Teaching and Learning at Concordia University:

Meeting the Evolving Education Needs of Faculty in Providing Access for University Students with Disabilities

Leo Adolphe Bissonnette

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ABSTRACT

Teaching and Learning at Concordia University:
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Computing and communications technologies are becoming increasingly central to the way faculty at universities carry out their educational mission. Little is known about how faculty are taking into account the needs of their students with disabilities when integrating technology into their courses. A survey (Fichten, Asuncion, Barile, Fossey & DeSimone, 2000) of a small number of faculty found that professors generally do not know what to do to ensure that students with disabilities have full access to electronic course material or how access problems can be solved.

The sample for this exploratory study consisted of 344 full-time and part-time Concordia University faculty, identified as having students with disabilities enrolled in their courses during the 2003-2004 academic year. Two intricately related components composed this study: a faculty survey (with a return rate of 34.3%), and follow-up semi-structured interviews with 30 faculty. The present study further explored training over internet, listservs, e-mail, or CD-ROM that can be provided in various self-paced formats.

Findings of interest included: 81 out of 101 respondents (80.2%) reported that they had not considered the needs of these students, while 12 respondents (11.8%) indicated that they had partially taken into account the needs of their students with disabilities. A small group of 8 faculty (7.9%) definitely took into account the needs of their students with disabilities. However, the present study also revealed that there is a willingness by faculty to be trained in this area.

When questioned about their preferred medium for interactive training, most respondents chose more than one. The most popular category chosen by 98 out of 114 respondents was a website (85.0%) followed by printed material selected by 94 respondents (82.2%) and CD-Rom chosen by 93 instructors (81.6%). 91 respondents (79.8%) indicated a combination of the three mentioned above. For those who chose other and gave examples, a common specification by them was a trainer.

Practical strategic implications for those involved in providing support to faculty adopting educational technology are outlined and discussed. Recommendations for future research are provided.

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I consider myself lucky to be influenced by my two good friends John Drysdale and Susan Hoecker-Drysdale. For the past thirty-five years they have continually contributed insights on research and insights on social attitudes. Their warm personal style and way of thinking about issues continues to be critical for my own career and personal development.

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CHAPTER I

INTRODUCTION

Today's educators face a new challenge in integrating the computer-based communication technologies into teaching and learning. For reasons of pedagogy, economics, access and efficiency, an exponentially increasing amount of teaching and learning is occurring over computer networks. Networks such as the Web, Intranets or dedicated broad band networks are being used to teach, to conduct research, to hold tutorials, to submit assignments and to act as libraries (Wasser, 1998). Learners of all ages, from preschool, through university, professional upgrading, employment training and life long learning are participating in educational programs delivered over computer networks. Universities and colleges across Canada and the United States are incorporating computer-based information and communication technologies into their courses at an accelerating rate. In 1994, 10% of college courses used e-mail as a tool for instruction and 7% of courses had a website. By 2000, this usage increased to 60% for e-mail and 30% for course websites (Carlson, 2000).

When one looks at education at the post-secondary level one sees that computer and information technology is changing the very nature of higher education and will continue to have an increasing effect on how we teach and how we learn. The systematic, pedagogically effective integration of computer-based communication technologies into teaching and learning is essential for addressing a university's mission to be accessible to a diverse student body and for ensuring the quality of teaching and learning at post-secondary institutions.

Pedagogical training is essential to faculty development and renewal and to the sustainable improvement of teaching and learning in higher education. One of the most critical issues in maintaining quality in higher education in today's rapidly evolving, knowledge-based society is the need for a transformation in the role of faculty. When computer-based communications technologies are used in a pedagogically sound manner, they can provide optimal conditions for learning, allowing for dramatically increased student contact and freeing the teacher to focus more intensively on individuals and small groups of students.

Encouraging learners to become more involved with the content and to collaborate with other learners requires fundamental changes in how teachers think about their courses. Now, more than ever before, teachers are challenged to assume a greater role as planners, designers, guides, mentors, and facilitators of learning (Cuneo, 1997).

While the integration of these new technologies has the potential to make higher education more accessible to different populations such as full-time employees and stay-at-home parents, etc., there is also the real possibility that the integration of technology could exclude an important and growing student body, namely, students with disabilities. Students with disabilities include both students with physical disabilities as well as those with learning disabilities. The number of students with disabilities enrolled in post-secondary institutions in North America ranges from 5% to 11% (Fichten, Asuncion, Barile, Généreux, Fossey, Judd, Robillard, DeSimone & Wells, 2001a).

For most students with disabilities, technology integration is beneficial but also presents substantial barriers (Banks & Coombs, 1998). Some of the benefits are: "computers assist with writing, help surmount barriers caused by specific impairments, help organize and speed up work, and promote personal growth." (Fichten, Asuncion & Barile, 2001b, p .7). Barriers include problems with access to software and hardware, and attitudes by either faculty or non-disabled students towards the use of adaptive computer hardware in the classroom.

While recent research has detailed the difficulties that students with disabilities face at the college and university levels, little is known about how faculty are taking into account the needs of this population as they incorporate technology into their courses. Data were obtained at Concordia between fall 1997 and spring 1999 [from: (1) focus groups with students with disabilities (n=12); (2) structured interviews with students with disabilities (n=37) and with postsecondary personnel responsible for providing services to them (n=30); (3) questionnaires completed by postsecondary students with disabilities (n=725)] (Fichten, Asuncion, Barile, Fossey & DeSimone, 2000) indicating that professors generally do not know what to do to ensure that students with disabilities have full access to electronic course material or how access problems can be solved. A survey (Fichten et al, 2001b) of providers of services for students with disabilities at the university and college levels in Canada reported that there is a lack of awareness among faculty with the computer-related needs of these students.

Put positively, as faculty learn to integrate computer-based communications technologies into their courses, we have an opportunity to train faculty and administrators to become more aware and interested in the potential for including students with disabilities into full participation in education through the uses of technology. Increasingly, the computer is moving out of the computer lab and into the classroom and onto the office desks of teachers and students. Awareness of adaptive computing uses in education must follow the computer into the classroom and office. The problem is that many faculty actually resist including students with disabilities in their courses. Whether this is from fear or prejudice, the result is still to exclude them. Teachers fear they will have to lower their teaching standards. The fact is that many faculty have found they have to increase their teaching standards and, when they do so, all students benefit. When a teacher describes verbally what he is writing on the blackboard, all students report they learn more easily. When a video is captioned, hearing students score better on comprehension tests than when it is not captioned. When faculty give consideration to special learning needs of students with disabilities, they become more aware and conscious of what they are doing. The result is they do it better (Coombs, 1992; Coombs, 1998; Cunningham, C., & Coombs, N., 1997).

The Concept of "Universal Design" Within Four Educational Environments: A Theoretical Perspective

The following paragraphs discuss access issues and present design considerations for assuring that a course is accessible to potential instructors and students with a wide range of disabilities. The field of universal design provides a framework for the discussion of issues raised in this dissertation and subsequent research activities.

Universal design

Visual, hearing, mobility, speech, and learning disabilities can impact the participation of potential students and instructors in a distance learning class. Planning for access as the course is being developed is much easier than creating accommodation strategies once a person with a disability enrolls in the course or applies to teach it. Simple steps can be taken to assure that the course is accessible to participants with a wide range of abilities and disabilities. People without disabilities also benefit when universal design principles are applied as a course is being developed. "Universal design" is defined by the Center for Universal Design at North Carolina State University as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design." (Mace, 2002).

At this Center, a group of product developers, architects, environmental designers, and engineers established a set of principles of universal design to apply in the design of products, environments, and communication and other electronic systems. General principles include:

- the design is useful and marketable to people with diverse abilities;
- the design accommodates a wide range of individual preferences and abilities;
- the design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities;
- the design can be used efficiently and comfortably, and with a minimum of fatigue;

- and appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility, (Connell, B. R., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., Sanford, J., Steinfeld, E., Story, M., & Vanderheiden, G., 1997).

When designers apply these principles, their products meet the needs of potential users with a wide variety of characteristics. Disability is just one of many characteristics that an individual might possess. Others include height, age, race, native language, ethnicity, and gender. All of the potential characteristics of participants, including disability, should be considered when developing a e-learning course. Just as architects design buildings used by everyone, including those who use wheelchairs, e-learning designers should create learning environments that allow all potential students and instructors to access course content and fully participate in activities.

Learning Environments

The educational enterprise provides us abundant examples of environments where access to facilities must be ensured for students with physical and/or learning disabilities and where access to instructional materials, media, and educational technologies must be ensured for students with sensory impairments and learning disabilities. For the present discussion I have opted to concentrate on four typical "learning environments" encountered today by most students immersed in formal education, specifically: classrooms, laboratories, libraries, and personal residences. In the following discussion, each environment will be analyzed for the problems encountered by students with sensory impairments, solutions provided by human adaptations and interventions, and the role that can be played by technology in optimizing the learning opportunity. Enhanced accessibility provided by these approaches are not restricted to a specific environment; commonalities will be found in all four environments discussed. In addition, accommodations that facilitate learning by these students in these settings can generalize to many other of life's daily activities and experiences. Technology will be featured in the following discussion, but it must be remembered that there are many non technological means by, which accessibility can be facilitated, and many of these have not been implemented to the degree possible. Thus, as we conduct the research and development needed for providing improved accessible learning environments for the future, we simultaneously must be diligent in promoting full access through other means as well.

