ARTICLES

Accessibility and Interactivity in Distance Education Programs for Health Professions

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Abstract

This article reports a two-year study of students' experiences of accessibility and interactivity in distance education programs for health professions. Through surveys and focus groups with students, instructors, and administrative staff, we found that accessibility and interactivity are interconnected and are important determinants of students' success in distance education programs for health professions. Women with full-time employment in urban areas who were studying part time—many as single parents—constituted most students in the five health professions studied: disability management, health services administration, nursing, occupational therapy, and social work. Undergraduate and graduate education courses were offered primarily through WebCT. Highlights of students' experiences were that instructors are a useful resource; accessibility requires students' confidence and technical skills, particularly in on-line library searches; and opportunities for required and voluntary interactivity reduce the loneliness and loss of community experienced in distance education. Research findings have both administrative and academic implications for improving distance education programs for health professions.

Résumé

Cet article rend compte d'une recherche de deux ans sur les expériences des étudiants avec l'accessibilité et l'interactivité dans des programmes de formation à distance pour des professions dans le domaine de la santé. Par le biais d'enquêtes et de groupes de discussion (focus group) avec des étudiants, des professeurs et du personnel administratif, nous avons trouvé que l'accessibilité et l'interactivité sont interconnectées et sont des facteurs importants du succès des étudiants dans des programmes de formation à distance pour des professionnels de la santé. Des femmes travaillant à temps plein dans des régions urbaines et qui étudiaient à temps partiel - plusieurs d'entre elles en tant que mères célibataires – constituaient la plupart des étudiants dans les cinq professions de la santé étudiées : la gestion de

services aux personnes handicapées, l'administration des services de santé, la profession d'infirmière, la santé au travail et le travail social. Les cours de premier cycle et de cycles supérieurs étaient offerts principalement par le biais de WebCT. Les points les plus marquants des expériences des étudiants étaient : les professeurs sont une ressource utile; l'accessibilité nécessite la confiance des étudiants et des habiletés techniques, particulièrement dans les recherches en ligne en bibliothèque; et finalement les occasions d'interactivité exigée et volontaire réduisent la solitude et le manque d'un sentiment de communauté qui sont éprouvés en formation à distance. Les résultats de la recherche ont des implications à la fois administratives et pédagogiques pour l'amélioration des programmes de formation à distance pour des professions dans le domaine de la santé.

Academic investigation of learners' perspectives of Web-based education is relatively new. Moreover, studies of learners involved in Web-based education have focused primarily on learners' attributes and skills and on technology (Abrahamson, 1998; Brown, 1996; Rahm & Reed, 1998; Sheppard & Mackintosh, 1998; Sherry, 1996). This article reports the results of a study on learners' perspectives on accessibility and interactivity in distance education conducted largely as Web-based education in five health profession programs in the Faculty of Health Professions at Dalhousie University, Nova Scotia, Canada.

Literature Review

Research in the area of distance education is wide and varied, dating back more than five decades. Early research focused on comparing measures of learning in traditional face-to-face delivery with a variety of distance delivery formats. Researchers are now beginning to turn their focus to students for perspectives, advice, and insight about their perceived success and satisfaction with distance learning (Cartwright, 2000; Jiang & Ting, 1999; Lesh, Guffey, & Rampp, 2000; Nelson, 1999). Fetherston (2001) argues the need for more focused research on pedagogical issues, stating that the Web has the potential to meet the learning needs of students if appropriate instructional design strategies are used.

It is clear that technology has become an integral part of the health professional's workplace. The Internet provides access to the most recent practice information, keeping pace with developments to an extent that conventional publications cannot hope to accomplish (Englebardt & Nelson, 2001). In a rapidly changing environment, health professionals must continually strive to remain current. Using technology, health professionals can immediately share their research and experience with one another around the globe. Applications of Web technologies in practice settings range from "E-visits" in a virtual clinic to an anonymous global database that allows health professionals to contribute incident report

data (Mamary & Charles, 2000; Lee, Zhang, & Wong, 1999). Technology has changed the face of distance education for health professionals. Formalized distance education, with time or geographic constraints, can inhibit learning if there are limited opportunities for contact between students and between the student and instructor (King, Young, Drivere-Richmond, & Schrader, 2001). The use of technologies to deliver education allows students to learn how to use the technology as they access the course and conduct research on line. In this way health professionals gain access both to new information and new ways to access it (Thiele, Stucky, & Allen, 1999). With distance technologies, the days of memorizing large volumes of information are replaced with the skill of knowing where to find current relevant information, a skill that will be useful for a lifetime (Niederhauser, Bigley, Hale, & Harper, 1999).

