

Learner-Centered Instructional Design and Development: Two Examples of Success

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Abstract

An environmental scan of the demand for and varied levels of success of online learning products and services suggests that dropout numbers are higher in online learning. One response is to enhance strategies for supporting learners who are engaged in online distributed learning environments. These strategies are examined within the ADDIE framework. A comparative analysis of learner evaluations of two online learning projects illustrates the benefits of learner-centered development and delivery of online instruction. A professional development course for employees of the United Nations High Commissioner for Refugees written by Maree Bentley, designed by David Murphy, and delivered by the Commonwealth of Learning provides data from the area of noncredit continuing education. An instructional design course created by Richard Schwier for the University of Saskatchewan provides data of a credited, graduate-level course.

Résumé

Des résultats de veille technologique concernant la demande et les niveaux divers du succès des produits et services d'apprentissage en ligne suggèrent que le nombre d'abandon est plus élevé pour l'apprentissage en ligne. La réponse de certains est d'implanter des stratégies de support pour les étudiants qui sont impliqués dans des environnements d'apprentissage en ligne distribués. Ces stratégies ont été étudiées dans le cadre d'ADDIE. Une analyse comparative des évaluations d'étudiant de deux cours en ligne illustre les avantages d'un développement de cours centré sur les étudiants ainsi que de l'apprentissage en ligne. Un cours de perfectionnement professionnel pour des employés du Haut Commissaire des Nations Unies pour les réfugiés, écrit par Maree Bentley, designé par David Murphy, et offert par le Commonwealth of Learning, fournit des données concernant la formation permanente non-créditée. Un cours de design pédagogique, créé par Richard Schwier pour l'Université de Saskatchewan, fournit des données d'un quant à un cours crédité de niveau gradué.

Over the past decade, development of distributed learning products and services, especially online products and services, has grown exponentially. This growth has been associated with expansion of knowledge-intensive sectors in the global economy. An estimated 50% of the gross national

product in Organisation for Economic Cooperation and Development (OECD) countries is currently generated by knowledge-based economic activities (Le Blanc, 2001). UNESCO's *Analysis of the World Education Indicators* (WEI) report (2002) states, "For every single year the average level of schooling of the adult population is raised, there is a corresponding increase of 3.7 per cent in the long-term economic growth rate" (p. 8). Further, as increasing numbers of countries represented in the WEI report move toward knowledge-based economies, the importance of human capital will continue to grow. In the foreseeable future, workers who create and use knowledge to add new value to products and services will be "a prominent and perhaps the dominant group in the workforce" (p. 9). Given the economic and social promise associated with success in higher education, demand for access is likely to continue to increase over the next decade. Michael Moe, Director of Global Growth Research for Merrill Lynch reports that in the year 2000 there were "84 million students enrolled in higher education worldwide. Global demand for higher education is forecasted to reach 160 million by 2025" (Moe et al., 2000, p. 2). Limitations on existing tertiary educational institutions' abilities to accommodate rising enrollments, increasing numbers of adult learners, as well as competing responsibilities in adult learners' lives, have all contributed to the demand for distance learning options. If this access can be provided via online learning options, nearly 40 million students could soon be involved (Moe et al.).

Increased student enrollments both on-campus and online will require increased recruitment of qualified faculty. A recent survey suggested that Canadian universities will need 32,000 new professors between now and 2010 to handle retirements and rising enrollments (Jackson, 2002, ¶ 5). Given predictions of mass faculty retirements during the first decade of the new millennium (AACSB International, 2002; Gibson-Harman, Rodriguez & Haworth, 2002), meeting these recruitment needs may be challenging. Strategies that involve senior faculty in the design and development of online learning options and an increase in graduate student involvement in teaching and marking may somewhat alleviate this problem. However, if the venture of providing access to quality learning through the use of technology is to succeed, attention needs to be paid to the concerns of learners as well as the reality of institutions.

Attrition Rates: Cause for Concern

Rapidly increasing enrollments in higher education distance learning programs may not result in equally high successful completion rates. Carr (2000, ¶ 13) reports a range of 20-50% attrition rates in distance education programs in United States colleges. Although these rates vary significantly among institutions, administrators generally concur that "course-comple-

tion rates are often 10 to 20 percentage points higher in traditional courses than in distance offerings” (Carr, 2000, ¶ 13). A metastudy of a broad range of correspondence-based distance education results undertaken by the World Bank reported “dropout rates ranging from 19 to 90 percent and an overall rate of 40 percent” (Potashnik & Capper, 1998, p. 43). Potashnik and Capper suggest that “while similar studies have yet to be conducted for technology-based distance learning, both intuition and the limited research already done suggest that the interactivity and novelty provided by most technology-based approaches may contribute to higher completion rates” (p. 43). However, recent studies of attrition rates in online learning programs provide little supportive evidence that technology-based approaches can ensure higher completion rates. Jameson (2002) argues, “it is common in Web-based instruction to have high attrition rates” (p. 2). Neil (2001) reports “enrollment and attrition rates are both statistically greater in the online format” (p. 66). Lorenzetti (2002) concurs that although it is relatively easy to attract learners to online distance education courses, dropout rates can “range as high as 50 percent” (p. 1). MacGregor (2001) argues that not all learners are willing to try online approaches to distance learning, and “those who do sign up drop out in higher numbers than in a traditional face-to-face course” (p. 143). “Technical and pedagogical problems and social isolation can often interfere with the learning process, leading to substantial attrition” (“Understanding Student Frustration,” 2002, ¶ 1). Given these preliminary findings, the success of electronically delivered distance education products and services may not be as secure as projected demand statistics predict: “whether or not e-learning ‘takes’ is a question that the learners, not the technologists, will ultimately answer” (Phillips, 2003, ¶ 3). In short, the predominant question about distributed online learning has been, “If we build it, will they come?” Currently the question is, “How do we design it to ensure they stay?”

One strategy for increasing retention rates is to place stronger emphasis on the needs of learners during the development and delivery phases of online learning projects. This strategy involves moving away from traditional domain-centered design toward a learner-centered perspective.