Classrooms

Although classrooms are now only one of several learning environments in formal education today unlike the past, they continue to be important learning environments for most students. The classroom is the center for didactic presentation, dynamic demonstrations, and interpersonal inquiry and discussion.

Notetaking (Brill, 1987; Brody, 1989; Brown, 1987; Enders & Hall, 1990; Farra, Morelli, & Balfe, 1988; Green & Brightman, 1990; Horn, Shell, & Severs, 1986b; Horn, Shell, & Severs, 1988; Kerchner & Kistinger, 1984; Laine & Harper, 1988; Maik, 1987; Shell, Horn, & Severs, 1989; Yau & Ziegler, & Siegel, 1990) is not a serious problem for most blind and visually impaired students. While visually impaired students use pens and pencils, blind students who use braille have long relied on the slate and stylus or manual braille writer. Some blind students have used tape recordings of classroom proceedings for later reference, but few have found this technique helpful for rapid scanning and review. Computer technology began to be used in the late 1970's, and today various laptop computers and dedicated notetaking devices give blind students alternative means for notetaking with either braille or synthetic speech displays.

Human adaptation is the primary requisite for making other classroom activities appropriately accessible for blind and visually impaired students. Common problems confronted by these students in classrooms relate to the inability to read written information whether it appears on a chalk board, overhead projection, handout, or video. By merely speaking all material that is written on a chalkboard or overhead projection, an instructor will make material accessible to blind and visually impaired students. Simultaneously, they will assist many other students who strain to read material from back rows and by eliminating ambiguity produced by idiosyncratic handwriting or visual processing problems.

This last point illustrates a principle that many of us have emphasized for years while promoting universal design of environments and products. When something is made accessible for people with disabilities, it is typically better for everyone else. It is usually more convenient and easier to use for everyone.

Pictorial and graphical materials used in classroom instruction produce additional problems for blind and visually impaired students. Adaptive techniques and materials can greatly assist these students, but rarely are these made available. Many visually impaired students will benefit from copies of all materials that are to be shown or projected in front of classrooms. Such copies should be produced with large print (point 16 type and larger) with a minimum of 70 percent contrast between the displays and the background. (Again, all sighted students would benefit from such handouts as well to be used as permanent records.)

Blind students need either excellent verbal descriptions or tactile diagrams or three-dimensional replicas of materials to be shown. Both tactile diagrams and models are enhanced when they are supplemented with audio descriptions and instructions. I shall return to these tactile materials when discussing another learning environment.

I have already alluded to the importance of handout materials for all students, but lack of access to them can cause serious problems for blind students if the handouts are to be used in classroom presentations and discussions. The common accommodation is through human intervention: the use of a reader (most commonly another student). This is better than no accommodation, but it more commonly is unsatisfactory because it interferes with hearing what is transpiring at that time, and it may be a distraction or burden to the volunteer reader and others nearby. For those who read braille, a braille copy is highly desirable. Most colleges and universities have access to facilities and services that can produce these alternative formats at short notice, especially when they are provided on computer diskette.

Alternative formats for handouts may not be as important when they are to be used outside of class because blind students typically will have means for reading them, either with a human reader or an electronic reading machine. Nevertheless, all instructors should consider providing the material in alternative formats available today through brailling services and electronic copies for students who use computers. Many college instructors today provide such materials for all students on campus computer networks. In such cases, blind students can experience equity with their sighted peers by using adapted computer displays.

Classroom accessibility for deaf and hard-of-hearing students is provided by human adaptation, intervention, and technology. For many of these students, lip-reading continues to provide the primary verbal information input or a valuable augmentation for residual hearing. Instructors can significantly enhance this informational input by continuing to face these students while speaking and avoiding talking when facing the chalkboard, projection screen or demonstration. Interpreters provide human intervention for classroom presentations and discussions for many deaf students. For some students, interpreters vocalize for the students thus providing two-way interpreting and full participation for the students.

Technology is playing an increasing role in making classrooms appropriately accessible for deaf and hard-of-hearing students. FM loops and infrared links are becoming common assistive listening devices for hard-of-hearing students. Instructors or other classroom presenters hold or wear a small microphone and transmitter that broadcast verbal information to receivers worn by hard-of-hearing students. These devices amplify the speaker while not amplifying other ambient sounds near the student as do standard hearing aids.

Real-time captioning or graphic display of speech is yet to be widely used in classroom situations, but a number of successful demonstrations have shown its effectiveness especially when there are a number of deaf students in the same classroom. A steno-typist enters lectures and discussion on a computerized keypad and the text is translated into full alphanumeric text, which is then displayed on a video screen. A verbatim transcript of the classroom session can then be produced and used for review by the students (Newell, Downton, Brookes, & Arnott, 1984). (In 1995 Concordia University started using computerized notetaking systems for the hearing impaired).

Audio-visual instructional media such as slides, videos and educational television can make classrooms inaccessible learning environments for all students who have sensory impairments. Such media are used by faculty to enhance learning by bringing students closer to the subject matter. A good audio-visual presentation can be compelling and motivating, immersing the student in the subject to be learned. What better way to experience history than through a good documentary? How else can a human experience the inside of an atom or a tissue cell? Problems arise, however, when only one half of the audio-visual presentation can be perceived. Even the simplest example, a slide show, will be almost meaningless to students with sensory impairments if it is handled inappropriately. Deaf students will not hear the audio nor may not see well enough in darkened rooms to benefit from interpreters. Without adequate verbal description, blind and visually impaired students will miss the important visual information.

Modern techniques and technologies provide means to make audio-visual displays accessible to people with disabilities. Captioning whether open or closed and video descriptions will provide the information otherwise absent to people with disabilities. Unfortunately, far too few producers of these educational media are providing the needed augmentations. Research being conducted by the National Center on Accessible Media at the WGBH Education Foundation is exploring innovative ways of making both captioning and descriptions available only to those who desire them. The key problem continues to be how to encourage or require producers of educational media to incorporate captions and descriptions so all students will benefit from the multimedia audio-visual instructional information (Vanderheiden, 1994).

The reference to multimedia instructional materials is a logical bridge to the next learning environment to be discussed, namely laboratories.

Laboratories

Educational laboratories exist today in many disciplines for individual tutorials, drill, practice, and advanced individualized study. Computer-aided instruction and audio-lingual language labs have been around for at least four decades; and today they are being upgraded by sophisticated interactive, multimedia educational technology contained on videodiscs and CD ROMs. For the most part, these exciting new educational tools are inaccessible to students with sensory impairments because the educational software contained on these media does not contain captioning or video descriptions. With the growth of interactive educational technology and curricula, it is essential that we develop the process and promote its use throughout the education publishing industry. It is not as easy to provide captioning and video descriptions on interactive multimedia as on a video, which is linear in nature; interactive media have completely different time and space constraints because both dynamic and still graphics are present. The needed processes will be developed, however, and then we must promote their adoption and wide usage.

Full participation of students who are deaf or hard-of-hearing does not often require adaptations in scientific laboratories as long as good communication is established between lab partners (Fichten, et al., 1989). Most of these students will be able to indicate the most effective form for this adaptation. Students who have limited vision usually can operate effectively and safely in scientific laboratories with appropriate optical or electronic magnification devices. Full participation of blind students in these laboratories, however, has long been a concern of schools and faculty despite the fact that many successful scientists with disabilities (including blindness) serve as roll models and live demonstrations of the fact that laboratory scientific experimentation can be conducted safely and productively.

Until relatively recently, human intervention augmented by low-tech adaptations have represented the bulk of techniques used to make science labs accessible for these individuals. Most students in labs are required to work in pairs because there is seldom sufficient equipment and supplies for everyone. Division of labour is the standard mode of operation for everyone. Judicious selection of lab partners and appropriate division of responsibility give each student the benefit of full participation and the specific strengths of the lab partner.

Today we are on the threshold of exciting technology that should make science labs far more accessible to all students including those with sensory impairments, namely: digital measurement instruments, sonifications, computer generated graphics, and virtual reality. Computer generated graphics and virtual reality are worthy of a more detailed consideration at this point.

Computer generated graphics

Many people cannot produce good graphics or drawings in science laboratories. Computer-aided paint, drawing, and design software packages are used today by many scientists and science students to produce precise graphical presentations of data gathered in laboratory investigations. Raw data are arranged in tables, and appropriate graphical formats are selected. The computer then generates and prints the graphic for use in papers or manuscripts. With such software, individuals without help of vision or coordinated movements can produce precise graphical displays for their experimental findings Vanderheiden, 1994).

Virtual reality

Virtual reality is an emerging technology that is being exploited successfully by game manufacturers and by some sales organizations. It should also be developed for science education for all students including those with disabilities. In brief, virtual reality is computer technology that provides the user with rich, interactive sensory information primarily visual today, but exciting advances are being made with auditory displays and, to a less degree, with tactile and proprioceptive feedback. Users normally wear special goggles, earphones, and gloves. As the person moves, all of the sensations move in three-dimensional space as do sensations we experience in the real world, thus the term "virtual reality".