The literature identifies accessibility as a necessary feature of distance education. Traditional classroom education can pose time and physical proximity barriers for the adult learner who is attempting to complete higher education. Women face a greater challenge than men as a result of attempting to balance the time demands of family, work, and education (Joseph, 1999). Adults living in rural communities seem to be marginalized in accessing higher education (Lauzon, 1991). Many minority groups who feel disadvantaged in a traditional classroom continue to feel marginalized in the virtual classroom. Differences in learning styles, as well as the cultural and gendered ideologies of the students and instructors, can have a negative effect on students' interest and success in accessing distance as well as on-campus education (Damarin, 1998; Marsden, 2000; Mates, 2000; Stoicheva, 2000).

Funding difficulties or lack of technical knowledge about computers or the Internet are especially problematic for some people. Accessing a virtual course may be complicated by low-level computer literacy skills (Mamary & Charles, 2000). Some students are afraid of the technology and/or lack the technological skills they need to access and complete the course (Nelson, 1999). This problem can be exacerbated by instructors' lack of technological skills or lack of technological support from the institution for both instructors and students (Geer, 2000). Administrators, technical-support providers, and library personnel need to be trained to support distance education students (Khan, 2000). Faculty need to be provided with technological and pedagogical professional development. They also need to offer their courses using a variety of learning technologies to facilitate accessibility (Brown, 2000). Furthermore, students need to help themselves by taking computer and orientation sessions before beginning a course to assure they have the requisite skills. Students also need to be willing to problem-solve with the technology just as they problem-solve issues in their daily professional lives (Clarke, 1999).

Overall, many groups remain disadvantaged in accessing on-campus, scheduled learning in classrooms because of distance, complex scheduling responsibilities, cost, personal circumstances, technology and skill requirements, and other considerations. Access is particularly problematic for women who need flexible hours to work around caregiving responsibilities; rural dwellers; seniors with limited ability or transportation; persons from minority racial groups; immigrant communities; communities where English is not the first language; and persons with a physical, mental, or learning disability.

Interactivity is another important concept in distance education and more specifically Web-based learning environments (Carey, 1999; Liaw & Huang, 2000; Tu, 2000). Interactivity is a vital learning process. For example, interactivity between students and between the instructor and students promotes community and connection in the course, creating support systems that facilitate learning (Geer, 2000; Liaw & Huang, 2000). Interactivity between students in the form of group work mimics the real-world experience of health professionals who must often work in teams. In group work, students can confront and learn to cope with the dilemmas of working in complex systems, attending to the human mind and body, fulfilling requirements for the administration and management of staff and patients, and responding to moral and ethical challenges (Brown, 2000; Niederhauser et al., 1999; Orrill, 2000). Thiele et al. (1999) note that "the current and future health care environment demands a collaborative approach" (p. 202). Such connections also help to create worldwide networks of connected professionals that allow students to form a strong sense of professional identity (Iwasiw et al., 2000; Lia-Hoagberb, Vellenga, Miller, & Li, 1999).

Distance education can provide an exciting learning environment that is empowering and motivating for those who for various personal and cultural reasons shy away from face-to-face interactivity. Protected by the anonymity, or at least the facelessness of teleconferencing or Internet-based courses, such students find the confidence and the space to voice their opinions unperturbed by the in-class barriers of shyness or of assertive students who inhibit their participation. Joseph (1999), for example, found that on-line courses with only women provide a high level of comfort in woman-to-woman students' discussions. The role of faculty in the delivery of courses by distance education has been the focus of a number of studies (Draude & Brace, 1999; Fetzer, 2000). DeBourgh (1999) found that student satisfaction with distance education was related to the performance of the instructor. Instructors need to work harder in a virtual classroom to create a sense of community and connection by providing opportunities for students to develop a sense of personality and social

presence by chatting about their daily lives as well as about the course material (Tu, 2000). Instructors must also provide clear and extensive syllabi, structure student participation, and provide timely and useful feedback on students' work (Maurer, Rozsenich & Sapper; 1999; Price, 2000; Nulden, 1999). Although such commitments are time-consuming in terms of course design, preparation, and teaching, they are necessary for student success in distance learning (Burge, 1999; Carr-Chellman & Duchastel, 2000; DeBourgh, 1999; Schno & Hazari, 1999).

Distance Education Programs for Health Professions at Dalhousie University

The most comprehensive source of university-based health professional education in Atlantic Canada is located in the Faculty of Health Professions at Dalhousie University. The Faculty provides a co-coordinating structure for eight schools, one college, and two research centers (a ninth school is pending). The Faculty offers undergraduate, graduate, and continuing health professions education. A wide range of distance education initiatives are in place including, but not limited to, a Master of Science (occupational therapy), a Diploma in Disability Management, a Bachelor of Science (Arctic nursing) in partnership with Nunavut Arctic College in Iqaluit, bachelor's and master's programs in social work, and a Diploma in Emergency Health Services Organization. A variety of school, faculty, and university administrative structures and partnerships have been developed to support distance education (see www.dal.ca/departments, Faculty of Health Professions). The Faculty of Health Professions initially contracted to use the Denver platform for e-education. Over 75% of the Faculty's distance education programs now use WebCT.