In the following sections of this article I focus on learner-centered design strategies and provide a comparative analysis of two learner-centered design projects to highlight the issues and possibilities of this approach.

Instructional Development: Changing Perspectives

To date, comparative research on the effectiveness of online learning has tended to focus on classroom-based learning (Collins & Berge, 1996; Gifford & Enyedy, 1999; MacGregor, 2001; Yucha & Princen, 2000). As a result

of this context, many early versions of online instruction extended classroom-based pedagogical practice into online learning environments (Gifford & Enyedy, 1999). Traditional classroom-based pedagogical practice has been highly dependent on “the transmission model of knowledge transfer ... [in which] knowledge is an identifiable object that is possessed by a person, detached from any social context, that can be conveyed from the mind of the instructor to the mind of the student” (p. 2; see also McTaggart, 2001). Given the epistemological perspective that knowledge-to-be-learned is an object that may be possessed and transferred, Domain Centered Design (DCD) tends to focus on design and development activities that lead to well-organized and well-presented knowledge objects (Sims, 2001). Rather than taking into account the needs, wants, and desires of the learner, “the focus of pedagogy from this perspective is to make transmission more efficient” (Gifford & Enyedy, p. 2). As a result, learners who use online products and services created from a DCD perspective tend to struggle with difficulties similar to those that have long challenged traditional distance learners who have used print-based materials (Beffa-Negrini, Miller, & Cohen, 2002).

Learner-Centered Design Models

In contrast to DCD models of knowledge acquisition, learner-centered, activity-centered, situated, and participatory models of instructional design and development focus on demographic and cognitive profiles of learners, prior knowledge, perceptions, preferences, needs, goals, characteristics, and experiences of learners. Although individual theorists draw distinctions among learner-centered, activity-centered, situated, and participatory models (Gifford & Enyedy, 1999; Reeves, 1999; Vinicini, 2001; Wilson, 1995), for the purposes of this article the commonalities among these models are considered and are referred to as learner-centered design (LCD).

The underpinning tenet of each of these models is a shift of focus from what is known about and what is valued in a content domain (DCD) to what is known about and what is valued by learners (LCD). This shift is away from primary concern for what will be taught and toward carefully examining learner characteristics and ensuring that learners will perceive content as worth knowing (Sims, 2001). Subsequent development activities are focused on ensuring that essential content is contextualized in learner experiences and/or goals so that learners will be motivated to value it.

A Case Study Example

A Boise State University (BSU) case study exemplifies the difference that may be made by a shift from DCD to LCD. In 1989 BSU launched a

distance learning online/off-Web, master's degree program in Instructional Performance and Technology (IPT). A variety of undergraduate degrees were accepted for entrance into the program; however, much of the curriculum assumed prior knowledge in the fields of psychology, educational psychology, and instructional design. Most students were full-time working professionals in fields other than education or instructional design. A common motivation for entering the program was to make a career change or to specialize in training in an existing profession. All students were required to make substantial commitments of weekly time and long-term planning. The program was for its time rather expensive. Students were required to have 15-hours-per-week access to a computer system valued at approximately US\$3,000 in order to interact with the FirstReader courseware system that delivered the program. Tuition fees per three-credit course by 1995 had reached US\$999. Despite their considerable initial commitments, "between fall 1989 and fall 1996, 44 percent of the students had dropped out" ("School's Founder," 2002, Reducing attrition in new online learners section, ¶ 1). In a series of exit interviews conducted by Chyung (2001), the most often cited reason for attrition was "discrepancies between ... professional or personal interests and the curriculum or the course structure" (Cause analysis section, ¶ 1). Course developers at BSU took this feedback seriously. A series of changes were made to the IPT curriculum and course structure. By the end of the 2000 term,

BSU's department of Instructional Performance and Technology had decreased online attrition to 15 percent by focusing on its first-time Internet learners.... The department also devised interventions to address students' unfamiliarity with the subject matter; varying interests, goals, and learning styles; and desires for personal contact and social interaction. ("School's Founder," 2002, Reducing attrition in new online learners section, ¶ 1).

Aligning the IPT program more closely with learners' needs, wants, and goals, as well as providing additional student support mechanisms, resulted in significantly improved retention rates.

Learner-Centered Design: Principles and Praxis

Reeves (1999) describes three basic principles of LCD: learnability, usability, and understandability. Learnability is defined as "the initial difficulty in learning how to use a computer-mediated learning environment" (p. 2). Reducing the complexity of electronic learning interfaces is critical, because "learners who are inexperienced in interacting with electronic media focus on interacting with the interface rather than on learning from the content" (Thompson, 2000, Passport to flexible learning project section, ¶ 2). Therefore, it is critical that interface designs seek to "to add value and meaning to illuminate, to simplify, to clarify" (Rand in

Reeves, 1999). Knowledge of the learners who will use the interface is critical for achieving this goal. Practical measures for ensuring interface learnability include designing intuitive navigation and interface features that can cope with unexpected user choices, creating help screens that are informative and appropriate for resolving specific problems, careful consideration of metaphors that may not translate across cultures, and a close match between the semantic density of information and learners' educational levels and familiarity with terminology. Usability is an extension of learnability in that usability is a measure of ease of use over time. Understandability is a measure of thoughtfulness in the design of content (Reeves): consideration for the cognitive load demands placed on learners (Cooper, 1998), consideration of how new content can be connected to what learners already know through explicit inclusion of learning strategies and self-monitoring activities in content (Doyle, 2002), and intentional scaffolding of incremental movement toward increased knowledge and skill levels (Reeves) each contribute to understandability.