Computer simulation (Green & Brightman, 1990) has a rich history in the realization of many phenomena. The airline industry has been training and honing pilot skills on simulators for many years. We should be able to adapt these technologies to science laboratory experimentation thus providing all students with the means to participate fully. Through such laboratory experiences, students should be able to master fundamental principals of science through simulated activities usually restricted to performance of experiments in laboratories.

There are those who insist that the usage of the actual tools of investigation is better than simulation, but I support the view that students with sensory or motor limitations will benefit greatly from the simulation along with all of the other students who do not have access to science laboratories. Virtual reality technology is still expensive, but its application in the entertainment field is driving the costs down. Within a very few years, the price will be within the range of schools. Then is when we will see the true value of virtual reality reaching into all sectors of our society, and there is strong reason to believe that students with disabilities will be able to find equity in these simulations.

Libraries

Libraries are warehouses of knowledge; but they have no value unless the knowledge can be accessed. Five points must be emphasized today when discussing libraries as learning environments. These apply to public libraries as well as school libraries because all are important learning environments for students and the general public.

All students, but especially deaf and hard-of-hearing students, must have good communication with library staff. Staff members skilled in sign language is encouraged; but in the absence of such skills, appropriate technology for interpersonal communication is needed. Obviously, libraries should also have an adequate number of text-phones that will provide for telephone inquiries.

Libraries should be equipped with inventories of audio-visual materials that have captioning and video descriptions. Redundancy in the forms in which multimedia information is presented must become a standard practice for libraries.

Card catalogues and other resource reference materials must be accessible to library patrons who have visual impairments. As libraries convert to computerized search and reference capability, this process should be made easier.

Libraries need to maintain appropriate access technologies on the premises to permit students with sensory disabilities to access print and audio-visual materials within the library including access to computerized materials. These should include optical character recognition-based reading machines, closed-circuit television magnifiers, and adapted computers for blind and visually impaired patrons.

Finally, library patrons with sensory impairments must be able to avail themselves of remote access to library materials that can be obtained over computer networks.

Again, we must address the form in which emerging digitized information is stored, browsed, and retrieved. This can become a very technical discussion, but I would urge librarians everywhere to investigate the accessibility needs of people with disabilities before adopting an approach of making digitized library materials available over computer networks. Within a very few years, people everywhere will be able to browse library materials and obtain them from remote locations using computer technology. These activities and materials will be accessible to people with sensory impairments.

Personal Residences

Personal residences are likely to become the most important learning environment for most people in the future, especially with an emphasis on life-long learning. Homes have always been the primary environment where children have learned language, values, and culture. Personal residences traditionally also have been the location where students of all ages have conducted school assignments homework. Today we are on the threshold of an insurgence of home-based learning options, many of which will be technology-based. I shall touch on three of these.

First we cannot forget continuation of the traditional homework assignments. Most of my discussions in this area will refer to means to make materials usually presented to students in printed form accessible to blind and learning disabled students. Instructional materials including texts and supplemental study materials must be made available in alternative formats. Recordings for the Blind and Dyslexic (RFB&D) and other volunteer reading organizations have provided an important service for blind and learning disabled students for many years. I anticipate that this service will continue to be needed far into the future although the medium used for storage will evolve to include digital recordings which will be far easier for students to search for specific chapters and sections. RFB&D is in the process of moving to digital audio books. Digital audio is the recording of sound-voices or music-by computer, and transferred onto some kind of medium such as a tape or CD. The sound quality is usually much better than traditional analog recordings and there is improved accessibility of the recorded material. RFB&D is currently developing its own digital audio textbook product that employs digital audio technology. They expect two versions to be available. The enhanced version will contain three components: the book's full text, a narrated audio recording and a synchronization file that links the audio with the text so that the reader may access the book in a variety of ways. For instance, the reader may want to read the words while listening to the text, have the text automatically highlighted as it is being read, navigate through sections of the book, or simply listen to the audio portion of the book. The standard version will contain a digital "table of contents" or "index" and an audio recording, so that the reader may navigate through the audio text more easily than if he/she was using an audio cassette tape. In the standard version, the reader may still need to follow along with a printed paper version of the text while listening to the audio.

I am making the assumption that most students with sensory impairments and learning disabilities (LD) at all levels of education will be using computers in their educational pursuits, and this assumption should be realized in the relatively near future. Without question, computers have already demonstrated their value for students in the preparation of reports. The written language difficulties of adults with learning disabilities have been well documented (e.g., Gregg & Hoy, 1989; Hughes & Smith, 1990; Johnson, 1987; Vogel, 1985). In fact, Blalock (1981) asserted that between 80 and 90% of adults with LD exhibit written language disorders. Specifically, adults with LD have been found to demonstrate difficulty with grammar, punctuation, spelling, organization, and coherency.

Several researchers (e.g., Collins, 1990; Primus, 1990) have found word processors valuable for helping persons with learning disabilities compensate for written language difficulties. Unlike the conventional methods of writing using pencil and paper or a typewriter, word processors (whether stand-alone devices or personal computer [PC] based systems) allow users to write without having to be overly concerned with making errors, since the text appears on the computer screen before it is printed out, and thus can easily be corrected. In addition, omitted words may be added, inappropriate words or blocks of text deleted, sentences or paragraphs moved, and spelling and punctuation corrected. Also, specified text is easily bolded (highlighted), underlined, or centred.

When not preoccupied with the "mechanical aspects" of writing, persons with learning disabilities are free to focus on the meaning of their written communication. This is particularly important for adults with learning disabilities, who often have developed a fear of translating their thoughts into written language as a result of a history of writing problems. Knowing that they can simply "generate" language and correct errors later reduces their anxiety, and is often enough to "liberate" their writing abilities. As a result of using a word processor, many persons with LD are better able to express themselves at a level commensurate with their intelligence.

Furthermore, since errors are easily corrected on the computer monitor before printing, users are more likely to end up with a neat and organized document. This helps develop a sense of pride in written work and may enhance the image persons with LD have of themselves as writers. This, in turn, may result in a more positive way to approach writing tasks. The psychological benefits associated with word processing and postsecondary students with learning disabilities have been documented by Collins (1990).

Now software exists and continues to improve that will allow a blind person to type mathematics or tabular data and have appropriately formatted mathematics or graphics printed out for sighted teachers or peers. Also today electronic reading machines and access to remote resources via the Internet make the reading of professional and educational materials much easier. Our students of today and in the future will have these capabilities. I mention computers and related information technology now because most of my remaining remarks in this section of the dissertation are based on the premise that students with sensory impairments and learning disabilities will have access to these important technologies to be used in their education.

Many groups are now providing computerized (or electronic) versions of texts and classic works of literature. These materials are generically referred to as "e-text" versions of the print documents. In order to help users find materials in e-text formats, we are making increased use of the internet to find sources of books. The most important thing to keep in mind when looking for text on the Internet is to search often. Our conventional advice to users today is to use keywords like e-text, electronic text, eBooks, online books, and online newsletters. Any of the major search engines will yield results with these keywords. If users get too many hits or if they want to narrow the scope of their search, they should try adding key words for the subject material they are looking for. Some of the most used search engines are:

- Google - www.google.com - Probably the most popular search site on the internet, and it provides a great variety of results depending on how the user phrases his/her search requests.
- Ask Jeeves(r) - www.aj.com - A good search engine that submits the user's search request to several of the other popular search engines.
- Alta Vista(r) - www.altavista.com - General search engine
- Lycos(r) - www.lycos.com - General search engine

- Yahoo(r) - www.yahoo.com - General search engine
- Seti-search - www.seti-search.com - For an extremely speech friendly interface that lets the user select the search engine he/she wants to use.

When one thinks of references to electronic text available on the Internet, the Gutenberg Project first comes to mind. The Gutenberg Project is a library of several thousand books in the public domain. They are freely available from several places on the Internet. www.gutenberg.net is a good place to get books and a list of other sites where the Gutenberg Project material is archived. A group of interested individuals volunteer to scan or type these books into plain ASCII files and make them available for free to anyone who wants to read them.

Electric Books at www.electricbook.com is another good place to start when looking for material, especially about a specific subject. This site categorizes its magazine listings by subject and its newspapers by state, so it is fairly easy to narrow down the amount of material you have to plow through.

Ask Magpie Magazines at www.askmagpie.com contains links to over 7000 online magazines and journals. Ask Magpie Magazines lets users search by category or travel through common categories to find what they want. Once the user selects a category, Ask Magpie presents a sub-category, so it is fairly painless to narrow a user's focus through its database. Once the user does find the specific magazine they are looking for (or find a new one they didn't know about,) the user can go directly to that magazine's site with the provided links.

In addition to all the generally available electronic text users may find on the Internet, I would suggest that readers check APH's Louis database of accessible materials for electronic textbooks from a variety of alternate media suppliers. The Louis database of accessible materials is accessible through APH's main Web page at www.aph.org. In addition to Braille, large print and recorded listings, Louis contains an electronic text media type, and individuals can use that as a criterion for searching the database.

