker, 2002a).

The *Canadian Recommended e-Learning Guidelines* bill themselves as "consumer-oriented, consensus-based, comprehensive, futuristic, distinctively Canadian, adaptable, and flexible." The last feature admits that "not all guidelines will apply to all circumstances" (p. 2). This qualification is only realistic, as the list is exhaustive. The 138 items are organized into three distinct sections: "Quality Outcomes from e-Learning Products and Services" includes 15 items related to how students acquire content skills, knowledge, and learning skills; "Quality Processes and Practices" includes 20 items on the management of students, and the delivery and management of learning, using appropriate technologies; and "Quality Inputs and Resources" includes the remaining 103 items, which range through intended learning outcomes, curriculum content, teaching and learning materials, product and service information, learning technologies, technical design, personnel, learning resources, comprehensive courses packages, routine evaluation, program plans and budgets, and advertising, recruitment, and admissions information. A more succinct adaptation issued under the same initiative was the *Consumer's Guide to e-Learning,* which structured 34 questions into basic, discerning, and detailed levels. These questions have been paraphrased in Table 2 of Appendix 16A, to allow for comparison with the other frameworks, but the instructions to consumers provided with the *Consumer's Guide* are more telling.

> Before you sign up of an e-learning course or program ask yourself:
>
> - What is my purpose for taking this course? Do I know what I want or need to learn?
> - Do I need a credit or certificate when I finish . . . or do I just want to know more?
> - How much can I afford to spend? How much time can I invest?

- What hardware and software do I have, and is it enough?
- Where will I access the Internet, what will it cost, and how convenient will it be?
- Are my computer and Internet skills good enough for the course I have in mind? Will I need technical help?
(Barker, 2002b)

Institutions intending to adapt their offerings to the online teaching and learning environment would be well advised to rephrase these questions along the following lines:

- What is our purpose for offering this course?
- Do we know what we expect students to learn?
- Do we have the technological infrastructure to support our students? Is it up-to-date?
- How skilled are our course developers and instructors in the online environment?
- What technical assistance do we have available?

Such questions are at the heart of the two models proposed in the United States.

In an analysis of the impact of electronically delivered distance education, undertaken for the American Council of Education, Judith Eaton suggested that the emergence of electronically delivered degrees, programs, courses, and services, has the potential to undo the delicate balance between "accreditation to assure quality in higher education, the self-regulation of higher education institutions, and the availability of federal money to colleges and universities" (Eaton, 2002, p. 1). Although higher education institutions are subject to state funding and regulatory bodies, and although the systems of accountability may vary from state to state, the federal government relies on accredited status to signal that institutions and programs are of sufficient quality to allow the release of federal funds in the forms of student grants and loans, research grants, and other federal program funds. Under traditional approaches to accreditation, the focus was on the verification of site-based resources contributing to a learning environment (e.g., the number of volumes in the library). To address some of the concerns raised by electronic delivery, the eight regional accrediting commissions in the United States developed the *Statement of Commitment for the Evaluation of Electronically Offered Degree and Certificate Programs,* which declares the resolve of the commissions to sustain the following values:

- that education is best experienced within a community of learning where competent professionals are actively and cooperatively involved with creating, providing, and improving the instructional program;
- that learning is dynamic and interactive, regardless of the setting in which it occurs;
- that instructional programs leading to degrees having integrity are organized around substantive and coherent curricula which define expected learning outcomes;
- that institutions accept the obligation to address student needs related to, and to provide the resources necessary for, their academic success;
- that institutions are responsible for the education provided in their name;
- that institutions undertake the assessment and improvement of their quality, giving particular emphasis to student learning;
- that institutions voluntarily subject themselves to peer review. (reprinted in Eaton, 2002, p. 26)

The regional commissions also committed themselves to a common statement titled *Best Practices for Electronically Offered Degree and Certificate Programs,* developed by the Western Cooperative for Educational Telecommunications (WCET). The statement was organized into five discrete sections: 1) institutional context and commitment; 2) curriculum and instruction; 3) faculty support; 4) student support; 5) evaluation and assessment. Taken together, the *Statement of Commitment* and the *Best Practices* propose a consistent framework for developing quality standards. How those standards might translate into benchmarks was the subject of as study prepared by the Institute of Higher Education Policy (Phipps & Merisotis, 2000).