Using LCD principles as touchstones in the Analyze, Design, Develop, Implement, and Evaluate (ADDIE) approach to instructional design is one method for supporting learner success. In the analysis phase, efforts are directed at collecting rich information sets about intended learners, and subsequently aligning instructional design and delivery plans to learner profiles. These profiles include demographic information, comfort with and access to technology, learning styles and preferences, comfort with the language of instruction, competing responsibilities and learning goals, academic self-concept, achievement expectancies, perceptions of authority, and idiosyncrasies (Barclay, 2001; House, 2002; Laks & Levy, 2003; Schwier, 2001; Wilson, 1995). LCD instructional design is based on connecting learners' characteristics and their prior knowledge to instructional strategies such as to ensure that learners are motivated and successful. The formation of these plans requires a thoughtful approach to contextualizing and chunking information, providing tools and activities that are meaningful to learners, and demonstrating the value of knowledge to be gained in terms of learner goals (Doyle, 2002; Goodyear, 1999; Merrill, 2000; Schwier, 2001; Weston & Amundsen, 2001). Involving learners in the analysis stage of the design process brings learners' concerns to the surface: "new issues become important, such as access, equity, representation, voice, and achieving consensus amid diverse perspectives" (Wilson, 1995, p. 3). Learner participation at this phase provides opportunities to resolve unforeseen cultural issues before they become part of the design (House, 2000; Sims, 2001; Thomas, Mitchell, & Joseph, 2002; Vinci, 2001). Further, learner participation in task analysis can inform designers and developers where the inclusion of options may allow learners to

choose personalized learning activities and pathways (Kommers, Lenting, & van der Veer, 1998; Milgrom et al., 1997).

Interaction between the instructional designer and learners “should not stop at the analysis phase” (Thomas et al., 2002, p. 41). “End users—the ‘consumers’ of the ‘instructional product’ should contribute directly to the project’s design and development” (Wilson, 1995, p. 7). Learners can contribute to the structuring of content in ways that support schematic connections through providing feedback on scaffolding strategies (Reeves, 1999). Student involvement in these activities can identify where coaching will be most needed and can provide early feedback on the effectiveness of self-monitoring activities (Murphy, 2000; Reeves, 1999; Vincini, 2001).

In the implementation phase, the locus of interaction tends to shift from designer-to-learner to instructor-to-learner, as well as learner-to-learner. In an e-learning environment, instructors need to “interact with students on an individual level” (Barclay, 2001, Design appropriately for distance section, ¶ 2). The presence of the instructor and the combined academic and social impression learners have of their instructor are important criteria for students’ satisfaction and success (Barclay, 2001; Beffa-Negrini et al., 2002; Thomas, Carswell, Price, & Petre, 1998; Weston & Amundsen, 2001). Instructor-student rapport, based on “interpersonal concern and effective motivation” is essential (Weston & Amundsen). Fostering trust and caring in an online environment and helping to create a secure and motivating virtual community involves providing timely support and encouragement, as well as promoting sharing among participants as a mechanism to overcome isolation (Collins & Berge, 1996). Online courses that lack mechanisms for sharing lack interaction and “are reduced to electronic correspondence courses” (Betz, 2003, ¶ 2).

Humans are social beings, and, as posited by the constructivist theory of learning, they develop new understandings and knowledge through their social interactions with a community of others, which some call “communities of practice.” Collaboration, critical analysis, and authentic assessments facilitated by technology are some of the strategies through which instructors [and instructional designers] can empower students in their knowledge and skill. (Kerka, 1997, p. 57)

A practical strategy for supporting the creation of a virtual learning community is to provide opportunities for off-task student-to-student communication. Off-task peer-to-peer chat can “mediate learner concerns about a lack of social interaction,” as well as establish a rapport that forms a basis for collaborative work (Clarke, 1998, p. 84). Student involvement in setting the norms, conventions, and netiquette that define the community is a critical component in the implementation phase of LCD projects (Schwier, 2001; Thomas et al., 2002).

Finally, in the evaluation phase, LCD emphasizes formative rather than summative, iterative rather than periodical, and lateral rather than hierarchical evaluation strategies. Learners involved in the analysis, design, and development phases evaluate the accuracy of learner profiles, the effectiveness of content structure, and the usefulness of learning strategies. In the implementation phase, learners evaluate the effectiveness of modes of communication and norms of interactions. At each stage of the project, learner participation influences design and development choices, situating the learner inside the learning community. “Members of a learning community, including both teachers and students, observe and monitor learning and make necessary adjustments to support each other in learning activities” (Wilson, 1995, p. 4). This lateral approach to ongoing evaluation ensures that the student perspective has been acknowledged in an LCD project.

LCD: A Comparison of Two Success Stories

An analysis of two learner-centered design projects, *Writing Effectively for UNHCR* and *Designing Materials for Individualized Instruction*, illustrate the advantages of focusing on learners’ needs during the development and delivery of online instruction.

Writing Effectively for UNHCR is a professional development course for employees of the United Nations High Commissioner for Refugees written by Maree Bentley, designed by David Murphy, and delivered by the Commonwealth of Learning. Developed in 1999 and revised in 2002, *Writing Effectively for UNHCR* has been delivered to date to more than 900 UNHCR employees. All course participants are asked to complete a course evaluation form. At the close of each offering of the course, course administrators compile the evaluation data and distribute them to course tutors for review and discussion. As a former course tutor, I have been granted permission to analyze these data and publish the results.

Richard Schwier developed *Designing Materials for Individualized Instruction*, a graduate-level course for the Educational Technology program at the University of Saskatchewan. Student designers Thelma and Ruth Cey were involved in both the development and pilot delivery of this online course. Data from a series of formative discussions between the course development team and the students enrolled in the pilot offering of *Designing Materials*, as well as from a debriefing session at the close of the pilot, were used to collect data for course evaluation. These data are limited to commentary from 12 of 13 students who participated in the pilot. As a member of the course development team, I have been granted permission to analyze these data for the purpose of preparing this article.

Writing Effectively for UNHCR

In 2001 the Commonwealth of Learning's *Writing Effectively for UNHCR* (United Nations High Commissioner for Refugees) course won the prestigious Open and Distance Learning Association of Australia (ODLAA) Award for Excellence in Development and Delivery of Distance Education and Open Learning Programs.

The award citation reads in part: *Writing Effectively for UNHCR* demonstrates a commitment to excellence that is amply reflected in the final product. The overall high quality represents the convergence of a range of attributes, the most notable of these being: "an in-depth understanding of the target group and its needs; sound background research; and attention to the appropriateness of learning strategies and media" (COL/UNHCR, 2001, ¶ 6).