E-text is still in its infancy, but researchers are making significant progress in developing means by which publishers can have their copyrights protected. In addition, new software will make it possible for students to have higher level math and science symbols readable in large-character, auditory or tactile modes. This is a significant breakthrough for blind students desiring to study higher-level courses in these disciplines.

A need still exists for an affordable, computer-driven, full- page-sized tactile display for the presentation of braille, math, and graphics. Research continues on this problem, and I remain confident that such a device will be produced so that blind students and other computer users will be able to feel much of the graphical information displayed on computer screens. In the interim, we must make a concerted effort to produce and distribute far more quality tactile diagrams and three-dimensional models needed as supplemental educational materials in many courses.

A second residence-based learning modality is provided by an increasing number of audio-visual, multimedia, and computer-based learning modules and courses. These include teaching materials on videos, CD ROMS, videodiscs, and computer diskettes. The potential problem confronting students with sensory impairments again relates to the need for having these instructional materials appropriately captioned and described.

These are issues on which we must continue to educate and pressure curriculum developers and publishers so they will respond to a growing market for accessible materials.

The third area of discussion for residence-based learning relates to distance education. For those individuals with special needs and students separated from their place of learning by distance the world of computer mediated communication holds enormous promise. The relative advantages of this environment bring untold opportunities within reach which can represent significant advancements for those who would otherwise be unable to take part in a learning experience within a community. A plethora of courses are now being taught over the Internet, the computerized information highway (Jacobson, 1994; Jennings, 1997; Trentin, 1997). These courses make extensive use of CMC (computer mediated communication primarily email and computer conferencing), the electronic blackboard, videos and telephone conferencing. Dr. Norman Coombs (Coombs, 1992), a blind professor, at the Rochester Institute of Technology (RIT), uses a computer with a speech synthesizer to regularly teach history classes of students on-line with a computer conference. He has been a pioneer in this field of teaching, and his writings demonstrate that students who are either deaf or blind benefit equally from this educational medium with those without disabilities. Dr. Coombs tells of a student who let him know by e-mail that she was deaf and indicated that this was the first class in which she could participate fully in discussions with the teacher and the other students. To date, most of these Internet-based courses and discussions have been character-based in contrast to being Windows-based. There, however, is a steady trend toward the use of multimedia information on the web. We must work with the producers of these courses to ensure that students with sensory impairments can participate fully. This will require the addition of alternative formats text or graphics; but inaccessibility of these courses is a barrier to learning that we must avoid. I believe that skilful use of multimedia can enhance and enrich communication. Some web design features primarily serve a function of making a page more appealing or making it catch the users' attention. Frequently these tricks do not contribute to content delivery itself, but if multimedia enriches the communication, then it actually improves the teaching, improves the delivery of content. If the design focuses on enhancing content and not on merely catching attention, then, almost without thinking about people with disabilities, the design will automatically communicate to everyone. To look at it the other way, when a teacher focuses on communicating to students with disabilities, the communication will be clearer for everyone.

By addressing the accessibility needs of students with sensory impairments, using the concept of "universal design" in these four learning environments, we can ensure that they will have the opportunity to experience equity in education with their peers.

Faculty Education

Faculty play an essential role in providing access for college students with disabilities. Though terminology has changed, the importance of faculty in working with students with disabilities has long been recognized. As college support services emerged in response to initial federal mandates in the U.S.A. for non-discrimination (Section 504 of the Rehabilitation Act of 1973), faculty education was one of the earliest areas identified as essential in promoting access for students with disabilities (Jastram, 1979).

Programs and support services targeting the unique needs of college students with physical and/or learning disabilities (LD) began to emerge in the early 1980's (Mangrum & Strichart, 1988; Fichten, C.S., Goodrick, G., Tagalakis, V., Amsel, R. & Libman, E. (1990). Because LD is invisible and affects the student's cognitive functioning, faculty education/sensitization pertaining to this population was found to be particularly crucial (HEATH, 1994). Faculty participation and education were identified in early campus models (Vogel, 1982; Fichten, C.S., et al. (1990) as well as ongoing strategies for structuring support (Brinckerhoff, Shaw, & McGuire, 1993; Gajar, 1989; Hill, 1996; Mangrum & Strichart, 1988; Rose, 1993).

Since the early 1980's, a number of practices have emerged for educating faculty and engendering their participation. Many recommendations and procedures have been proposed in the literature to promote positive faculty attitudes toward and increased understanding of the needs of students with physical and/or learning disabilities (Lundeberg, & Svien, 1988; Morris, Leuenberger, & Aksamit, 1987; Rose, 1993; Stewart, 1989; Tomlan, Farrell, & Geis, 1989). But are these strategies meeting the education needs of faculty? Is the field of college support services preparing and supporting faculty to adequately participate in providing the "access to knowledge and ways of knowing" (Walker, 1980) so crucial for students with disabilities?

Statement of the Problem

To address questions concerning the provision of faculty education to meet evolving faculty requirements to satisfy the needs of students with disabilities as outlined on page 25, I first examined the body of literature (see Chapter II of this dissertation) on the role of faculty in providing access for college students with disabilities and how this role is being defined and clarified over time. The term access refers to providing an equal opportunity for students with disabilities in all aspects of the college experience. For faculty this might involve the roles of teaching, mentoring, policy development and so forth. More specifically, for the purposes of the present study, I am defining accessibility from the perspective of information technology. I am not concerned with the cause of the disability but how the disability impacts the utilization of information technology. This narrow definition not only means that we are focused on providing accessibility to information technology, but we are concerned with how these technologies can enhance working, learning, and daily independent living.

The educational enterprise at the post-secondary level provides us abundant examples of environments where access to facilities must be ensured for students with physical and/or learning disabilities and where access to instructional materials, media, and educational technologies must be ensured for students with sensory impairments and learning disabilities. Various sources in the literature were also examined in Chapter II that serve to shape the faculty role including students with disabilities, and faculty themselves. Next, current practices in faculty education/sensitization pertaining to college students with disabilities were reviewed. Implications of the discrepancies between the evolving faculty roles and current educational practices were then discussed. Guiding questions were proposed for expanding efforts and models in faculty education that keep pace with the evolving faculty role in providing access for college students with disabilities as they learn to integrate the new technologies into their courses.

The rapidly expanding use of technology in instruction is the primary forum for discussion in this dissertation as faculty develop new pedagogical strategies for all students. The present exploratory study further explored training over internet, listservs, e-mail, or CD-ROM that can be provided in various self-paced formats. Using 344 Concordia University faculty members identified as having students with disabilities enrolled in their courses during the 2003-2004 academic year as a test bed (see Appendices A and D), my dissertation research was carried out to demonstrate the interest in and the need for online instructional technologies for delivery of professional development opportunities to educators of students with disabilities at the post-secondary level.

I proposed a three stage model for carrying out the research and faculty in-service training: phase one of the model involved distribution, collection, and evaluation of faculty surveys that addressed attitudes, knowledge of various handicapping conditions, and accommodation. Since one of the long term goals of this dissertation research is to work toward the development of a high-quality interactive training resource on how to create accessible multimedia for e-learning materials to meet the special needs of faculty teaching students with disabilities in their courses, faculty were asked the following three general questions listed Table 1 on the following page.

Table 1 – General questions 40, 41 and 43 from questionnaire

1 (Ques. 40)	40) Which of the following formats would you find most useful for this type of resource? ☐ An instructional guide that provides you with a well structured step-by-step route through each topic. ☐ A reference that allows you to look up specific topics as required. ☐ A resource that offers a combination of the above approaches.
2 (Ques. 41)	41) What would be your preferred medium for this type of training resource? ☐ CD-ROM ☐ DVD ☐ Web site ☐ Virtual Learning Environment ☐ Printed Material (books, booklets, instruction manual) ☐ Video ☐ Combination of the above
3 (Ques. 43)	43) Which of the following accessibility topics would you like to see addressed in a guide to creating accessible e-learning materials to meet your specific needs when teaching students with disabilities? ☐ Assistive technology and accessibility ☐ Browsers and accessibility ☐ Accessible design principles ☐ Accessible curricula design principles ☐ Accessible on-line assessment ☐ Accessible navigation ☐ Accessible HTML (tables, forms, page structure) ☐ Accessible images and graphics ☐ Accessibility and colour ☐ Accessibility and typography ☐ Accessibility and audio content ☐ Accessibility and video content ☐ JavaScript and accessibility ☐ Accessibility and Flash ☐ Accessibility and PowerPoint ☐ Accessibility and XML technologies (including SVG and SMIL) ☐ Accessibility and Java applets ☐ Testing and validation ☐ Web development tools and accessibility

Phase two involved an inservice mechanism for providing faculty with a package of information on disabilities. The Director of Advocacy and Support Services at Concordia, hired two consultants to prepare a comprehensive package of information for the following Units within Advocacy and Support Services: Office for Students with Disabilities, The International Students Office, The Centre for Native Education, and Inter-Faith Chaplaincy. This package of materials on disability information was made available both in hardcopy and web-based formats to present specific concerns and suggestions emphasizing student self-advocacy by providing classroom modifications and general instructional strategies.