In Quality on the Line, Phipps and Merisotis surveyed the literature to compile a list of 45 possible benchmarks. They then determined whether those benchmarks were recognized at various institutions delivering online courses, and examined the importance of each benchmark to administrators, staff, faculty, and students at those institutions. The result was a list of 24 benchmarks that should be considered "essential to ensure the quality in Internet-based distance education" (p. 2). The elements (see Table 3 in Appendix 16A) include institutional support, course development, teaching and learning, course structure, student support, faculty support, and evaluation and assessment benchmarks. The similarities between these benchmarks and the proposals from the accrediting agencies clearly demonstrate a common conceptualization of distance education in the United States. Where they diverge is in the degree to which the actual curriculum elements are prescribed, and in the relative weights given to institutional structures. It is also apparent that both sets of standards are designed more for traditional face-to-face institutions introducing distance education programs than for distance education providers updating their mode of delivery. The provider focus remains a strong orientation under both U.S. schemes, and unlike the accreditation standard for open and distance learning in the United Kingdom, neither U.S. scheme speaks to the importance of encouraging learners to take responsibility for their own learning.

Process versus Outcomes

One of the first principles in all of the quality assurance schemes considered here is guaranteeing consistency in the product's results. In the view of TQM advocates "many quality management initiatives, especially in service industries, die because we fail in measurement of the outcomes" (Widrick et al., 2002, p. 130). The dangers of presenting higher education outcomes as strictly utilitarian competencies are familiar features in the debate about quality assurance activities. However, even if outcomes could be framed in wider terms, there is also a hazard of sliding into what has been aptly described as a variation on the "naming fallacy"; that is, assuming that "explicitness about standards" somehow provides assurance that the standards have been or can be achieved (Greatrix, 2001).

Major efforts have been directed to identifying "quality in undergraduate education," but according to Ernest Pascarella, some of these efforts are "based on a naive understanding of just how difficult it is to accomplish in a valid manner" (Pascarella, 2001, p. 19). Most notably, he argues that institutional reputation and resources, and student or alumni outcomes are "potentially quite misleading," and that results based on either of these common approaches are more likely to be driven by inputs than by effective educational practices (pp. 19-21). The solution to this problem should rest in careful measures that address the integrity of the teaching and learning processes within institutions. The seemingly insatiable appetite for comparable measures, regardless of their validity, is a dimension of the operating environments of most post-secondary institutions. While it is clear that the rhetoric of accountability and the bureaucratic systems it has spawned are not likely to disappear, it may be possible to present a framework for quality online teaching and learning that attends to more than short-term transactional or monetary values.

Reshaping the Debate

Whether or not the demands of stakeholder groups (however ill-defined), the threat of fraud, or the intensification of competition from local or international providers are behind the current impulses for elaborating quality assurance mechanisms, a dual challenge is being presented to the providers of online teaching and learning. The common thread across quality assurance schemes in the four jurisdictions is the need to address the concerns from both inside and outside the academy. Even if online and distance delivery institutions have been made the scapegoats for a wide range of changes, not the least of which being the erosion of the power of institutions of higher education to regulate themselves, there may still be an opportunity to address some of the concerns presented by colleagues in more traditional institutions. It follows that an overarching principle of any proposal to address quality assurance in online teaching and learning environments must be to recognize the integrity of higher education—no matter how it is delivered. The rhetoric of both the Australian and British qualification frameworks suggests just such an integrated approach, but the regulatory burdens they have spawned do little to reassure those who value the independence of higher education.

In the process of taking back some of the momentum in the debate, the academy must provide clear statements of educational goals. Such goals need not be restricted to technical mastery in specific subjects; the opportunity to pursue ideas beyond the needs of corporate sponsors should not be ignored. The measure of the effectiveness of the articulation of the educational goals should be the ways a course, program, and institution's goals align with one another. The demonstration of a consistency of purpose should be persuasive to internal and external stakeholders alike, but should not presuppose that students are responsible for seeking their own learning outcomes. This suggestion returns to the essential need for quality to be constructed through consensus building among a range of institutional stakeholders, who must, at the same time, not promise, or be promised, more than can be delivered.

A second theme running through all of the frameworks presented here is the need for sustained institutional commitment to support distance learners. The precise nature of that support would be determined by the nature of the programs and by what students need in order to have a reasonable chance of attaining their aspirations in a given program. All too often, online delivery of courses and programs has been presented in an experimental mode, without long-term, planned infrastructure development. Whether it involves investing in technical systems, or in training for support and instructional staff, the process of developing robust online teaching and learning environments should not be attempted as "one-offs." Some observers have gone so far as to suggest that digital technology may hamper rather than promote educational change, because the focus of investment becomes the short life-cycle technologies, rather than the longer view needed for effective education (Ehrmann, N.d.). An institutional commitment to supporting learners will go a long way to satisfying other stakeholders, without displacing the fundamental project of scholarship. This can only be true, however, if students and educators are engaging in a collaborative process of discovery; that is, if academics are not simply dispensers or interpreters of content for passive students.