Internal partners for the research reported here were five health profession programs in Dalhousie University's Faculty of Health Professions: disability management, health services administration, nursing, occupational therapy, and social work; the Office of Instructional Development and Technology (OIDT); and Academic Computing Services (ACS). External partners were the Office of Learning Technologies (OLT) of Human Resources Development Canada (HRDC) and the Workers' Compensation Board of Nova Scotia (WCB).

Research Assumptions, Objectives, and Methods

A number of assumptions informed the research objectives. First, experience showed that students' comfort and confidence with technology influenced their learning process. Objective one, therefore, sought to further understand the technological needs of students. Second, distance education offerings in the Faculty were blossoming, and there was no infrastruc-

ture in place for overseeing this growth. Objective two, therefore, sought to trace and analyze this growth to improve service delivery. Third, it was assumed that analysis and dissemination of the research findings would be of value to both the internal partners and to external, interested parties who are considering, or are already involved in, distance delivery. Objective three, therefore, was directed toward analysis and dissemination.

Based on these objectives, using surveys and focus groups, data were gathered during the 1999-2000 and 2001-2002 academic years. Those studied were distance education students in undergraduate and graduate education programs in one of the five participating health professions.

For the study, accessibility was defined as *the different ways in which the technology of distance education is available to students.* Accessibility to distance education for health professions refers to the availability and usefulness of feedback, resources for preparation, and technology support to access courses, communication, and university administration processes. Interactivity was defined as *the interplay and exchange in which individuals and groups (learner-learner, instructor-learner) influence each other.* Interactivity in distance education refers both to required interactivity designed by instructors as part of the program and to voluntary interactivity with instructors and/or students around non-course topics.

Surveys

Students in undergraduate or graduate distance education courses across five health professions programs were surveyed in September 2000 (by e-mail) and in October 2001 (embedded in WebCT courses). Results of the September 2000 survey (N= 235; 88 respondents, 37% response) informed the development of the October 2001 survey (N=276; 118 respondents, 43% response). No attempts were made to trace individual students to compare first and second responses. Some of the same students who were still enrolled in these health professions programs completed both surveys. The October 2001 survey included 23 questions in three sections about (a) demographics, (b) accessibility issues, and (c) interactivity issues, the latter two sections being rated on 5-point Likert scales. Surveys were administered toward the end of the academic term, and were clearly marked as optional (see Appendix).

Focus Groups

Focus groups were conducted to inform survey development between the first and second surveys and to gather qualitative responses from students, instructors, and administrative staff. The five focus groups (N=24) included three with students (total N=16), one with administrative staff (N=4), and one with instructors (N=4). One male and 10 female students

discussed accessibility and interactivity in the first two student focus groups. Through purposeful sampling (Depoy & Gitlin, 1998), additional students were invited both to add their own comments and to respond to comments by the previous focus groups. We had not initially intended to include faculty and staff focus groups because the investigation centered on students' experiences. However, it became clear that organizational matters in the university had a major effect on accessibility and interactivity. To follow up on experiences reported in the student focus groups, focus groups were held with faculty who had experience in teaching at least two distance education courses in health professions and with administrative staff in the five health professions programs.

Results

The results are from the October 2001 survey and the five focus groups with students, instructors, and staff. Analysis of the October 2001 survey included frequency tabulations by survey question (SAS) and cross-tabulations of variables (e.g., cross-tabulations of demographic variables, and of demographic variables assessed against accessibility and interactivity variables). Cronbach's alpha test was administered to determine consistency among select questions. The Fisher Exact Test and Factor Analysis were performed on selected survey results. External researchers analyzed focus group data. Interpretive analysis of the focus group transcripts was to identify students' experiences of accessibility and interactivity in health profession education.

Demographic Information

Prior to their studies in the 2000-2001 academic year, 50% of the 118 responding students had already completed more than three credit courses by distance education, and 40% had taken one or two courses. The majority of these (47%) were enrolled in social work programs, with 18% in disability management, 16% in nursing, 12% in occupational therapy, and 7% in health services management. Ages ranged from 26 to 55. Almost 35% were between 26 and 35, and almost 28% were between 36 and 45. The rest were between 46 and 55 years. Most of the 118 respondents (88.8%) were women. The geographic location of these students was heavily weighted toward urban dwellers (67%) despite the expectation that distance education will increase access to higher education for rural dwellers. Of the almost 58% who reported children or dependents in the home, 13% were single parents. All single parents were women, and 73% of single parents were employed full time.

Close to 78% of the 118 students were employed full time, over 16% were employed part time, and over 6% were unemployed. Most of these students were combining full-time employment and studies, with 76.5%

studying part time, and 15.7% of these taking one course. The largest number (45.6%) did most of their studying in the evenings. Over 20% studied in the mornings, 18.4% studied mostly on weekends, and 20% varied the time of their studies.