Phase three was even more personal as it addressed each faculty member as they encountered individual students in the classroom. In this phase of the study I examined and evaluated the use of online instructional technologies such as internet and e-mail for the delivery of additional materials to support the information contained in the Advocacy/Office for Students with Disabilities Package. One-on-one interviews with professors were used to learn more about the techniques used for making course materials available through computer-based technologies that is, key frustrations, lessons learned and best practices. Vignettes will be presented in Chapter IV, "Results", and Chapter V, "Discussion", of this dissertation to demonstrate the divergent/convergent perspectives among faculty. In addition, the strategies of reviewing course materials made available on web sites and the adaptation of course handouts into text files, for which the qualitative coding technique was used appropriately.

These faculty learners exemplify the busy professional who cannot participate within a traditional facility-based model, due to limitations of time and campus geographical location (Concordia University is a four faculty, two campus university), and thus require an alternative "just-in-time," self-directed approach to learning (Bess, 1997). Professors accommodating students with disabilities in their courses will benefit from their participation through increased knowledge of the most current, emerging strategies and new technologies available for accommodation of their students.

Organization of the Dissertation

The next chapter provides an extensive review of the literature that includes an overview of a body of literature on the role of faculty in providing access for college students with disabilities and how this role is being defined and clarified over time. The literature review is divided into three major sections. The first section, entitled "Emerging Trends in the Literature", places the present study within a body of literature dealing with the rapidly expanding use of technology in instruction as faculty develop new pedagogical strategies for all students. I look in some detail at two studies by the Fichten Research Adaptech Team within this small body of literature which evaluates the use, or the utility, of computer or information technologies in the postsecondary education of students with disabilities (Fichten, Asuncion, Barile, Fossey & DeSimone, 2000; Fichten et al, 2001b). the section concludes with a description of my preliminary pilot study in which data about faculty experiences working with students with disabilities and with technology integration were gathered (Bissonnette, Schmid, & McWhaw, 2002). The next major section, entitled "The Evolving Faculty Role", reviews research studies that were conducted in colleges and universities that focused on attitudes toward students with physical and/or learning disabilities and accommodations for these students. Various sources in the literature are examined that serve to shape the faculty role including students with disabilities, and faculty themselves. Next, current practices in faculty education/sensitization pertaining to college students with disabilities are reviewed. Implications of the discrepancies between the evolving faculty roles and current educational practices are then discussed. The chapter concludes with a section describing literature on "Universal Design" -- that is, a strategy for providing flexible access to information systems by individuals with a wide variety of disabilities.

Chapter III discusses the methods and procedures used in the present study. A detailed description of the two methodological techniques employed in the study is presented -- that is, the survey and semi-structured interviews with the Concordia University faculty. I discuss the sample and procedures for collecting data. I also provide specifics regarding data analysis procedures. The chapter concludes with a brief discussion of content validity.

The results of this study are presented in Chapter IV. In Section I the quantitative data gathered from the faculty respondents are summarized. In Section II interview data from the semi-structured interviews are presented.

Chapter V includes a summary of the components of this study (purpose, problem, methods and procedures, and results). Limitations of the study are also presented, and the results are discussed. The chapter concludes with suggestions and recommendations for future research.

CHAPTER II

REVIEW OF THE LITERATURE

Literature Review

The purpose of this chapter is to provide a comprehensive review of a body of literature on the role of faculty in providing access for college students with disabilities and how this role is being defined and clarified over time. (The reader is reminded that the term "access" refers to providing an equal opportunity for students with disabilities in all aspects of the college experience). The literature review is divided into three major sections. The first section, entitled "Emerging Trends in the Literature", places the present study within a body of literature dealing with the rapidly expanding use of technology in instruction as faculty develop new pedagogical strategies for all students. I look in some detail at studies by The Fichten Research Adaptech Team within this small body of literature, which evaluates the use, or the utility of computer or information technologies in the postsecondary education of students with disabilities, (Fichten, Asuncion, Barile, Fossey & DeSimone, 2000; Fichten et al, 2001b). the section concludes with a description of my preliminary pilot study in which data about faculty experiences working with students with disabilities and with technology integration were gathered (Bissonnette, Schmid, & McWhaw, 2002). The next major section, entitled "The Evolving Faculty Role", reviews research studies that were conducted in colleges and universities that focused on attitudes toward students with physical and/or learning disabilities and accommodations for these students. Various sources in the literature are examined that serve to shape the faculty role including students with disabilities, and faculty themselves. Next, current practices in faculty education/sensitization pertaining to college students with disabilities are reviewed. Implications of the discrepancies between the evolving faculty roles and current educational practices are then discussed. The chapter concludes with a section describing literature on "Universal Design" -- that is, a strategy for providing flexible access to information systems by individuals with a wide variety of disabilities.

The Present Study: It's Place within an Emerging Trend in the Literature

The present exploratory study is situated in an emerging small body of literature, which evaluates the use, or the utility of computer or information technologies in the postsecondary education of students with disabilities. Indeed, searches of the ERIC, PsycINFO, and MEDLINE data bases show at this time that in spite of the proliferation of information, with the exception of the present research, my earlier preliminary study (Bissonnette, Schmid, & McWhaw, 2002) and that of Fichten; Adaptech Research Team (Fichten, Barile, & Asuncion, 1999-2001), there is virtually no empirical research which evaluates the use or the utility of computer or information technologies in the postsecondary education of students with disabilities.

Emerging Trends in the Literature

The Fichten Research

Fichten and her associates note that because computer technologies are expensive and can contribute to negative experiences and learning outcomes (e.g., create barriers between people, skill destroying), it is important to make available empirical data to better advise stakeholders in a number of areas: student groups, personnel who provide services to students with disabilities, professors, administrators, planners, policy makers, developers and suppliers of both mainstream and adaptive technologies. It is the need for information which is based not in individual but in collective experiences that makes this research not only timely, but also urgent (Fichten, Barile, & Asuncion, 1999a). Data were obtained between fall 1997 and spring 1999 from: (1) focus groups with students with disabilities (n=12); (2) structured interviews with students with disabilities (n=37) and with postsecondary personnel responsible for providing services to them (n=30); (3) questionnaires completed by postsecondary students with disabilities (n=725) (Fichten, Asuncion, Barile, Fossey & DeSimone, 2000) indicating that professors generally do not know what to do to ensure that students with disabilities have full access to electronic course material or how access problems can be solved. A survey (Fichten et al, 2001b) of providers of services for students with disabilities at the university and college levels in Canada reported that there is a lack of awareness of faculty with the computer-related needs of these students.

While these studies have provided us with preliminary information on faculty awareness of technology integration and its effects on students with disabilities, the small sample sizes in the 2000 study: (1) focus groups with students with disabilities (n=12); (2) structured interviews with students with disabilities (n=37) and with postsecondary personnel responsible for providing services to them (n=30); (3) questionnaires completed by postsecondary students with disabilities (n=725)] (Fichten, Asuncion, Barile, Fossey & DeSimone, 2000) and the fact that service providers were surveyed rather than faculty in the 2001 study (Fichten et al, 2001b) makes it difficult to draw any substantive conclusions.

Institutional and Pedagogical Concerns: An examination of Students with Disabilities and their experiences with technology in their academic work at Concordia University

Computing and communications technologies are becoming increasingly central to our everyday lives and particularly to the way faculty at Concordia University carry out their educational mission. A variety of programs and initiatives has been created to assist teaching faculty at the University who wish to incorporate technology in their teaching, but little is known about how faculty are taking into account the needs of their students with disabilities when integrating technology into their courses. To provide preliminary information in this area I, working out of the Office for Students with Disabilities, the Centre for the Study of Learning and Performance (CSLP) and the McConnell Project research team collaborated on a study, carried out during the 2001-2002 academic year that examined disabled students' experience with technology in their academic work at Concordia. Currently enrolled students with disabilities were sent a sixteen page questionnaire to learn of their experiences. Current faculty were sent a seven page questionnaire asking them to provide us with data about their experiences working with students with disabilities and with technology integration (Bissonnette, Schmid, & McWhaw, 2002). I shall at this point report on the results of the analysis completed on the faculty data.

The McConnell project was a three-year university-wide development, implementation and evaluation project that examined the creative and effective use of technology to enhance the teaching and learning process for both professors and students. The Centre for the Study of Learning and Performance (CSLP), a research centre associated with the Education Department, co-ordinated the evaluation of the use of technology and continues to work closely with the various units within the university such as the Office for Students with Disabilities.

McConnell Project: Method

In the fall of 2001 and winter 2002, we sent out 900 questionnaires to faculty who had at least one student with a disability registered in their courses. One hundred and sixty faculty members completed the questionnaire representing a participation rate of 18%. There were 89 males and 71 females. The average number of years of teaching experience at Concordia was 11.5. The breakdown by faculty was Fine Arts, 11.3%; Arts and Science, 65%; John Molson School of Business, 12.5%, Engineering and Computer Science, 9.4%.

The seven-page questionnaire was developed by the authors to examine faculty's experience with students with disabilities and the types of training they have received in supporting a student with a disability. We included questions about whether and how they used technology in their courses and how they had taken into account the needs of their students with disabilities when integrating technology. We also included questions about which types of adaptive computer hardware and software they were familiar with.