Learning technologies can promote powerful connections to content, context, and community. Unfortunately, they can also offer broad access to poorly designed and executed courseware. There are deliberate choices to be made in how to accommodate a generation of students who expect independent investigation, collaboration, and peer contacts to be facilitated in an online environment.

The threats to traditional delivery, and most especially the disaggregation of tasks associated with teaching in higher education, are providing new opportunities for exploring the constructions of community and knowledge, teaching and learning. In the generation of documentary evidence of interactions with content and with others, the structure of the online environment lends itself new kinds of exploration. Eventually, the goal of such inquiries should be to point to ways to improve the teaching and learning environment. Ultimately, the online programs should be able to mobilize recent theory and research into how people learn, and to enhance learning by "enabling the identified characteristics of effective learning environments and ensuring that they are present and accessible" (Herrington et al., 2001, p. 266) From that perspective, the pursuit of quality online teaching and learning environments may become as much an exercise in scholarship as it has been in market or state control.

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Appendix 16A

The Quality Assurance Agency for Higher Education in the United Kingdom has distinct distance learning guidelines that "offer advice on assuring the quality and academic standards" of programs offered at a distance, including those making use of new technologies (QAA, N.d.b). The elements in these standard have been paraphrased in Table 16A-1.

Table 16A-1. QAA guidelines.

Guideline 1: System design

1. Institutions offering distance learning programs should design and manage operations in a way that applies the principles generally relevant to higher education, and at the same time takes full account of the considerations specific to teaching students at a distance.
2. Providing programs at a distance should be part of an explicit strategy for achieving the institution's stated aims
3. Prior to offering programs at a distance, an institution should explicitly design and test its systems for administering and teaching students, and should plan for contingencies in order to meet stated aims in academic quality standards.
4. An institution should safeguard its position with respect to the laws of any country in which its proposed programs will be made available.
5. An institution's plans for offering programs at a distance should be financially underwritten for the full period during which students will be studying, and at a level that safeguards the quality and standards to which the institution is committed.

Guideline 2: Academic standards, program design and approval

6. Institutions offering programs at a distance are responsible for ensuring that the academic standards of awards will be demonstrably comparable with awards delivered in other

ways, and consistent with benchmarks recognized in the UK.

7. In designing distance learning programs, institutions should ensure explicit and reasoned coherence between, on the one hand, the aims and intended learning outcomes, and on the other, the strategies for teaching at a distance, the scope of the learning materials and the modes and criteria of assessment.

8. Distance learning programs of study must be designed to ensure a learning opportunity that give students a fair and reasonable chance of achieving the academic standards required for successful completion.

9. Processes for approving distance learning programs, while underpinned by principles relevant to all educational programs, will take into account the requirements of the system of distance education and opportunities for scrutiny.

10. The program approval process should include an element of scrutiny external to the institution.

11. Programs of study are monitored, reviewed, and subject to re-approval regularly. Institutions should ensure that the content of all learning materials remains current and relevant, and that learning materials, teaching strategies, and forms of assessment are enhanced in response to feedback.

Guideline 3: Management of program delivery

12. Institutions are responsible for managing the delivery of each distance learning program of study in a manner that safeguards the academic standards of the award.

13. Institutions are responsible for ensuring that each program is delivered in a manner that provides, in practice, a learning opportunity that gives students a fair and reasonable chance of achieving the academic standards required for successful completion.

14. Learning should be treated as an activity involving all participants in the system, in which monitoring, review, and feedback to those who manage programs of study are used regularly to enhance all components of teaching, learning, and system delivery.

Guideline 4: Student development and support

15. Institutions should give attention to supporting and promoting autonomous learning and enabling learners to take personal control over their own development.

Guideline 5: Student communication and representation

16. Institutions should meet the needs of the students studying at a distance for full and clear information about the nature and expectations of the program of study, the relationship between achievement and assessment, academic progress and the accumulation of credit, and the characteristics of the distance learning system and how students interact with it. The information provided should be conveyed in a way that enables students to make informed decisions about their own education, and to monitor their progress against clear expectations of achievement.
17. Institutions should monitor the effectiveness of information provided to students, and in response to their findings, take steps to enhance its provision.
18. Institutions should take steps to determine what means of student representation are appropriate and realistic for students in a distance learning program, and provide those students with accurate information about them.