The Design Phase: Planning for Success

A cohort model was deemed necessary for administrative purposes. Background research into learner needs and program goals resulted in detailed learner profiles, which in turn led to the selection of course features and delivery modes. As potential participants could be working anywhere in the world, a distance learning solution was the only viable one. Because many learners would be stationed in remote, isolated field offices where Internet services are delivered on very low bandwidths, online activities and interactions were restricted to e-mail exchanges. In locations where field offices had minimal bandwidths, file size restrictions ensured that messages and assignments could be sent and received. Although a Web site was built for learners who would have better connections, only supplementary resources and information were housed on the site. All required course materials would be printed and delivered via UNHCR bag service. Most participants would concurrently fulfill full-time field duties; therefore, the decision was made to allow participants, in consultation with their tutors, to determine assignment submission schedules within the boundaries of the dates that would define cohorts. This flexibility would allow participants to plan their studies around work schedules. Given the uncertain nature of UNHCR duties, extensions were made available. As all participants would be professional adults who dealt with numerous competing demands on their time, all assignments were linked to work-related writing; therefore, learning goals were matched with career goals. Because participants' entrance skills in writing in English would vary widely, and because the course was designed as a professional development activity rather than as a credit toward a credential, assessment was based on improved performance. Multiple submissions of individual assignments would allow participants to use tutor feedback to revise and improve their work. Given this flexibility in course policy,

ensuring continuity among tutor interpretations of policy became a primary concern for the developers. Semiannual, face-to-face training sessions for tutors, supplemented with monthly online discussions involving both course administrators and tutors, would provide the basis on which to form a community of practice. In this community of practice, peer review would be introduced through an evolving monitoring role. Random checks of marked assignments would provide tutors with advice on improving practice, initially from the program developers and later from peers. Frequent participant feedback would provide tutors and administrators with concrete evidence of the effectiveness of their joint endeavor to continue to improve the course. This careful matching of learners', tutors', and administrative needs and goals to policies and activities that supported these needs and goals marked *Writing Effectively* as an LCD project.

Since its inception in 1999, more than 900 UNHCR staff in over 70 countries have participated in *Writing Effectively*. The course is offered four times per year, and each cohort can enroll as many as 100 learners over six months. Successful completion rates have varied from cohort to cohort, but the range to date is 74-84%. Given that each of the participants works in a troubled area of the world and participants carry their duty loads throughout the term, this range of successful completion rates is remarkable. On completion, each participant is asked to rate the quality of course administration and support, learning materials, and tutor support. Participants' ratings across all three sets of criteria remain consistently high. One hundred, fifty-two participants from six cohorts from 2001 and 2002 submitted course evaluations. Results from a sample of six of 27 questions are illustrated in Table 1.

Participants' comments on experiences with the course include the following.

I would like to thank the administration of the course for good organization and material and my tutor for support and advice. The study material and web site references are very useful and will help me in future.

I wish to share a few complimentary words with those who participated in creation of this course. Course book is written that well that it is the best example of effective writing. This has been a very beneficial experience and has definitely influenced my understanding of writing process. Thank you.

I started very late and felt a bit reluctant to continue the course, because of the official work load ... but then, when I started, my tutor was very helpful and quick to respond to my tasks' submission. It helped me very much, and gave me better motivation to continue my course.

Table 1
Participant Evaluations

Evaluative Statement	Percentage of Participant Responses				
	All/Most	Most	Half	Some	Little/ None
The course administration and support provided by the Commonwealth of Learning assist me in pursuing this self-study course smoothly.	69	30	1		
Each topic provided activities for testing or self-monitoring my own learning.	53	46	1		
The assigned written work improved my writing and analytical skills.	68	30	1	1	
The content in each topic was deliberately related work at UNHCR.	71	25	4		
The feedback on my work was helpful to my learning.	96	2.5	1.5		
The tutor gave me individual help with my learning in this course.	79	18	2	1	

N=152

These types of courses are really helpful to express the facts in excellent manner. We deal with the lives of refugees. Our writings for UNHCR directly effect the refugees. Therefore, it is very much necessary to write effectively for UNHCR. I learned a lot from this course and hope it would continue for other UNHCR employees as well. Together we can make this world without refugees.

Comments such as these motivate course administrators and tutors to continue to work toward ensuring the success of *Writing Effectively*.

Designing Materials for Individualized Instruction

In 2002 a prototype online version of *Designing Materials for Individualized Instruction* was showcased at the Gwenna Moss Teaching and Learning Centre's Summer 2002 professional seminar on Best Practices in Technology Enhanced Learning. A pilot version of *Designing Materials* was offered in 2002. The successful completion rate for the pilot was 92%. This excellent initial result, as well as positive student feedback from the pilot, led the Educational Communications Department at the University of Saskatchewan to consider adopting the model as a standard for delivery of Web-based courses. Other departments have also shown interest in using *Designing Materials* as a model for Web-based delivery.

Demand for a distance learning option for *Designing Materials* arose from difficulties rural students experienced in attending face-to-face sessions of foundational courses in the Educational Technology program. Once it was decided to develop an online version of *Designing Materials*, learner profile data were collected. The inclusion of two student-designers who had completed the face-to-face version of *Designing Materials* ensured a learner-centered focus for the project.

The pilot enrolled 13 graduate students. Approximately half the students resided in rural areas, and the remainder resided within a 30-mile radius of the university campus. Eight were practicing professional educators, two were full-time graduate students, and three were part-time graduate students with varied work-related responsibilities. Most students were in an early stage of the program and had completed fewer than nine credits toward their graduate degrees. Because all students' initial experiences in the program included classroom-based sessions, and because the transition from classroom-based to online instruction would influence their learning experiences at various stages of program completion, discussions with students played a significant role in design and development decisions. Some students stated that they were not comfortable with a solely distance option; therefore, optional once-a-month classroom sessions were included. Attendance at these face-to-face sessions varied from 33-50%. Prohibitively long commuting distances for rural students resulted in these relatively low attendance rates. Although the distance education option met rural students' needs, this group expressed concern about becoming isolated from the instructor and their peers. Weekly online chat sessions, moderated by the instructor, bridged this concern. A media-rich learning environment that included lectures that could be accessed in either audio or videostreams was delivered via the course Web site. The Web-based lectures were supplemented with PowerPoint slides. Print copies of the slides, as well as print materials for each module of study, were provided to all students. A CD-ROM version of both Web-based and print resources was produced. A wealth of online resources and access to peer-reviewed journals through the library's electronic databases provided all students with the breadth and depth of learning materials required for graduate-level study. Applied project options allowed learners to align assignment work with their career goals and activities. Self-monitoring tools and just-in-time online or face-to-face coaching provided frequent, timely feedback.