Finally, we asked if they had been trained in how to use adaptive technologies and if not, would they be willing to receive this type of training.

Results: Experience with students with disabilities

Of the 160 faculty members who responded, 20% reported that this was the first time they had a student with a disability in their course. The remaining 80% had already had at least one student with a disability in a previous course. Forty-five percent had experience with five or more students with disabilities over the course of their careers at Concordia. Most faculty members (about 73%) found out they had a student with a disability in their courses after having received a letter from the Office for Students with Disabilities. Thirty-seven percent said they were told directly by the student.

Technology integration

Eighty-three percent of the professors who responded to the questionnaire reported using technology in their courses shown in Table 2.

Table 2 - Description of Technologies used in Courses

Technologies used	**Percent**
PowerPoint overheads or slides in class	60%
Show videos	45%
E-mail to communicate with students	86%
Computer-mediated conferencing for student discussion	13%
Use labs (language)	16%
Have a course web site	50%
Provide PDF files for students to access or download	23%
Other	22%

Faculty who reported having a course web site indicated the following features on their sites listed in Table 3:

Table 3 - Description of Course Materials on Course Web Sites

Materials on Web sites	**Percent**
Course outline/information about course	85%
Course notes such as PowerPoint	64%
Links to other web sites	53%
Video clips of lectures	8%
Audio clips of lectures	1.5%
Chat room or on-line discussion area	18%
List of supplementary reading material	45%
Exams:	24%
Course grades:	40%
Other	36%

Forty-nine percent of the faculty who are using technology in their courses felt that the students were taking advantage of the technology provided.

Technology integration and students with disabilities

When asked how they had taken into account the needs of their students with disabilities when developing the technologies used in their courses, 72% reported that they had not considered the needs of these students while 16.5% reported partially taking into account the needs of their students with disabilities. Twelve percent reported definitely taking into account the needs of their students with disabilities. Only 15% of the faculty reported being familiar with adaptive computer hardware and software for students with disabilities. Only 4% had consulted with Services for Disabled Students about which types of adaptive technologies are available to these students.

Training

Less than 1% of professors had been trained in how to use adaptive technology in their courses but 49% reported that they would like to receive this type of training. The type of training they would like to receive is just-in-time hands on training when they have a student with a disability registered in their course who has special needs and they need to have adapted or alternate modes of technology integration to fully participate in the course.

While our research demonstrated that faculty at Concordia are willing to make accommodations for students with disabilities in the classroom such as providing handouts with larger fonts or describing graphics or PowerPoint slides to students who are visually impaired, faculty did not indicate that they were ensuring the accessibility of their websites for students with disabilities. Including video clips of lectures may be especially problematic for students with visual or hearing impairments. For example, students with hearing impairments may not be able to understand the videos unless they are close-captioned.

The finding that 72% of the faculty surveyed at a large urban university in Canada had not taken into account the needs of their students with disabilities seems to represent a crisis in providing access to technology for this population. Our study confirms an earlier study (Fichten et al, 2000) that there is a lack of awareness by faculty on how to make technology accessible to students with disabilities. However, our study also revealed that there is also a willingness by faculty to be trained in this area. Even faculty who did not wish to receive training at the time of the survey indicated their willingness to partake in training in the future as the need arises. The results also show that faculty have a definite preference in the type of training they would like to receive. They prefer receiving hands-on just-in-time training when they have a student with a specific disability who requires accommodations in their courses with regard to the type of technology used.

While faculty were amenable to attending to special needs, their "just-in-time" approach to training creates a potentially serious (and classic) problem: the retrofitting of already-developed materials to accommodate these needs. This approach is usually expensive, and generally not timely. Decisions on the hardware and software should be made a priori as accessible, eliminating the need to make changes. This requires institution-level policy and support. Our data indicate that sympathy for a position does not necessarily imply rational planning.

The present study takes up the question of how to inform and motivate faculty to take into account the needs of their students with disabilities as they integrate technology into their courses.

Reviewing additional literature Wasser (1998) refers to six important criteria for good technology access in postsecondary institutions:

- Access to university systems and the internet from a variety of locations at various times of day;
- Training on computers and the internet,
- Technical support when and where students are using computers;
- Digital libraries which provide on-line access to catalogues and electronic texts;
- Faculty support and training on integrating technology into courses;

- Responsiveness to the needs of the community (e.g., on-line application, e-mail, course and university information on the web.

These are the same criteria that need to be considered when providing services to students with disabilities.

It is by no means clear that computer-based learning is superior to traditional delivery of education (e.g., MacDonald & Wideman's study cited in "Evaluation by York U.," 1999; Russell, 1997,1999). What is clear, however, is that in the foreseeable future newly emerging educational technologies are not only here to stay but will proliferate (e.g., Farrell, 1999; Mercier, 1999; Office of Learning Technologies, 1998). Many faculty are scrambling to learn the basic skills needed to function given the new realities (cf. UCLA Graduate School, 1999). Given the general lack of technological sophistication of an ageing faculty, it should come as no surprise that professors generally don't know what kinds of things to do to ensure that students have full access to their electronic course materials (c.f., Banks & Coombs, 1998). Paradigms for how best to incorporate computer technologies into courses in specific disciplines are not yet evolved (Cuneo, 1997; Bowe, 2000; Christophersen, 2002; Rose & Meyer, 2002), and much energy goes into the design of electronic courseware (LT Report, 1999). Regrettably, as is the case for overall institutional IT planning, the accessibility concerns of students with disabilities are simply overlooked by professors as well.

The Evolving Faculty Role

The role of faculty with students with disabilities is simply to teach and mentor these students as they would any others. Yet this task has, at times, proven complex and arduous. As noted by Jastram (1979),

> There will probably be no more persistent or difficult problem for faculty members than this question of how far it is reasonable or appropriate to go in waiving specific requirements or modifying assignments in order to accommodate a particular student with a disability (p. 19).

How, then, are faculty to teach and mentor students with disabilities? College faculty are far from a homogeneous group. They work at widely diverse institutions and represent an array of disciplines. They are diverse individuals in various stages of professional development. And yet, despite this diversity, there are broad influences that cross disciplinary, institutional, and individual lines Perspectives provided by experts in the area of college access, students with LD, and individual faculty are examined.

Service Providers

College and university service providers provide yet another facet in viewing and clarifying the evolving role of faculty. In general, service providers provide insight on how mandates for access are being implemented on a daily basis on college campuses with faculty and how these roles are evolving in keeping with the broader evolution of campus support services.

Service providers recommend that faculty participate in the process of determining the type and range of accommodations in the classroom (Brinckerhoff, Shaw

& McGuire, 1993; Harris, Horn & McCarthy, 1994; Heyward, 1992; Jarrow, 1993; Scheiber & Talpers, 1987; Scott, 1994; Stewart, 1989). As described by Harris, Horn, and McCarthy (1994), "ideally an accommodation results from collaborative effort among the student, faculty, and the student affairs professional designated to assist in this individualized process" (p.40). Heyward, Lawton, and Associates noted that when faculty are excluded from this decision-making process and relegated to a non-participating role in providing student access, they are likely to express their displeasure by challenging the service provider, refusing to accommodate the student, or demanding to review the documentation, resulting in a "classic example of an accommodation request gone wrong" (Provision, 1991, p.1). Service providers agree that faculty have the right to raise objections about accommodations that may compromise the integrity of a course or program. King and Jarrow (1990) made the important distinction for faculty, however, that "whether or not an accommodation is to be made is not negotiable. How an accommodation is to be made is negotiable" (p.8).

As participants in the negotiation of accommodations, faculty are also called upon to maintain academic requirements or standards. "It is the faculty member's role to ensure that the proposed accommodations do not have the effect of 'watering down' the curriculum or substantially altering standards" (Brinckerhoff, Shaw, & McGuire, 1993, p. 247). Faculty, then, must be able to distinguish content and pedagogical practices that are essential to a course or program from those requirements and practices that are nonessential and thus may be accommodated.

Another role of faculty is to participate in the development of institutional disability policies (Brown, 1994). Heyward, Lawton & Associates noted the importance of policy in establishing collaborative structures and "fostering conditions that will create a positive, productive climate for interactions between faculty members, service providers, and students" (Faculty members, 1995, p. 4). Faculty involvement in institutional policies for students with disabilities might come into play through campus grievance and academic standards committees, or include such crucial academic areas as procedures for course substitutions, reasonable accommodations for participation in an Honors Program or eligibility for the Dean's List (such as allowing for reduced course load), and so forth. Service providers also recommend that faculty participate on campus disability advisory boards or committees in order to provide input and feedback pertaining to disability issues (Brown, 1994; Michaels, 1986; Matthews, Anderson & Skolnick, 1987).

In addition to participating in the development of policy, faculty are expected to uphold and follow established institutional policies and procedures. Faculty should refer students through institutional channels, such as the "office for students with disabilities", when a request for accommodation is made (Faculty members, 1995). Faculty need to cooperate with procedures established by the "office for students with disabilities" such as reviewing, signing, and returning forms for test accommodations, note takers, and so forth, in order to facilitate communication and maintain operating procedures (Brinckerhoff, Shaw, & McGuire 1993). Service providers also recommend that faculty participate in student outreach and notification requirements through such means as announcements in class or on course syllabi that accommodation of disability-related needs is available upon request (Scheiber & Talpers, 1987).

