eLearning Research Theme

Overview

The use of eLearning technology can provide opportunities which promote the broader inclusion of students with disabilities. For example, web-based courses, one form of eLearning, provide enhanced educational opportunities for people with disabilities who, because of factors such as climate, health issues, or inaccessible buildings locations or classrooms, experience barriers to attending classroom-based courses. On the other hand, while eLearning can reduce or remove many barriers encountered by people with disabilities, it can also create *new* barriers.

Dis-IT's eLearning research studied:
- what eLearning technology is currently used in Canadian universities and colleges;
- how accessible these technologies are to students with a variety of disabilities; and
- what can be done to eliminate the new obstacles that eLearning technologies create for people with disabilities.

From this research, Dis-IT's eLearning research team:
- identified eLearning related barriers and facilitators for students with different disabilities;
- assessed the accessibility of different forms of eLearning;
- examined the perspectives of several postsecondary stakeholder groups; and
- disseminated the findings and recommendations based on the findings to a variety of stakeholder and academic groups.

Projects

For the purposes of our research, eLearning refers to the range of information and communication technologies that professors use when teaching their courses entirely in the classroom, entirely online, or a combination of both. Examples include:
- PowerPoint presentations
- online tests
- course materials on CD-ROMs
- course/learning management systems (e.g., WebCT, Blackboard, FirstClass).

While eLearning reduces or removes barriers encountered by many people with disabilities, it can also create new barriers, particularly for people who require adaptive hardware (e.g., an adapted mouse), or adaptive software (e.g., software that "speaks" what is on the monitor). For example:
- Video and audio clips can be helpful to people with specific learning disabilities, but are inaccessible to people who are deaf or have visual impairments unless the video and audio content is presented in an accessible way (i.e., textual description of video, captioning of audio).

- Web-based discussion forums provide a means for students who are deaf to participate independently in online classroom discussions, but some learners with print-based learning disabilities find text-based discussion forums problematic because of the amount of text on the screen.

Some of the questions the Dis-IT Research Alliance's eLearning research team set out to answer include:
- What types of eLearning are being used by Canadian postsecondary institutions?
- How accessible is the current range of eLearning technologies to students with various disabilities?
- What is the level of awareness within the postsecondary community regarding the accessibility of eLearning for students with disabilities?
- What eLearning problems have students with disabilities faced?
- What are solutions that students with disabilities use to resolve eLearning accessibility problems?

Dis-IT's eLearning team:
- conducted a review of literature on the accessibility of eLearning to postsecondary students with disabilities
- conducted key informant interviews
- conducted a web-based survey
- disseminated the results at conferences and meetings in both English and French

Key Informant Interviews

During the fall of 2004, telephone and face-to-face interviews were conducted with 22 key informants made up of:
- postsecondary students with a variety of disabilities who had the experience of using a form of eLearning
- campus-based disability service providers
- faculty who had the experience of teaching a course where they used some form of eLearning and had at least one student with a disability take that course
- publishing industry personnel responsible for postsecondary ePacks and eCourses (e.g., a package of PDF files of journal articles that comprise the readings for the course; a complete supplemental web-based course package that includes notes, study topics, self-test quizzes, etc.)
- deans and other key individuals responsible for eLearning initiatives at their institutions.

These interviews collected data from across Canada from English and French speaking individuals. The goal was to get a broad understanding of the "lay-of-the-land" regarding the types of eLearning being used, issues, etc.

Findings

The most common forms of eLearning reported by the key informant sample were course/learning management systems (i.e., web-based tools used to create, deliver and administer online courses, such as WebCT and Blackboard).

Other common forms of eLearning, in rank order, were:
- class presentations using software such as PowerPoint
- downloadable course-related files in PDF, Word, Excel, and HTML
- ePack/online resources that accompany textbooks
- course web pages
- email discussion lists, web-based threaded discussions, bulletin boards

The key informants indicated that these forms of eLearning are generally accessible to most students with disabilities, but that some forms of eLearning cause problems for particular groups of students.