Informal feedback on the course design and delivery modes occurred throughout the pilot offering. A formal debriefing session, in which the developer or instructor did not participate, concluded the course activities. Students participated either in person or via an online chat session. Communication between online and on-site participants was facilitated by

projecting the chat session onto an on-site screen and entering comments from on-site participants into the chat session.

In both settings the debriefing session began as an informal discourse. Students who had previously taken online coursework (5 of 12 students) compared the features of *Designing Materials* with other online learning environments. Students for whom *Designing Materials* was a first experience with online learning compared it with classroom-based experiences. Although all students expressed overall satisfaction with *Designing Materials*, those who had previous online learning experiences expressed somewhat higher satisfaction than those for whom *Designing Materials* was a first experience in online learning. The group that lacked previous experience with technology-mediated learning environments commented that the time commitment required to complete the course was significantly increased because they had to become familiar with the delivery courseware and develop online communication skills, as well as work through content and complete assignments.

Following the informal discussion, student feedback on the level of effectiveness of the *Designing Materials* pilot was solicited via 11 prompts.

1. The assignments (clarity, difficulty, usefulness, structure, weighting);
2. The usefulness and adequacy of feedback students received.
3. The lectures and specifically the organization of the lecture pages (outlines, video, PowerPoint slides). How did students make use of them?
4. The online chats/activities. How did students use the chat rooms?
5. The Web site design. What could be improved, added, deleted?
6. The text: Smith and Ragan have just started work on a new edition—should we keep this one, and then review the new one for adoption?
7. If students wanted to eliminate one thing from the course, what would it be?
8. If students wanted to add one thing to the course, what would it be?
9. What do students want more or less of?
10. Which things require the most urgent attention? What should be changed first?
11. What is just about right the way it is? In other words, what would students keep?

Students responded to a prompt through discussion, which generated a series of statements. This was followed by a request to all other students to indicate their support or otherwise of each statement. Abstentions were not calculated into the ratings. Table 2 summarizes the feedback from the debriefing session.

As well as the above results, technical difficulties with the Web site interface and CD-ROM were reported. As a result of this debriefing session, technical editing was undertaken. Chat sessions, assignment instructions and weightings, as well as collaborative activities, were reviewed. Revisions were made to improve course features for subsequent offerings.

Discussion

Rather than applying generalized theory-based recommendations for electronically delivered instruction, the instructional design features and strategies for *Writing Effectively* and *Designing Materials* designs carefully referenced learner profiles and task analyses. As a result, a number of the instructional design features in the courses are significantly different because the learners for whom the courses have been designed, as well as course goals, are significantly different. Table 3 illustrates the contrasting instructional design features of *Writing Effectively* and *Designing Materials*.

Table 2
Debriefing Session

<i>Students' Comments</i>	<i>N=12 Participants' Responses as Percentages Students in Support</i>
The initial learning curve for this course is too high.	33
The weighting of grade for the first assignment should be lower.	67
Clarification of the second assignment is needed.	100
Collaborative activities are ineffective in the current format.	50
Automated feedback on the CD ROM materials is helpful.	50
Feedback from the instructor is critical to success in the course.	100
All required feedback from the instructor had been provided.	100
Continue use of print versions of the PowerPoint slides, the current course textbook, concept maps, and diagrams included in the print package.	100
Provide a more structured approach to the chat sessions.	67
Reported use audio alone, rather than video versions of lectures.	83
Reported occasional use of video for assurance the instructor "was still out there."	100
Eliminate optional assignments.	83
Eliminate print copies of course materials available on CD ROM or Web site.	33
Eliminate print copies of course materials available on CD ROM.	67
Include more lectures.	100
High overall satisfaction with the course	100

Table 3
Writing Effectively and Designing Materials: Contrasting Instructional Design Features

<i>Writing Effectively</i>	<i>Designing Materials</i>
Low-technology design—print-based course materials delivered by UNHCR bag mail.	Relatively high-tech: Video lectures Web-cast to students Web-casts and PowerPoint notes also distributed on CD ROM.
For learners with minimal bandwidth access, e-mail file-size limits defined.	For learners with low bandwidth access, Web casts also distributed on CD ROM.
As many learners had no access to the WWW, WWW resources made available, but optional.	WWW resources an integral part of the learning experience.
No expectation for collaborative work among learners.	Explicitly stated expectation for collaborative work, but no formally aligned requirement.
No use of online Bulletin Board or Chat features for learner-to-learner interaction.	Extensive use of online Bulletin Board or chat features for learner-to-learner interaction.
Flexible learner-defined assignment submission schedules, bracketed by predetermined course start and end dates. E-mail submission of all assignments.	Fixed assignment due dates, flexible submission modes (electronic or hard copy).
Exclusive distance-delivery, no face-to-face components.	Flexible attendance—learners allowed to choose whether to attend monthly face-to-face plenary sessions.
Increased tutor participation in course policy and course design revisions, based on lack of availability of learners to contribute time.	Iterative student course evaluations and frequent course updates.
Assignments may be submitted as many as three times in order for participants to make revisions based on tutor feedback	Assignments submitted once. Suggestions for improvement returned with graded assignments.
Criteria for success based on individual improvement, rather than meeting a predetermined standard of achievement.	Assignments graded in reference to an evaluation rubric that reflects standards for graduate achievement.
Dual track—participants choose from office-based correspondence, or field- or country-based report portfolio submissions.	All learners complete one set of assignments—bracketed choices are designed into these assignments.