A final and crucial role recommended by service providers is for faculty to make instructional modifications in the classroom. Numerous references in the literature provide suggested "teaching tips" for classroom adjustments such as providing new or technical vocabulary on the blackboard, giving assignments orally and in writing, and announcing reading assignments well in advance (AHEAD, 1991; Mangrum & Strichart, 1988; Vogel, 1997). Brinckerhoff, Shaw and McGuire (1993) extended this role by encouraging faculty to incorporate learning strategies instruction into their teaching to promote student independence and success. Walker (1980) articulated this role most clearly when he noted that "academic personnel within a postsecondary institution have the primary responsibility for program accessibility; only they can make the modifications in teaching procedures and methods that make full program accessibility possible" (p. 54).

Student Perspectives

Unfortunately, little information is available in the literature on the perspectives of students with disabilities pertaining to the faculty role. Limited research has shown that college students with disabilities report physical, programmatic, and attitudinal barriers to higher education (West et al., 1993; Hill, 1996). As West et al.(1993) noted, "Those (barriers) mentioned most frequently appeared to be a lack of understanding and cooperation from class instructors, professors, and other school personnel regarding accommodations and modifications that the students or the coordinator had requested" (p.462). Hill 1996; Fichten, C.S., Goodrick, G., Tagalakis, V., Amsel, R. and Libman, E. (1990) surveyed university students with disabilities in Canada and found similar student concerns. A growing number of personal accounts (Adelman & Wren, 1990; Murphy, 1992; Reiling, n.d.; Stolowitz, 1995; Wren & Segal, 1991) of individuals with learning disabilities describing experiences in higher education are emerging and do provide comment and insight on the faculty role.

Individuals with learning disabilities appear to be keenly aware of the personal attention and good will needed from faculty to attain the "qualitative aspects of accommodation" (Murphy, 1992, p.66). Such strategies as getting to know the instructor, sitting in front of the class, and participating in class discussions were routinely mentioned (Adelman & Wren, 1990; Murphy, 1992; Wren & Segal, 1991) in order to "let them (instructors) know you're interested and trying hard" (Murphy, 1992, p.66).

Another faculty role is to serve as a resource in learning. As noted in Wren and Segal (1991), quoting an individual with LD:

> "My attitude was that teachers provide guidelines for what to learn, but it was my responsibility to take home material presented in class and learn it in my unique style. I didn't expect professors to spoon-feed me, but I did need them as a resource for me to use after I had grappled with a topic" (p.14).

Though articulated in different ways, students consistently acknowledge the importance of faculty in providing the personal access to "knowledge and ways of knowing". As one student commented, "words are cheap . . . action is what counts!" (Stolowitz, 1995, p.6).

Faculty Perspectives

Faculty themselves have commented on how they perceive their role with college students with disabilities. Both anecdotal accounts and research on faculty participation are examined in the present review of the literature.

Anecdotal accounts

Anecdotal accounts in the literature provide a sense of the range and intensity of faculty responses to working with and accommodating students with disabilities especially learning disabilities. Some faculty are quite disparaging. For example, in one faculty survey a respondent commented "Why dilute a college education any more than it already has been by accepting less than capable students?" (Matthews, Anderson & Skolnick, 1987, p.50). In another survey a faculty member responded, "Making special arrangements for students is a frustrating waste of time" (Lampkin, 1995).

Yet other faculty view providing access for students with learning disabilities in a more positive light. "I have often found the students with LD to be very, very good students who have learned how to cope to the point that many refuse extra consideration" (Lampkin, 1995, p. 13). A frequent benefit noted by faculty is the opportunity for increased attention to and improvement of their teaching. One faculty member reflected that "attending to the special needs of LD students has actually been the primary source of my development as a teaching professional, and the result has been greater effectiveness as a teacher of persons of all characteristics" (Scheiber & Talpers, 1987 p. 131). At a conference of highly selective institutions of higher education, Sheridan (1990) remarked that "if the attention to dyslexic students leads to a heightened consciousness of the importance of skilful teaching, then the presence of these students on our campuses will have made a significant contribution to the improvement of higher education" (p. 19). We see then a range of viewpoints by individual faculty in response to their role in teaching students with LD.

Research on Faculty

Research pertaining to faculty participation with college students with physical and/or learning disabilities has not directly addressed the faculty role. Tangentially, however, research has focused on assessing faculty attitudes and willingness to provide requested accommodations. In general, faculty have been found to be less comfortable with students with learning disabilities and to have lower academic expectations in working with these students than with students without disabilities (Houck, Asselin, Troutman & Arrington, 1992; Leyser, 1989; Minner & Prater, 1984). Research findings also show, however, that faculty attitudes are not uniform. Significantly more positive attitudes have been found in women (Aksamit et al., 1987; Bigaj, 1995); certain academic disciplines such as education and social sciences (Bigaj, 1995; Fonosch & Schwab, 1981); and faculty with prior experience teaching individuals with LD (Morris, Leuenberger & Aksamit, 1987).

In examining faculty willingness to provide accommodations, researchers indicate that faculty are often willing to provide accommodation for students with learning disabilities but are concerned with maintaining academic integrity (Houck, Asselin, Troutman, & Arrington, 1992; Matthews, Anderson, & Skolnick, 1987; Nelson, Dodd, & Smith, 1990; Nelson, Smith, & Dodd, 1991). As Matthews et al. (1987) noted, "faculty "would accommodate to a point, but not to the extent of lowering certain course standards involving instruction, assignments, exams, and academic policy" (p. 49). The authors do not clarify how faculty draw these definitive lines of standards that will and will not be accommodated.

The preceding influences service providers, students with learning disabilities, and faculty themselves are helping to clarify and define the role of faculty in providing access for college students with disabilities. Our understanding of this role is evolving over time as service providers, students, and faculty shape future directions. Are current education practices preparing faculty to meet these evolving roles and expectations?

Current Practice in Faculty Education

Jarrow noted that there are only three things that faculty need to know in working with students with disabilities: "(1) that they must accommodate; (2) that they are capable of developing appropriate accommodations; and (3) that the Handicapped Student Services Office will help faculty as much as possible" (Stewart, 1989, p. 33).

These points perhaps represent faculty education in its most basic form. A number of models and "best practices" proposed in the literature, however, provide much greater detail in both structure and content of ongoing faculty education efforts.

Recommended Structures

In order to develop faculty understanding of college students with disabilities, Lundeberg and Svien (1988) suggested that campus service providers follow a series of steps. They suggested: assessing faculty needs and concerns; designing the faculty inservice to address these needs; and evaluating the outcomes of the training.

Many service providers in the literature reiterate this general approach to structuring and developing training and provide further detail on the varying forms of faculty training that may be effective. Tomlan, Farrell and Geis (1989) proposed five phases in faculty development: a faculty survey; in-service training for the entire faculty; small group presentations with departments, divisions, or committees; one-to-one meetings with faculty, and a post-measure to assess changes in attitude and awareness.

Tomlan et al. (1989) explained "the phases give support to faculty and staff as each professional struggles to make general information applicable to daily practice" (p. 24).

With only slight variation, the literature on faculty education concurs that it is most effective to view faculty education as a developmental process over time requiring multiple and varied forms of outreach (Geis, Morris, & Leuenberger, 1989; Lundeberg & Svien, 1988; Morris, Leuenberger, & Aksamit, 1987; Rose, 1993; Stewart, 1989). The purpose of faculty education is predominantly described as targeting increased knowledge about and improved attitudes toward students with disabilities. This focus is directly reflected in pre-test faculty surveys (Rose, 1993; Morris, Leuenberger & Aksamit, 1987; Tomlan, Farrell & Geis 1989; Geis, Morris & Leuenberger, 1989; Thompson, Bethea & Turner, 1997). Questions typically target knowledge of such areas as pertinent legislation, characteristics of physical and/or learning disabilities, or campus services. Questions focusing on attitudinal issues include such topics as comfort level with students with disabilities or perceived potential for student success.

A frequently recommended strategy for education is large group faculty in-services. These sessions, targeting all faculty, have been described as the most efficient means of presenting general awareness information (Stewart, 1989). Their purpose is typically to provide basic information about disabilities and services and to answer general questions (Anderson & McGuire, 1993; Aune & Ness, 1991; DuChossois, 1993; Geis, Morris & Leuenberger, 1988; Lundeberg & Svien, 1989; Tomlan, Farrell & Geis, 1989).

Many service providers note that it is important to maintain education efforts with small groups of faculty as well in order to provide more in-depth information on a topic. Some recommend this as a follow-up strategy after large group in-service training (Tomlan, Farrell & Geis, 1989). Others recommend small groups as an appropriate starting point in engendering the support of small groups of individuals who then work with faculty peers in their own departments (AHEAD, 1991; Stewart, 1989).