Guideline 6: Student assessment

19. Institutions should be able to demonstrate that all summative assessment procedures used are appropriate for the mode of study, and that in all respects assessment procedures accord with the requirements to safeguard academic standards.

20. Institutions should be able to demonstrate that the summative assessment of a module, or a program as a whole, assesses students' achievement of stated learning outcomes.
21. Institutions should have direct control of the summative assessment process and of the determination of results
22. Formative assessments should be used as part of the design of distance learning programs.
23. Institutions should monitor the soundness of their assessment practices and amend them in response to feedback.

This bureaucratic model is a sharp contrast to the one developed by Canadian Association of Community Education. Tables 16A-2.1 to 16A-2.3 summarize recommendations presented in the *Consumers Guide to e-learning* for post-secondary and adult edu-cation levels (Barker 2002b). The first level in the guide was defined in terms of basic information needs. Note that these guidelines anticipate that potential suppliers of all e-learning products will provide *written* advise to their students on these matters.

Table 16A-2.1. Consumer's Guide to e-Learning recommendations: Level 1.

1. What are the intended learning outcomes, and what entry level knowledge or skill is necessary for a reasonable chance of success?
2. What recognition will be awarded upon successful completion (e.g., transferable credits, degree, professional designation, etc.)?
3. What are the necessary learning skills needed for success (e.g., the ability to write, to manage time, to take examinations, etc.)?
4. What types of material are to be covered, and what are the sources and the relevance of this content?
5. What is the format for instruction and assignments (i.e., group or individual)?

6. Who will be teaching and assessing the students?
7. What is the nature of the assessments, and what are the criteria for success?
8. How long can the course be expected to take, including mandatory or flexible timelines?
9. What are the minimum computer and operation system requirements, and what options exist, if any?
10. What technical skills will be required to access the course materials?
11. What are the total costs, including tuition, books and materials, equipment, and other fees?
12. How credible is the product? What are the qualifications of the design and delivery personnel, and how objective are the evaluation reports?
13. How does one get started? What are the complete registration procedures and services?
14. How does one get help? Who does one contact for technical assistance and content expertise?
15. What are the policies for withdrawal and refunds?

The second level, designed to help potential students distinguish among programs meeting all of the preceding criteria, considered evidence of good e-design and e-delivery. The second level recommendations are summarized below.

Table 16A-2.2. Consumer's Guide to e-Learning recommendations: Level 2.

1. Systems work consistently for the learner.
2. Navigation is logical and well organized.
3. Content is relevant, well organized and presented in an interesting manner.
4. Materials are updated on a regular basis.

5. Access is provided to the learning resources, and advice is given on how to access institutional services.
6. Learning packages allow options for individuals to personalize the course.
7. Scheduled expectations (e.g., synchronous instruction and communication) are present for a reason.
8. What learners need to succeed is easily accessible to them online.
9. There are ways to connect to the instructor and to other students.
10. Assessment of learning takes a variety of forms, and is conducted against clear, achievable criteria.

The final level presents more detailed evidence of good e-design and e-delivery.

1. Individuals are made to feel like valued customers.
2. Scheduling of when to register, learn, and be assessed is flexible.
3. Materials are interesting and motivating.
4. Approaches and materials are free of cultural, racial, class, age, and gender bias.
5. Students are given opportunities to demonstrate current skills and knowledge for advanced credit or a shortened program.
6. The program provides a statement of acquired skills and knowledge, not just a completion certificate.
7. Various approaches are offered to appeal to different learning styles.

Table 16A-2.3. Consumer's Guide to e-Learning recommendations: Level 3.

8. The institution provides access to objective evaluation reports on all delivery components: instructors, curriculum, student success, processes, and resources.
9. Courses and programs demonstrate a favorable comparison of benefits to costs.

Two documents recommending standards for quality distance education delivery have been widely circulated in the United States. The National Education Association (NEA), in conjunction with Blackboard, validated 24 proposed benchmarks. The Western Cooperative for Educational Telecommunications (WCET) developed a best practices document to inform regional accreditation agencies. The elements of these documents are presented in Table 15A-3; the order in which the paraphrased WCET elements have been presented has been altered to facilitate comparisons.