Although contrasting instructional design features in *Writing Effectively* and *Designing Materials* highlight the importance of adapting to differences in learner profiles, an LCD focus also resulted in similarities. Both course designs were prepared for adult learners engaged in professional careers. Further, both learner profiles included individuals with no prior

distance and/or online learning experience; therefore, corresponding comparable ID choices were made. In both courses, self-monitoring exercises and self-evaluation tools were designed to allow students to track their own progress, just-in-time pedagogical coaching, that is, 24-hour response time to student queries are provided, administrative and technical support are provided via online communication, and applied course work and assignments relevant to learners' career goals are predominant.

Writing Effectively and *Designing Materials* are both partial and iterative applications of an LCD model for online learning. Although the learner profile data for *Writing Effectively* indicates that most learners are isolated from their course peers, the course design does not include opportunities for peer-to-peer interaction. The rationale for excluding peer-to-peer interaction was based on sensitivity to learners' competing responsibilities. Concern was expressed that time spent communicating with peers might compete with time spent on coursework and result in lower completion rates. Whether learners would benefit from social interaction or collaborative coursework and be more motivated to complete as a result, are possibilities that have not yet been explored. Given the design sensitivity to learners' competing responsibilities, alternative course pacing options may merit consideration. Currently, personalization of learning is limited to student choice between general office correspondence and report-writing components. As some participants' work-related writing typically does not include either component, alternatives could more closely align course requirements to a broader range of learners' career-related goals. For example, participants whose work primarily involves accounting responsibilities have commented that the preparation of a financial report would be more appropriate. Finally, direct student involvement in design and delivery has been limited to feedback during the evaluation stage of the project. This limitation precludes learner input on issues such as "access, equity, representation, voice, and achieving consensus amid diverse perspectives" (Wilson, 1995, p. 3).

Analysis of learner feedback from the pilot offering of *Designing Materials* provides opportunities for considering refinements to the original design. *Designing Materials* uses broadband media-rich components that are not accessible to some learners. Despite debate over their value (Barclay, 2001; Gifford & Enyedy; 1999; McTaggart, 2001), much of this bandwidth is taken up by video lectures cued to PowerPoint slides. Although 100% of the learners asked to have the number of lectures increased, 83% reported consistent use of the audio version and only occasional viewing of streaming video via the Web or video files on CD-ROM. All students agreed that their motivation for viewing video segments was to maintain a sense of instructor presence. Recording case study scenarios or presentations of comparative examples of ID features

might serve this need equally well and enhance the instructional capacity of the video medium. Maintaining a blended delivery mode, that is, holding face-to-face seminars as an alternative to synchronous online discussions, divides *Designing Materials*' cohorts into two communities. Web-casting on-site seminars to remote learners or connecting on-site and remote learners via Web-based audioconferencing might mediate this divisive effect. The existing dichotomy between learners' desire for flexibility in assignment submission dates and an institutional requirement for predetermined deadlines warrants further consideration. As the majority of graduate students enrolled in the Educational Technology program are full-time working professionals, allowance for negotiated assignment submission dates might better serve learner needs. Student-designer involvement in LCD projects ideally extends into the implementation and evaluation phases; however, fiscal restrictions ended this involvement in *Designing Materials* at the pilot phase. As a result, the opportunity to include student designers in resolving issues and refining features for subsequent offerings has been lost.

Although opportunities for collaborative work are part of *Designing Materials*, the structure of these activities has not yet promoted the level of collaboration initially envisaged. The lack of collaborative work involving on-site and remote learners may be attributed to learners' preferences, comfort zones, or the divisive effect of face-to-face and online subcommunities. Including a requirement for on-site and remote learners to engage in collaborative work may enhance the learning experience, expand comfort zones, and mediate community division. Dissatisfaction with the lack of structure in chat sessions may be a further example of learners' preference for remaining inside an existing comfort zone. Because a lack of structure is a feature of synchronicity, providing students of ID with an opportunity to experience synchronous communication in a learning environment, and perhaps develop an increased tolerance for its ambiguity, may benefit learners more than deference to an existing preference.

Aligning ID features to learners' needs, wants, and desires while concurrently creating instances of discontinuity as avenues to enhanced learning may be the most challenging task in the application of LCD to online learning development projects.

Continual focus on keeping learner needs to the fore, as well as sensitivity to learners' desires within the purview, underpins an effective pedagogical balance.

Writing Effectively and *Designing Materials* are works-in-progress. Ongoing learner profile analyses and evaluation processes continue to align course structure, content, features, and delivery modes more closely to learners' needs, wants, and desires. Ongoing task analyses provide oppor-

tunities to discover appropriate places for planned discontinuity. Continued revision and renewal will be required to maintain the viability of these courses. Nevertheless, current successful completion rates and predominantly positive learner feedback warrant labeling *Writing Effectively* and *Designing Materials* as examples of LCD success.

Working with LCD

LCD is itself a work-in-progress. Emergent technologies, as well as improvements to technological infrastructures, evolving pedagogical applications of technologies in electronic learning environments, expanding learner experiences with and increased learner sophistication in the use of educational technologies all contribute to ongoing innovation and change. As a result, many appropriate LCD choices are temporal and iterative. The basis for making LCD choices—matching detailed learner profiling and task analyses with effective pedagogical, administrative, and technological choices—remains relatively stable. These are listed in the Appendix.