Dalhousie University was chosen by 88% of respondents because they needed a program that enabled them to study as well as to work full time. Moreover, 85% of students needed a program that could be completed from home because there was either lack of administrative support or technology to enable study during working hours. For 56.4% of respondents Dalhousie University offered the only distance education program available in their profession, and 52% reported that they had heard that Dalhousie offered good distance programs.

Confidence in Computers

On a 5-point Likert scale, participants were asked to indicate their levels of confidence in using computers, particularly in keyboarding, word-processing, e-mail, Internet searches, sending and receiving electronic attachments, the on-line use of library resources, Internet applications, and troubleshooting.

Table 1 illustrates that 72% of respondents rated their confidence in keyboarding at the highest levels (4 or 5). Respondents also rated their confidence at the highest levels in word-processing (70%), e-mail (73%), and to a lesser extent in the use of attachments (51%), whereas 61% rated their confidence lowest in library searches (1 or 2). Survey respondents also gave a low confidence rating on their use of Internet applications (44%) and troubleshooting (56%).

In focus groups, students reported that confidence in distance learning was highly dependent on having good computer skills. Most students acquired their computer skills by trial and error at home or, where access

Table 1
Distance Students' Confidence Levels in Computer Skills

Skill	N	High %	Average %	Low %
Keyboarding	112	72	18	10
Word processing	114	70	22	8
E-mail	112	73	21	6
Internet searches	113	42	39	19
Attachments	114	51	28	21
Library searches	113	17	22	61
On-line applications	111	22	34	44
Troubleshooting	112	14	30	56

was possible, at work. They experienced a growth in confidence when they could study by distance in a well-organized course with ready access to administrative and technology support.

Accessibility

With reference to accessibility, respondents rated the availability of various technology modes and instructor feedback on a 5-point Likert scale. Table 2 indicates that almost three quarters of students gave a high rating (4 or 5) to the availability of Internet/Web-based technology. Video-taping was either not available or not applicable to 51% of respondents. Teleconferencing was not applicable, meaning not used, by 37% of respondents. This technology was available only to 28% of respondents, primarily nursing students who access hospital teleconferencing technology.

In focus groups, instructors reported that videotaping and teleconferencing are not widely used because they are not readily available to many students. Scheduling of teleconferences is next to impossible to arrange given different work schedules, family responsibilities, and time zone differences, with students in some programs living not only across Canada but also as far from Canada as New Zealand. There is a circular argument here. The most available technology to students is Internet/Web-based. Students may have greatest availability to this mode because the Internet is so widely used in many aspects of life, including distance

Table 2
Availability and Use of Technology Modes and Instructor Feedback in Distance Students' Education (*N*=118)

Mode	N	Use %	Feedback %
Highly Available			
Teleconferencing	112	28	14
Internet/Web-based	113	71	45
Videoconferencing	109	2	4
Limited Availability			
Teleconferencing	112	12	15
Internet/Web-based	113	21	30
Videoconferencing	109	4	7
Not Available			
Teleconferencing	112	23	19
Internet/Web-based	113	7	16
Videoconferencing	109	45	22
Not Applicable			
Teleconferencing	112	37	52
Internet/Web-based	113	1	9
Videoconferencing	109	49	67

education for health professions. The five programs chose WebCT as the primary delivery mode because it is the most available technology mode for students, instructors, and administrative staff.

Almost half the respondents rated instructor feedback on Internet∕Web-based courses as very available, although it is important to point out that 16% indicated that instructor feedback was not available. From students' perspectives, the most helpful instructors provided flexible hours and deadlines, were well organized, gave a great amount of useful feedback, and were also fully committed to and experienced with distance education.

Respondents also rated the usefulness of resources for preparation and assistance to participate in Internet∕Web-based courses. Instructors were rated by 45% of respondents as very useful, whereas workshops were rated by 8% of respondents as not useful. Only 40% had access to workshops to prepare for Internet∕Web-based courses. The most useful preparation resources were ranked as instructors, manuals∕literature, and family and friends (ranked from most to least useful). Instructors indicated that workshops were viewed as an extra burden as most respondents were women who were already juggling education and full-time employment.

Table 3 indicates that from 20% to 41% of respondents received useful assistance from a range of people, most probably instructors, the university on-line service, and others in the household. Help lines were not applicable to 43% of respondents. Students in focus groups reported that many did not bother to access help lines after a while because they were too slow to respond, and the help offered was usually by students who did not fully understand the struggles of Web-based learning when an on-campus visit was not an option.