NEA—2000	WCET—Best Practices
Institutional support	**Institutional context and commitment**
1. A documented technology plan is in place that includes electronic security measures. 2. Reliable delivery systems are in place. 3. Centralized support is available for building and maintaining the distance education infrastructure.	Each program is consistent with the institution's mission. Each program is compliant with the statement of accreditation, and with the regulatory environments in which it operates. The institutional plan and budget demonstrates commitment to distance students and program sustainability. Sufficient infrastructure is available, and staffing is appropriate. The organization of the institution supports the process of program design and approval, and coordinates student services for distance students. Articulation and transfer agreements are consistent with the guidelines. Technical systems and training programs are in place for staff, faculty, and students. Technical requirements and the availability of support are communicated clearly.

Table 16A-3.
NEA 2000 and WCET benchmarks and best practices.

NEA—2000	WCET—Best Practices
	There is an explicit match between the technology used and the program requirements.
Course development	**Curriculum and instruction**
4. Guidelines are in place for minimum course design standards where learning outcomes (not technology) drive the content. 5. Instructional materials are reviewed periodically to ensure they meet program standards. 6. Courses are designed to require students to engage in analysis, synthesis and evaluation. **(Teaching/learning)** 7. Student interaction with faculty and other students is facilitated in a variety of ways. 8. Feedback on student assignments and questions is constructive and provided in a timely manner. 9. Students are instructed in proper methods of effective research.	Academic rigor and breadth are assured through evidence from the approval processes, and by having academically qualified people define outcomes, develop curriculum, and determine assessment criteria. In programs, presentation, management, and assessment are the responsibility of people with appropriate academic qualifications. Appropriate student-to-student, and student and instructor interactions are demonstrated and evaluated to inform the delivery design. Program requirements are communicated, including technical, financial, and time commitments. Career opportunities and certification parameters are communicated, clearly and honestly.

NEA—2000	WCET—Best Practices
(Course structure) 10. Before starting, students are advised about the program so that they can determine if they have the motivation and commitment to learn at a distance, and the technology required by the course design. 11. Students are provided with supplemental course information that outlines the course objectives, concepts, and ideas; and learning outcomes for each course are summarized in a clear, straightforward written statement. 12. Students have sufficient access to library resources. 13. Faculty and students agree on expectations about times for student assignment completion and faculty response.	Where consortium agreements exist, performance expectations, appropriate oversight, training, and benefits are specified, and conform to regulatory and quality assurance standards.
Student support	**Student support (IV)**
14. Students receive information about programs, including admission requirements, tuition and fees, books and supplies, technical and proctoring requirements, and student support services	Programs are designed to meet the needs of specific student populations. Program plans, communications, and infrastructure demonstrate ongoing commitment.

NEA—2000	WCET—Best Practices
15. Students are provided with hands-on training and information to aid them in securing material through electronic databases (and other sources). 16. Technical assistance is available throughout the course or program, including practice sessions prior to the beginning of the course and access to technical support staff. 17. Questions directed to student support service personnel are answered accurately and quickly, and structured systems are in place to address student complaints.	Admission, technical, and financial requirements are communicated clearly prior to admission to the program, along with information on timeframes, the criteria of assessment, the availability of advisory and support services, and technical help. Students can access appropriate support services without coming to the physical campus. Distance students are demonstrably part of the academic community.
Faculty support	**Faculty support (III)**
18. Technical assistance in course development is available to faculty. 19. Faculty members are assisted in the transition from classroom teaching to online instruction, and are assessed during the process. 20. Instructor training and assistance, including peer mentoring, continues through the online course.	Workload and compensation policies are consistent. Faculty are aware of intellectual property issues. Technical design and production support are provided for faculty, including design and instructional support services. Faculty orientation and training are provided as needed, support for ongoing development and course management is demonstrated.

NEA—2000	WCET—Best Practices
21. Faculty members are provided with written resources to deal with issues arising from student use of electronically accessed data.	Support is available for those providing direct services to students, including training and mentoring.
Evaluation and assessment	**Evaluation and assessment**
22. Each program's educational effectiveness and teaching/learning process is assessed through an evaluation process that uses several methods and applies specific standards. 23. Data on enrollment, costs, and successful or innovative uses of technology are used to evaluate program effectiveness. 24. Intended learning outcomes are reviewed regularly to ensure clarity, utility, and appropriateness.	As a component of the institution's overall assessment activities, documented assessment of student achievement is conducted in each course and at the completion of the program by comparing student performance to the intended outcomes. When examinations are employed, they are written in circumstances that include firm measures for student identification. Procedures are in place to secure personal information. Overall program effectiveness is measured