The following forms of eLearning can cause problems for students with visual impairments:
- class presentations (e.g., PowerPoint, web pages in class)
- downloadable PDF files and, for students who are completely blind, downloadable PowerPoint files
- videoconferencing
- web lectures using video and Flash

The following forms can cause problems for students with learning disabilities or neuromuscular impairments:
- online chat (typing and reading)

The following forms can cause problems for students with hearing impairments:
- online audio-based chat (speaking and listening)
- web lectures using audio
- digital audio and video clips

Web-Based Survey

Methodology

Based on the findings from the key informant interviews, a questionnaire was formulated and distributed to a small sample of participants for additional information and feedback. From the responses of this sample, Dis-IT's eLearning research team developed a bilingual web-based survey on the accessibility of eLearning at Canadian colleges and universities.

During the first half of 2006, the survey was administered to 406 participants from four convenience sample target populations:

1. **Students with disabilities**

    245 students enrolled at Canadian colleges and universities who have taken at least one course in the last three years which used some form of eLearning.

2. **Campus-based disability service providers**

    77 staff who provide disability-related services at Canadian postsecondary institutions.

3. **Professors**

    39 college and university professors who have taught at least one student with a disability during the last three years in a course where they used some form of eLearning.

4. **eLearning specialists**

    45 individuals who support/implement eLearning at Canadian postsecondary institutions, including managers of distance education and instructional technology departments, persons who train faculty to use technology or multimedia, designers and developers of eLearning on campus, etc.

ePublishing industry personnel were not included at this stage as this was intended to be a study of eLearning users and not eLearning producers.

Sampling was designed to ensure representation within each group from:
- Canada's provinces/territories
- universities, colleges, and postsecondary distance institutions
- English speaking, French speaking, and bilingual institutions

Findings - Students

Most and least accessible forms of eLearning

When we asked the 245 students with a variety of disabilities who completed the survey to rate the level of accessibility for specific types of eLearning they encountered in their courses, the top five most accessible types were:

1. email
2. course-related files in Word, PowerPoint, etc.
3. WebCT, BlackBoard, FirstClass or other course/learning management system

4. course web pages
5. in-class presentations using PowerPoint

Conversely, the least accessible forms of eLearning were:
1. videoconferencing
2. live online voice-based chat (speaking and listening)
3. audio clips / files (e.g., recorded class lectures)
4. online content that uses Flash
5. CD-ROM tutorials used in class or computer labs

It goes without saying that these rankings are different when filtered by different disabilities/impairments. For example, the most accessible form of eLearning for students who are blind was course-related files in Word, Excel, etc. and the least accessible was PowerPoint presentations viewed online using a browser.

Benefits of eLearning

When we asked students to list three benefits of using eLearning, the top three reasons were:
1. availability of course notes online
2. helps with learning/academic success
3. helps understand course lecture/content

Problems students with disabilities encounter when using eLearning

When we asked students to list the three most troublesome problems they experienced, the most common were:
1. inaccessibility of websites and/or course management systems
2. technical difficulties (e.g., problems logging into course web sites from off-campus; adaptive software such as Jaws (screen reading software) or Dragon (dictation software) unable to render the content or the web site accessible)
3. poor use of eLearning by professors

How do students with disabilities resolve their eLearning problems?

A surprising finding of this study is that 67% of students reported that at least one of their three most important eLearning problems had not been resolved. For problems which <u>had</u> been resolved, the top three identified solutions were:
1. non-eLearning solutions (e.g., someone read the material aloud to the student, student was assigned a different (non-eLearning) task)
2. professor provided assistance
3. student obtained and/or used needed computer technologies and alternate formats.

Findings - Campus-Based Disability Service Providers

Most of the 77 campus-based disability service providers we surveyed indicated that:

- eLearning is most accessible to students with mobility impairments and least accessible to students who are totally blind
- they (or their staff) are knowledgeable about the eLearning access needs of students, eLearning used by professors, and how to make eLearning accessible
- eLearning used by professors is not always accessible
- service providers are the ones who usually handle eLearning accessibility problems and felt this was a reasonably effective way of working.