Table 3
Distance Students' Ratings of Resource Usefulness for Internet/Computer Support

Resource	Highly Useful %	Somewhat Useful %	Not Useful %	Not Applicable %
Others in Household (*N*=113)	37	12	21	30
Co-workers (*N*=113)	22	12	26	40
Instructors (*N*=113)	40	27	28	5
Library Personnel (*N*=112)	12	9	24	55
Friends (*N*=112)	17	18	27	38
Reference Books (*N*=111)	10	13	32	45
Help lines (*N*=111)	9	21	27	43
Designated Technicians (*N*=111)	20	19	24	37
Dal.U. Online Service (*N*=107)	41	27	23	9

In focus groups, students voiced their frustration with using administrative and library resources at a distance when there is an overwhelming bias toward on-campus students who can do troubleshooting in person. The most frustrating student experiences were with completing registration and payment to start a course on time, receiving notices of double-billing, complex or non-access on-line to marks and some course materials. Students applauded administrative staff, particularly those in each program. In their focus group, administrative staff indicated that they were pleased that they could help, but computer support for students took up far more of their time than was allotted in relation to other duties associated with their positions. In many instances, administrative staff members were learning the technologies by trial and error at the same time as the students. They were as frustrated as the students, if not more so, by the lack of systematic administrative procedures to deal with distance education students in the university. The instructors' focus group emphasized the ad hoc manner in which they have managed to learn the distance education technology and pedagogy, the lack of university support, and the excessive amount of time a Web-based course takes to formulate and conduct, although teaching in distance education is allocated the same workload toward promotion and tenure as on-campus teaching.

Focus groups also indicated that university-based distance education needs a strong faculty and university infrastructure to support the delivery of distance programs. Coordinated efforts from the registrar's office, distance education faculty development, library services, and university administration were described as necessary to support faculty and students in their distance education initiatives.

Interactivity

Two types of interactivity were examined: required interactivity that instructors designed as part of the distance education program; and voluntary interactivity around non-course topics either with or without an instructor's involvement.

The surveys and focus groups indicated that most courses required some interactivity (Table 4). Students and instructors indicated that if interactivity was not an integral aspect of the course design, then interactivity, especially between students, would be low. The three forms of required interactivity included in the survey were one-on-one with the instructor, one-on-one or in small groups with other students, and as a full-class group including the instructor. Around 70% experienced a high level of opportunity and helpfulness toward learning through these forms of required interactivity. The greatest opportunity and helpfulness in required interactivity was one-on-one with the instructor and with the full

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Table 4
Distance Students' Ratings of Opportunity and Helpfulness on Required
and Voluntary Interactivity

		Required Interactivity						
Communication		*Opportunity*				*Helpfulness*		
Activity with:	*N*	*Great deal*	*Average*	*None*	*N*	*Very much*	*Average*	*None*
		%	*%*	*%*		*%*	*%*	*%*
Instructor only	111	66	23	11	106	64	22	14
Other students	111	69	19	12	105	65	23	12
Instructor and other students	110	67	25	8	106	70	19	11
		Voluntary Interactivity						
Communication		*Opportunity*				*Helpfulness*		
Activity with:	*N*	*Great deal*	*Average*	*None*	*N*	*Very much*	*Average*	*None*
		%	*%*	*%*		*%*	*%*	*%*
Instructor only	110	68	21	11	106	61	27	12
Other students	110	68	23	9	107	5	17	18
Instructor and other students	109	66	22	12	106	62	22	16

student group and the instructor, most often using a common bulletin board as reported by focus groups.

In contrast, students offered mixed ratings on small-group work. Fewer than 50% of respondents experienced a high level of opportunity and helpfulness, 22% reported at least some opportunity, and 29% reported a low level of helpfulness in small group work. Students in focus groups recognized the necessity, but also the extra layer of student communication time and stress in small-group work. Web-based programs are advertised as offering a high degree of flexibility to study at one's own pace or on one's own schedule. However, one focus group participant pointed to the organizational complexity of scheduling group work with people in different time zones with different schedules. Group work is an essential feature in generating a sense of community and the interactivity required to learn and critique professional work. Yet one student reported: "I found that in several of the courses that I took … a major portion of my mark was based upon group work and … involved people from different time zones, on different schedules … so it was really difficult to make deadlines … I think it downgraded the quality of my learning. I know it degraded the quality of my marks." Students and instructors themselves

reported varied ability to encourage interactivity. Most students felt that interactivity was encouraged by instructors through such methods as grading participation, questioning students or requiring students to post questions, or by discussing case studies or relevant Web sites.

There were no statistically significant differences between urban and rural students or between those with and without dependants. Those who were fully employed gave lower ratings of their confidence in using computers and structured interactivity activities.

Table 4 also shows that almost 70% of students experienced a high level of opportunity and helpfulness in voluntary interactivity. Examples were in exchanges between individual students about their lives, as well as their study requirements, or discussion in courses of non-course topics. Web-based chat rooms were typically set up either by instructors or students, with guidelines for making this a voluntary, safe place to talk without an instructor present.