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Appendix

Checklist for LCD

<i>Continua</i>	<i>Options</i>
<i>A. Pedagogical</i>	
Prior learner knowledge	<p><i>Norm.</i> Prerequisite requirements promote relative homogeneity of prior learner knowledge; therefore, neither enriched nor remedial materials or strategies will be required.</p> <p><i>Advanced.</i> Learners' past performances indicate in-depth understanding of this discipline or content. Enriched content that promotes higher order thinking is appropriate.</p> <p><i>Remedial.</i> Learners' past performances indicate the need for remedial support. Prerequisite materials and additional support for learners should be included.</p> <p><i>Varied.</i> Learner past performances are varied. Multiple levels of and/or approaches to instruction may be required.</p> <p><i>Unknown.</i> No available information. Learning materials and instructional strategies may need to be adapted to learner needs during the course of instruction.</p>
Semantic density	<p><i>Norm.</i> Semantic density is aligned with the level of learners' prior knowledge and instructional content; therefore, adaptations of materials will not be required.</p> <p><i>Advanced.</i> Learners' prior knowledge and sophistication with language indicate a need for higher-level instructional content and materials.</p> <p><i>Misaligned.</i> Learners' lack of sophistication with language is misaligned to learners' prior knowledge. Complex concepts may need to be presented in simplified language.</p> <p><i>Varied.</i> A range of instructional materials and strategies will be necessary to support learners.</p>
Learner control	<p><i>Low.</i> Learners' lack of prior knowledge, novice skill level, or discomfort with decision-making suggests that a highly structured learning environment is appropriate.</p> <p><i>Bracketed.</i> In a structured environment, learners are comfortable with and capable of making limited choices about their own learning. Options for learners to select assignment topics or project types from a predetermined list may be desirable.</p> <p><i>High with advisement.</i> Learners' high levels of skill or motivation to learn require an allowance for learners to construct individualized learning pathways. Learners' novice-level previous knowledge of the content area will require advisory support in decision-making.</p> <p><i>High.</i> Learners' high levels of previous knowledge skill, preference for independent learning, and motivation to learn require the allowance for learners to construct individualized learning pathways.</p>
Discontinuity	<p><i>Low.</i> Novice learners will require few instances of discontinuity. Predictability will support learner development of basic knowledge and skills.</p> <p><i>Moderate.</i> Learners' knowledge and skill levels may be extended by learning to adapt to occasional instances of discontinuity.</p>

*Continua**Options*

High. Learner sophistication or affective learning goals indicate frequent use of discontinuity is desirable.

Mode

Textual. Learning style is predominantly visual and textual. Learning materials and activities emphasize reliance on text.

Graphical. Learning style is predominantly visual and graphical. An emphasis on images, illustrations, and graphical representations is required in learning materials and assignments.

Auditory. Learning style is predominantly auditory. An emphasis on verbal communication is required in learning materials, and presentation of assignments.

Kinesthetic. Learning style is predominantly kinesthetic. An emphasis place on learner manipulation of learning aids, and performance or demonstration of acquired knowledge and/or skills.

Expansive. Preferred learning styles need to be supported, but also expanded. Learner comfort with alternative styles needs to be developed. Mode of learning materials and requirements are varied.

Learner motivation

Education for personal development. Learners are motivated exclusively by personal interest. Neither a credit nor a credential is required to acknowledge achievement; therefore, evaluation is deemphasized or excluded.

Professional development. Learners are motivated to up-date or add to existing skills. Recognized credit for achievement may be desired or required. Skill or competence requirements may be externally evaluated.

Education for credit. Learner motivation is to acquire credit for achievement in a course or module, but not a full program of study. Course or module need not be contiguous with a broader program.

Education or training for a credential. Learner motivation is to acquire a certificate, diploma, or degree. Continuity among courses or modules is desirable.

Workplace training: noncredit. Learner motivation is to acquire knowledge or skill to apply to increased productivity or responsibility in the workplace. Application is emphasized. Evaluation is de-emphasized or excluded.

Workplace training: credit. Learner motivation is to achieve a promotion, meet criteria in an employee growth plan, etc. Evidence of achievement is required. Evaluation is emphasized.

Learning community

Independent learner. No peer-to-peer interaction is required; therefore, variant-pacing options may be accommodated.

Pairs. Learners need to complete some part of the instruction in collaboration with a partner, such as those that are commonplace in science courses. A means of communication between paired learners is required.

Small group. Learners need to collaborate in a small group. Pacing and communications channels need to support group collaboration.

Cohort. Pacing options may be more restricted and activities may need to be more structured. A combination of independent and collaborative

<i>Continua</i>	<p><i>Options</i></p> <p>activities may be desirable. A variety of communication channels may be necessary.</p> <p><i>Group-to-group.</i> Learners belong to location-specific subcohorts that communicate with geographically distant subcohorts. Collaborative work may be primarily subcohort based. Synchronous communication may be required to link subcohorts.</p>
Instructional support+	<p><i>None.</i> Learners will use these learning materials without instructional support.</p> <p><i>Peer.</i> Learners will work through these learning materials in pairs or groups, but will not receive formal instructional support.</p> <p><i>Parent.</i> The materials will be developed to support parents who teach their children at home.</p> <p><i>Marker.</i> While learners will not receive help from an instructor, assignments and/or tests will be graded by a marker.</p> <p><i>Facilitator.</i> Learners will receive help from a facilitator who advises them on ways to work through the learning materials and activities, but who will not be involved in grading assignments.</p> <p><i>Teaching assistant.</i> Learners have access to the support of a teaching assistant. The teaching assistant may also be responsible for grading assignments and/or tests.</p> <p><i>Tutor.</i> Learners will receive help from a tutor who has not developed the materials, but who is responsible for supporting learners and for grading assignments and/or tests.</p> <p><i>Instructor.</i> Learners will receive help from an instructor (teacher or professor) who will provide that assistance either in a face-to-face setting or from a distance.</p> <p><i>Mentor.</i> Workplace learners will have access to a mentor who works in the same field or area of work, but who will not grade student work.</p> <p><i>External expert.</i> Learners will have access to an external expert who will support them in developing expertise, but who will not grade student work.</p>
Pacing	<p><i>Self-paced.</i> Learners work through the learning materials at their own pace. No time restrictions apply to either the start or stop dates of this learning experience.</p> <p><i>Self-paced/bracketed.</i> In defined start and end dates, learners can submit assignments and/or write tests whenever they choose to do so.</p> <p><i>Reaching/negotiating milestones.</i> Learners submit assignments and/or write tests when they have either completed a module or unit, and so forth, or as negotiated with the instructor.</p> <p><i>Externally defined deadlines.</i> Dates for submission of assignments and/or writing tests are defined by the instructor or the program of studies.</p>
<i>B. Administrative</i>	
Delivery model	<p><i>Classroom-based.</i> The delivery model requires learners to attend classroom-based instruction. Potential learners who cannot attend face-to-face sessions are excluded.</p>

*Continua**Options*

Distance learning: print-based. The delivery model often emphasizes independent learning, print-based learning materials, instructional support via postal, telephone, or email communication with an instructor. Learners need to be independent, self-motivated, and able to cope with isolation from peers.