Regarding dissemination of accessibility related information and assuring the accessibility of eLearning, less than half of the service providers indicated that their schools:
- teach professors about eLearning accessibility;
- have someone on staff to solve eLearning accessibility problems;
- include accessibility as a criterion for selecting and using eLearning products.

Only 21 percent of the service providers were at institutions that have guidelines that explicitly addressed the accessibility of eLearning.

Findings - Professors

- Approximately two-thirds of the 39 professors surveyed felt they knew about the eLearning accessibility related issues of their students with disabilities.
- About half indicated that they could create accessible eLearning content.
- Fewer than half indicated that there was someone on campus who could help them create accessible eLearning content.
- Less than 20 percent indicated that accessibility was a criterion for the selection of eLearning at their school.
- Only 41 percent indicated that their school had eLearning accessibility guidelines.

These results are surprising and troubling considering that these professors were selected for their experience teaching students with disabilities using eLearning. We expected that they would be more knowledgeable about eLearning accessibility.

Findings - eLearning Specialists

- Over 80 percent of the 45 eLearning specialists we surveyed indicated they knew about the types of eLearning used by the faculty in their schools.
- About half indicated they knew about the eLearning access needs of students with disabilities.
- About one-third indicated they knew how to fix eLearning access problems.
- Forty-four percent indicated that there was someone on campus who could help make eLearning accessible.
- Only about one-third indicated that accessibility was a criterion for of the selection of eLearning at their school and that their school had accessibility guidelines.

Conclusions

What do these findings mean about eLearning and accessibility in Canadian postsecondary education?

- The most popular forms of eLearning are generally accessible to students with disabilities.
- When students encounter problems, however, the problems often remain unresolved.
- The accessibility of eLearning can vary depending on the nature of students' disabilities/impairments and whether they require the use of adaptive software or hardware.

Our research identified six potential solutions:

1. Better availability of adaptive computer technologies
Students with disabilities need better access to adaptive computer technology, both on and off-campus

2. Universal Instructional Design (UID)
Universal Instructional Design should be utilized by faculty, by postsecondary institutions, and by the postsecondary publishing industry. Some important UID principles are:
- methods that are accessible and fair to all
- flexible to use
- simple and consistent in design
- do not demand unnecessary physical effort

3. Institution-wide changes
In order to effectively address eLearning accessibility related concerns, the following institution-wide changes are needed:
- schools need to use accessibility as a criterion in choosing eLearning products, texts, and teaching materials
- accessibility should be planned ahead of time rather than treated as an afterthought
- learning institutions need to develop an eLearning accessibility policy
- campus-based disability service providers should be invited to sit on college and university eLearning committees as they are generally knowledgeable about students' eLearning access needs.

4. Improved technical support
Better support for technical difficulties may help resolve many of the problems students mentioned. For example, the individuals on campus responsible for resolving eLearning technical problems need basic training on accessibility, adaptive technology, etc., to better support students with disabilities who seek out assistance.

Most schools have a computer related help line for students and faculty; help line representatives need to have expertise in eLearning access issues

5. e-Learning accessibility standards
Professionals who manage, purchase and/or make decisions around what eLearning will be brought onto campus must develop and adopt eLearning accessibility standards if these do not already exist at their institution.

6. Improved support for faculty

Faculty need support in order to make their eLearning accessible. This can be done by:
- adding relevant subject matter on eLearning accessibility into overall faculty training on eLearning use
- having a staff position for someone who can make eLearning accessible by captioning video clips, making accessible Adobe Acrobat files and ensuring the accessibility of web pages and PowerPoint presentations

Overall, eLearning has more advantages for students with disabilities than disadvantages. It is now time for postsecondary institutions, vendors, and publishers to ensure that the potential of eLearning to enable all learners, whether they have a disability or not, is fully realized. Failure to do this will result in limiting the types of postsecondary educational opportunities available to Canadians with disabilities.

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Products

Products from the Dis-IT eLearning research theme are available at:
- www.dis-it.ca/elearning

Further Information

Website:
- www.dis-it.ca/elearning

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