In discussing the helpfulness of voluntary opportunities for interactivity, one focus group participant described a sense of loss, stating, "You lose the bulk of the learning you can get from sitting in the classroom with other students. The connectedness you achieve. You lose that sense of community but gain a different one, of course." Most students felt the need for, and managed to obtain some amount of, informal interaction either on line, by telephone, or in person where possible. The need to substitute some form of interaction for in-class interaction was high, but students still often experienced feelings of disconnectedness and loneliness. Discussion board communication was deemed most successful, although turn-around time could be lengthy in this mode. Teleconferencing and chat rooms were praised for the immediacy of communication, but complaints were made about the scheduling of such interactions and the inability of some students to keep up with the flow of the discussion.

Limitations and Contributions of the Study

One limitation of the study was the developmental state of the survey instrument. Although the September 2000 survey informed the October 2001 survey, no formal validation was done to ensure that the tool was reliable and valid.

A second limitation is the potential evaluation overload experienced by students, who were asked to complete the survey for this project at about the same time they were completing the university Student Rating of Instruction evaluation. With many reminders of the necessity of completing the Student Rating of Instruction form, they may have chosen to complete the university evaluation rather than this survey, and thereby lowered the survey response rate.

A third limitation is that the programs, technical supports, faculty, and distances from the university were highly variable, with some students being in the same city as the university whereas others were on the other side of the world. Local students indicated that they occasionally visited the campus to sort out problems, whereas this was not an option for those who lived across Canada or elsewhere. Students rated and discussed experiences that were divergent and from different professional curricula.

A fourth limitation is that focus group numbers were small and may not be fully representative of those studied. Students were located around the globe, including New Zealand, Denmark, a few United States locations, and various locations in Canada. Complex scheduling and differences in time zones probably meant that the participation rate was low on teleconference focus groups. These limitations affect the ability to generalize from the findings. Neither survey nor focus group samplings were sufficient for generalization beyond those studied.

Having highlighted limitations, it is important to consider what this study adds to the growing understanding of distance education. First, we learned lessons that changed the research and delivery of distance education during the study. For example, the increased response rate from 37% in September 2000 to 43% for the October 2001 survey reflects in part the learning acquired to conduct research in a WebCT teaching platform.

Second, lessons were learned that contribute to general knowledge about distance education. With findings that mirror those in earlier studies, particularly in the demographics of distance learners, this study offers perspectives that shed light on the challenges and possibilities for distance education for health professions. It seems that the demographics of respondents are consistent with those found in the literature: primarily female and employed either full time or part time, with most single parents being female. The rural-urban distribution found in this study is also representative of the distance education population described in the literature.

Discussion

It seems that student accessibility and interactivity in distance education are inextricably linked and central to success. Ease of accessibility cannot make up for a lack of opportunity for social or intellectual interactivity. Students who experience this lack can feel isolated and dislocated. Students will be frustrated if courses offer extensive interactivity, but not easy technological accessibility to interactivity.

Furthermore, technological accessibility is a portal to interactivity, and extensive interactivity provides students with accessibility to the best learning environments. Confidence and high-level skills in using com-

puters seem to underpin accessibility and interactivity. Although most of the students reported high levels of confidence with keyboarding and word-processing, they also reported low confidence levels with conducting Internet and library searches. Students who participated in the focus groups identified computer literacy as the most important skill contributing to confident participation in a Web-based learning environment, a finding consistent with the literature. Students report a strong reliance on instructors to assist in preparing them to take distance courses and to provide technological support. Interactivity also requires high-level computer literacy by instructors and students. Both parties need skills to manage small-group discussions, chat rooms, and bulletin boards while juggling work schedules and other responsibilities.

For instructors, students, and administrative staff, time is clearly a major issue in distance education. To design courses that maximize accessibility and interactivity, instructors need time to prepare and support students and also to develop their own computer skills. Instructor time is also needed to collaborate with the library, computer services, the registrar, student fees—a host of administrative and academic support services that are critical to designing for accessibility and interactivity in distance education. As instructors continue to create opportunities for interactivity, there is a need for general university support, including faculty development, to ensure that distance education reflects sound pedagogical as well as administrative and technical practices. Students need to structure time to work on distance education as well. The time to learn the technology and methods of learning is added to the actual study time, even if travel time to class is reduced. Students also need time for voluntary interactivity, just as they do on campus. For administrative staff, time is also problematic. Although they have fewer on-site classroom issues, the time for troubleshooting with students and instructors escalates, particularly for new users of distance education.

Conclusion

The key finding of this project is that accessibility and interactivity are interconnected and central to successful distance education for health professions. Because Web-based courses are perceived to be the most accessible mode of delivery, there is a need to support students in developing a high level of computer literacy. In fact distance education accessibility and interactivity require a different set of resources and procedures than exist for on-campus students. To support accessibility and interactivity in distance education for health professions, there is a great need for coordination between virtually all sectors of a university. Individual programs, faculties, and the whole university need to recognize that distance education students may never appear on campus. Travel time may be

saved, but the time required for distance education is no real saving, and in many instances is greater than for on-campus education.

Students' experiences in distance education for health professions were the focus of this research. From a student's perspective, successful distance education for health professions requires coordinated resources to create not only a virtual classroom, but also a virtual university.