Distance learning: Radio transmission and print-based materials. The delivery model is relatively inexpensive and accessible to learners in remote locations. Print-based materials may be minimal or predominantly graphical in order to support learners with low literacy levels.

Distance learning: Televised transmission and print-based materials. The delivery model often emphasizes transmission of lectures. Learners may have access to synchronous communication with the instructor via telephone, or teleconferencing with peers and the instructor. Submission of assignments may be either via post or e-mail.

Distance learning: televised and online. The delivery model adds an online synchronous or asynchronous component to televised transmission of lectures or events. Learning materials may be Web-based. Group work may be supported by online collaboration.

Web-based instruction. The delivery model emphasizes use of Web-based learning materials, supported by synchronous, asynchronous, or combined channels of communication among learners and with the instructor. Print-based materials are minimal or excluded. Learners need to have prerequisite technological skills in order to succeed.

Blended learning. The delivery model includes a form of distance learning, as well a requirement for classroom-based learning. Classroom-based components often include introductory and concluding sessions. Required attendance excludes potential learners from distant locations.

Flexible learning. Learners select the most appropriate delivery model from a range of options.

Geographical scope

World. Learners may be located anywhere in the world. Global copyright clearance will be needed for all third-party intellectual properties. Asynchronous channels of communication will be required.

Continent. Learners may be located anywhere across a continent. Appropriate copyright clearance will be needed for all third-party intellectual properties. Asynchronous channels of communication will be required.

Country. Learners may be located anywhere in a country. National copyright clearance will be needed for all third-party intellectual properties. Asynchronous channels of communication may be required. National curricula may determine content or evaluation tools.

Regional. Learners may be located anywhere in a region. Appropriate copyright clearance will be needed for all third-party intellectual properties. Asynchronous channels of communication may be required.

State or province. Learners may be located anywhere in a state or province. Appropriate copyright clearance will be needed for all third-party

*Continua**Options*

intellectual properties. Asynchronous channels of communication may be required. State or provincial curricula may determine content or evaluation tools.

City. These materials are designed to be used in a specific city, for example, the instruction may assume that learners have access to local resources.

Campus. All learners will have access to institutional resources and support services, for example, a reserve collection in a library, laboratory facility, etc. Instruction may include required readings or use of facilities available exclusively for members of a campus community.

C. Technological

Communication channels

Asynchronous. Learners and instructional support person(s) communicate in an exclusively asynchronous manner.

Singular synchronous face-to-face event. Learners and instructional support person(s) meet in the same place, at the same time, once during the course of instruction.

Singular synchronous online event. Learners and instructional support person(s) communicate in real time online, once during the course of instruction.

Series of face-to-face synchronous events. Learners and instructional support person(s) meet in the same place, at the same time, periodically during the course of instruction.

Series of online synchronous events. Learners and instructional support person(s) communicate in real time online (using Chat or MSN messenger, for example), periodically during the course of instruction.

Fully synchronous and face-to-face. Learners and instructional support person(s) meet in the same place, at the same time, throughout the course of instruction.

Fully synchronous and online. Learners and instructional support person(s) communicate in real time online throughout the course of instruction.

Multiple channels. A combination of synchronous and asynchronous of communication channels are available.

Access to technology+

Learners must have access to:

- A telephone
- Facsimile machine
- Radio
- Television
- Audiocassette
- VCR
- Computer
- Computer and e-mail
- Computer and CD-ROM
- Computer and basic Internet service
- Computer and high-speed Internet service
- Computer with multimedia capabilities

<i>Continua</i>	<i>Options</i>
	Selecting appropriate technological requirements may include sensitivity to the cost to learners, and availability of service levels in learners' locale.
Access to software+	<p>Learners must have:</p> <ul style="list-style-type: none"> • A word-processor • Database software • Spreadsheet software • Graphics software • A presentation program • Multimedia software • Web browser (and plug-ins) • Whiteboarding program • Synchronous communication program(s) <p>Prescribing the use of specific software and software versions ensures learners can use instructional materials, participate in instructional events, and communicate with peers and the instructor. Overly prescriptive requirements exclude potential learners.</p>
Technological literacy	<p><i>Basic skills.</i> Learners are required to have basic technological skills. Support is provided to allow learners to develop more advanced skills as they work with the learning materials.</p> <p><i>Core skills.</i> Learners are required to have a core set of technological skills to use learning materials. Support is provided for a limited number of skill requirements.</p> <p>Core and application-specific skills. Learners are required to have application-specific skills to use learning materials.</p>
Web accessibility	<p><i>W3C Level 1 guidelines.</i> Minimal accessibility adaptations will be made in the design of learning materials. Learners with visual or auditory disabilities can use the materials (W3C Working Draft, Core Checkpoints for Guideline 1 section).</p> <p><i>W3C Level 2 guidelines.</i> Significant effort and expense will be expended to ensure that learners with a range of disabilities can use these learning materials. (W3C Working Draft, Core Checkpoints for Guideline 2 section).</p> <p><i>W3C Level 3 guidelines.</i> All available ways of making Web-based materials accessible to learners with disabilities, including intellectual disabilities, will be addressed. (W3C Working Draft, Core Checkpoints for Guideline 3 section).</p>
<i>D. Idiosyncratic factors</i>	<p><i>Competing responsibilities.</i> Demands of employment, family commitments, and so forth, may require special consideration for pacing, channels of communication, and so forth.</p> <p><i>Cultural sensitivities.</i> Use of images, metaphors, examples, and so forth may need to be adapted to be relevant to learners' cultural context.</p>

Note. + indicates multiple choices in a category.