Acknowledgments

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Appendix

20   E. TOWNSEND, C. CAMPBELL, J. CURRAN-SMITH, F. McGINN,
D. PERSAUD, P. PETERS, I. BOWER, and S. LE MAY SHEFFIELD

E. TOWNSEND, C. CAMPBELL, J. CURRAN-SMITH, F. McGINN, D. PERSAUD, P. PETERS, I. BOWER, and S. LE MAY SHEFFIELD

E. TOWNSEND, C. CAMPBELL, J. CURRAN-SMITH, F. McGINN,
D. PERSAUD, P. PETERS, I. BOWER, and S. LE MAY SHEFFIELD

**RESEARCH SURVEY ON DISTANCE EDUCATION -
ACCESSIBILITY & INTERACTIVITY**

Dear Student:

WE NEED YOUR HELP! Your responses to the following survey will help our research team make recommendations for improving learning through distance technologies with Dalhousie. The survey is easy to answer and it will take you less than 15 minutes – just reply to this email and then complete the 23 questions. Filling out this survey is entirely voluntary. Whether or not you answer the survey will have no effect on your grades or any aspect of your class standing. Furthermore, you are free not to answer any question that you do not wish to answer. Filling out and returning this survey indicates your consent to participate in this study.

WHAT IS THIS RESEARCH ABOUT?
Learning through distance technologies is still relatively new. As one of the first students to use this technology, you are a pioneer in this expanding field and we are hoping that you will share your insights and experiences with us. We need your help to better understand students= needs and experiences with distance learning technologies, resulting in improved design and delivery of distance courses for future students here and elsewhere.

CONFIDENTIALITY
This survey is separate from any course evaluation and all answers will be kept confidential. Responses to this section go directly into a separate database at the OLT (Office of Learning Technologies) research station at Dalhousie University; no instructor or staff member from any program will have access to the raw data. All responses will be aggregated for analysis so that individuals cannot be recognised. Upon completion of this research project, a summary report will be sent to the external funder (Human Resource Development Canada).   All surveys will be kept in a secured area and destroyed when the project is finished.

CONTACT
If you have any questions or concerns, or would like to know more about the research that we are doing, please feel free to contact the OLT Research team at OLT@dal.ca, Tel: xxx-xxx-xxxx, Fax: xxx-xxx-xxxx. We will follow-up in the next week or so to ensure receipt of this survey and to answer any questions.

REVIEW OF INSTRUCTIONS
Please complete this survey by
1. replying to this E-mail (click reply),
2. indicating your responses in the body of the survey
3. send the E-mail back to the sender [NOTE: please be sure that you are only replying to the sender].

There are three sections to the survey: (1) Demographics; (2) Information about Accessibility; and (3) Information about Interactivity.

Section 1:   Demographics

1. Including this course, how many courses have you taken by distance?
one course
two courses
three courses
more than three courses

2. In which School /Program are you enrolled?
Disabilities Management
Health Services Admin
Nursing
Occupational Therapy
Social Work

3. Sex:
Female
Male

4. Age:
25 yrs and under
26 to 35 yrs
36 to 45 yrs
46 to 55 yrs
over 55 yrs

5. For your current study, do you live in an urban area?
yes
no

6. In order to further assess urban and rural issues, please indicate your postal / zip code here:

7. Do you have children or other dependants in your home?
yes
no

8. Are you a single parent?
yes
no

9. Employment status (Choose one only):
full time homemaker
self-employed
work full time
work part time
unemployed
retired
other (please specify):

10. Student status (Choose one only):
full time
part time
single course

11. In general, when do you do most of your school work for your distance course(s)? (Please indicate for as many as is appropriate eg. 1,2,5)
Morning
Afternoon
Evening
Late night
Weekends

12. Why did you decide to take a distance course, or courses, through Dalhousie University? Please consider the following reasons and indicate "yes" or "no" as to whether or not they affected your decision.

It was cheaper than elsewhere.	Yes	No
Dalhousie offered the only program.	Yes	No
Others in my family went to Dalhousie.	Yes	No
A lot of my friends were going to Dalhousie	Yes	No
I did my undergraduate degree at Dalhousie.	Yes	No
I needed a program I could do from home.	Yes	No
I heard that it was a good distance program.	Yes	No
I was impressed with the delivery of the courses.	Yes	No
Dalhousie was the only place I looked into.	Yes	No
I needed a program that enabled me to study & continue working	Yes	No

13.   Describe your level of confidence with the following technological skills:

1=not confident at all   5=very confident

Keyboarding		1	2	3	4	5
Word processing	1	2	3	4	5
E-mail		1	2	3	4	5
Internet Searches	1	2	3	4	5
Sending/receiving electronic attachments					
		1	2	3	4	5
On-line use of library resources	1	2	3	4	5
Internet Applications		1	2	3	4	5
Troubleshooting	1	2	3	4	5

Section 2:   Information about Accessibility at Dalhousie University.
Accessibility refers to the different ways in which the technology of distance education is available and useful to you as a learner at Dalhousie University.

Using a 1 to 5 scale, and based on your experience with Dalhousie:

14. How available do you perceive the following modes of distance education to be with Dalhousie?

0=N/A   1=not available at all   5=very available

Teleconferencing	0	1	2	3	4	5
Internet or web-based	0	1	2	3	4	5
Videoconferencing	0	1	2	3	4	5

15. How available is feedback on technological issues relating to the following modes of distance education with Dalhousie University?

0=N/A   1=not available at all   5=very available

Teleconferencing	0	1	2	3	4	5
Internet or web-based	0	1	2	3	4	5
Videoconferencing	0	1	2	3	4	5

16. In general, how useful were the following in preparing you to take distance education courses with Dalhousie University:

0=N/A   1=not useful at all   5=very useful

Workshops	0	1	2	3	4	5
Manuals/literature	0	1	2	3	4	5
Friends / family	0	1	2	3	4	5
Instructors	0	1	2	3	4	5

17. In general, how useful were the following in assisting with computer and/or Internet tasks at Dalhousie:

0=N/A   1=not useful at all   5=very useful

Others in household	0	1	2	3	4	5
Co-workers	0	1	2	3	4	5
Instructors	0	1	2	3	4	5
Library Personnel	0	1	2	3	4	5
Friends	0	1	2	3	4	5
Reference books	0	1	2	3	4	5
Help-lines	0	1	2	3	4	5
Designated technicians	0	1	2	3	4	5
Dal On-line Student Services (eg. registration, fees and grades)						
	0	1	2	3	4	5

Section 3:   Information about Interactivity.
Interactivity is the interplay and exchange in which individuals and groups (learner-learner, instructor-learner) influence each other. Interactivity may be fostered through social rapport building activities, through the design of a course, or by the nature of the communication in a course. This survey asks about opportunity and helpfulness of interactivity in distance education with Dalhousie University.

Using a 1 to 5 scale, and based on your experience with Dalhousie:

18. What opportunity was there for the following activities at Dalhousie?

1=no opportunity at all   5=lots of opportunity

Exchange of information on yours' and other students' backgrounds and experiences
1   2   3   4   5
Communication about non-course content related topics
1   2   3   4   5
Participation in planned or spontaneous activities that allowed me to share my ideas, opinions and beliefs about course-content related topics

1   2   3   4   5

19. How helpful were the following activities in encouraging interactivity at Dalhousie?

1=not helpful at all   5=very helpful

Exchange of information on yours' and other students' backgrounds and experiences
1   2   3   4   5
Communication about non-course content related topics
1   2   3   4   5
Participation in planned or spontaneous activities that allowed me to share my ideas, opinions and beliefs about course-content related topics
1   2   3   4   5

20. What opportunity was there for the following designed activities at Dalhousie?

1=no opportunity at all   5=lots of opportunity

Individual communication between myself and the instructor of the course
1   2   3   4   5
Communication among myself, the instructor and other students in the course
1   2   3   4   5
Small group work or exercises with other students in the course
1   2   3   4   5

21.   How helpful were the following designed activities in encouraging interactivity at Dalhousie?

1=not helpful at all   5=very helpful

Individual communication between myself and the instructor of the course
1   2   3   4   5
Communication among myself, the instructor and other students in the course
1   2   3   4   5
Small group work or exercises with other students in the course
1   2   3   4   5

22. What opportunity have you had for the following communication activities at Dalhousie?

1=no opportunity at all   5=lots of opportunity

Required communication only with the instructor
1   2   3   4   5
Required communication with other students
1   2   3   4   5
Required communication with the instructor and other students
1   2   3   4   5
Voluntary communication only with the instructor
1   2   3   4   5
Voluntary communication with other students
1   2   3   4   5
Voluntary communication with the instructor and other students
1   2   3   4   5

23. How helpful were the following communication activities in encouraging interactivity at Dalhousie?

1=not helpful at all   5=very helpful

Required communication only with the instructor
1   2   3   4   5
Required communication with other students
1   2   3   4   5
Required communication with the instructor and other students
1   2   3   4   5
Voluntary communication only with the instructor
1   2   3   4   5
Voluntary communication with other students
1   2   3   4   5
Voluntary communication with the instructor and other students
1   2   3   4   5

Thank you for taking the time to complete this survey. The results of this survey will be posted on a Website or through the e-mail list serve set-up. Participating students will be notified when results are available.

This research is part of an externally-funded Project which is looking at students= experiences with learning through distance technologies in the health professions. Specifically, these questions ask about accessibility and interactivity in distance education and will be used for research purposes only. Every student currently enrolled in distance technology courses at the Schools of Occupational Therapy, Disabilities Management, Health Services Administration, Nursing, and Social Work has been sent a survey.