A general strategy recommended in the literature is to provide individualized support to faculty in such areas as understanding an individual student's learning style, possible strategies for adapting course content and requirements, and suggestions for effective teaching methods (Morris, Leuenberger & Aksamit, 1987; Rose, 1993; Stewart, 1989; Tomlan, Farrell & Geis, 1989). The goal of such support is typically described as assisting faculty in responding to individual students.

A post-measure of changes in faculty attitudes and knowledge is frequently recommended to follow faculty education. Such measures typically mirror the pre-training measures described previously. In a study comparing faculty pre-post measures Morris, Leuenberger and Aksamit (1987) found that faculty education and interaction over two semesters consisting of small group presentations and discussions, phone consultations, and printed materials correlated with positive changes in faculty attitudes and knowledge. Specifically, they noted that: in-service training increased faculty knowledge; and that without in-service training, faculty attitudes became significantly less positive.

Content of Training

Faculty education literature also contains recommendations for the content of training, predominantly focusing on the components of large group faculty in-services. Once again recommendations in the field are remarkably consistent. Most authors recommend providing information on disabilities including such areas as definitions, characteristics, and simulation exercises approximating the experience of having different kinds of disabilities. Experts also consistently recommend including information on the legal requirements of Section 504 and the ADA in the U.S.A.(similar recommendations are made by service providers in the Canadian context based upon provincial legislation). And lastly, it is recommended that faculty in-service training provides information on institutional responsibilities and resources in meeting the needs of students with disabilities (Anderson & McGuire, 1993; Aune & Ness, 1991; Du Chossois, 1993; Lundeberg & Svien, 1988; Stewart, 1989). Other suggestions for in-service content include: providing a student and faculty panel to present specific concerns and suggestions (Lundeberg & Svien, 1988); emphasizing student self-advocacy (Aune & Ness, 1991); and suggesting classroom modifications and general instructional strategies (Anderson & McGuire, 1993; Du Chossois 1993, Stewart, 1989).

A few references described more in-depth approaches to faculty education in the areas of adapting course instruction and evaluation. (See for example, Aune & Ness, 1991; Tomlan, Farrell & Geis 1989). These projects represent efforts to support faculty in adapting educational strategies. Pockets of such activities may well be occurring in the field. However, these more intensive strategies and suggestions do not appear to have been broadly incorporated into recommended practices in faculty training.

Recommended Practices in Faculty Training Discussion: Discrepancies Between Faculty Roles and Models of Training

The numerous sources examined previously are contributing to our evolving definition and understanding of ways faculty contribute to student access on a daily basis. Typical activities and expectations reflect an evolving faculty role that well exceeds merely allowing accommodations in the classroom. Current models of faculty education appear to be addressing many of the information needs of faculty.

Yet other aspects of the roles faculty are being asked to fulfill are not being identified in the faculty education literature. An area of faculty education warranting review is the promotion of positive faculty attitudes toward disabilities. Research indicates that increased knowledge about disabilities of all types enhances faculty attitudes toward students with disabilities (Morris, Leuenberger & Aksamit, 1987). Bigaj (1995) found a positive relationship between faculty's willingness to use and self-reported use of accommodation strategies. And yet, student reports indicate continued dissatisfaction with faculty accommodation. It may be that in efforts to address important attitudinal barriers, faculty education efforts have ignored the many other systemic influences that affect faculty behaviour and interactions with students in general. Future faculty education efforts should look more broadly at institutional and professional reinforcers for faculty and what motivates faculty to teach any student well.

In the area of instruction, faculty are receiving general strategies and individual support. Simple "teaching tips" are designed to be minimally imposing on faculty time yet enhance learning opportunities for students with disabilities. Through over-simplification, however, such "tips" may be placing premature closure on discussions of instructional modifications. For example, the rapidly expanding use of technology in instruction may prove a primary forum for discussion as faculty develop new pedagogical strategies for all students. Faculty must be supported and encouraged to pursue appropriate and creative instructional strategies within their disciplines that more closely provide equal learning opportunities catered to specific fields of study.

In light of faculty roles, other areas of current educational practice also warrant review. The most frequently recommended practice for promoting faculty education is through the provision of a large group presentation. Yet service providers frequently bemoan poor faculty turnout, the need for mandatory attendance requirements, or the "preaching to the choir" phenomenon of having only the most willing and agreeable faculty in attendance. Researchers have indeed noted that when asked, faculty state that they prefer to receive information in means other than this large workshop format (Bagget, 1994; McCarthy & Campbell, 1993).

Recommendations

The field of disability support services is in its third decade and has undergone extensive growth. Over time, the field's understanding of campus access for students with disabilities has broadened, evolving from originally being viewed as the sole responsibility of the Services for Disabilities support office and maturing to being viewed as a comprehensive responsibility across the full range of institutional departments and staff. During this time, models of faculty education have emerged and provide an important foundation for faculty training efforts. In addition to these practices, however, the field of disabilities support services needs to expand its faculty education efforts to keep pace with the evolving role of college faculty in participating in and providing access for college students with disabilities. Based on this evolving role, the following guiding questions are framed to suggest a broader conceptualization of future directions in faculty education. Questions are posed at an individual, institutional, and disciplinary level and have influenced the statement of the problem, as outlined in Chapter I.

I - Individual faculty level

How should faculty be taught and supported in applying non-discriminatory decision-making?

Extensive discussion of these thought processes is provided elsewhere (Scott, 1990; Scott 1997). It is important that faculty are provided training and on-going opportunity to discuss the implications of these thought processes for specific courses, programs of study, and institutional standards and requirements.

What other formats of information delivery and support need to be provided for faculty to meet different needs over time and address differing faculty career phases?

Faculty typically have heavy constraints on their time. As Bess (1997) noted, "Most faculty in American higher education suffer from role strain and role overload" (p. x). It is important that training about disability and the new computer-based technologies be made available in formats that are easily accessible to faculty and at times convenient to a range of faculty schedules. Faculty also tend to be most responsive to initial disabilities training when they are faced with the imminent need of accommodating a student currently in one of their classes. Future directions in faculty education should further explore training over internet, e-mail, or CD-ROM that can be provided in various self-paced formats.

Faculty typically progress through a series of career phases. Walker and Symons (1997) noted that in order to develop a sense of self-efficacy in college teaching, it is important to provide training for instructors early in their careers. This finding for general development of teaching competence and confidence in college faculty may suggest useful strategies in disability training. Targeted training for teaching assistants and new faculty may provide a fruitful focus for long-term development in the field. In addition, tenured full professors are developmentally at a stage that is potentially more relaxed. Some individuals at this stage choose to focus more on instruction. Individualized training and reward structures would perhaps be particularly beneficial with this group as well.

II - Institutional level:

What institutional reinforcers influence faculty and how should the field tap into these factors to encourage faculty to address the needs of students with disabilities? Menges (1997) noted that

> faculty development too often makes faculty the objects of activities conducted by others, so that faculty themselves are limited to roles of trainee, recipient, and client. Attention to motivation helps to focus on the faculty perspective, that is, on how faculty experience the stresses, satisfactions, and efficiencies of work life (p. 410).

The field of postsecondary disabilities would certainly benefit from examining the role of institutional reinforcers in faculty education. Perhaps a key to changing behaviours is to provide a pay off for working in unique ways with students with disabilities. Faculty education literature (pertaining to all students) discusses the importance of addressing both extrinsic and intrinsic faculty motivators.

College faculty are typically responsible for activities in the areas of research, teaching, and service. Though emphasis varies by institution, external reward structures most often emphasize research in faculty promotion (Finkelstein, 1984). There is increasing discussion and a reported shift in priorities taking place at many institutions, however, with greater emphasis being placed on college teaching (Glassick, Huber & Maeroff, 1997; Magner, 1998). Disability service providers need to be aware of institutional reward structures for faculty on their individual campuses and seek out or create collaborative opportunities in which faculty gain exposure to disabilities of all types physical and learning, etc. issues in an arena other than the negligibly rewarded area of "service". For example, collaboration could occur in seeking institutional instruction or research incentive moneys; technology or distance learning funds might provide an opportunity to pool expertise; LD services might seek external funds to do research or enhance collaborative teaching with faculty.

Intrinsic motivators reported by faculty include tasks that: fulfill a need for achievement and responsibility; provide the opportunity to participate in decision-making; and grapple with open-ended problem solving and complexity (McKeachie, 1994). Such intrinsic factors should be considered in designing collaborative projects with faculty. By recognizing faculty incentives and interests, process becomes the focus of faculty education rather than specific content.

III - Disciplinary level:

How might faculty within a specific discipline be encouraged to investigate the topic of teaching students with disabilities?

Discussions about the ramifications of disabilities should be receiving attention in every field in order to clarify and define essential requirements, reasonable accommodations, implications for professional licensing certification, employment, and so forth. How can the field of disability support services support, encourage, and participate in such discussions and activities? Certainly, the collaborative scholarship mentioned previously presents an opportunity for disability service providers and faculty to work together. At the core of such collaboration, however, is a need for shared professional respect between faculty and disability service providers. Beyer (1997) described faculty and administrators as having different value systems. Faculty reported valuing scholarship, while administrators frequently valued accountability and efficiency. In addition to administrative values, many disability service providers also value advocacy. Though the values of faculty and disability service providers are not mutually exclusive, it may be beneficial for disability service providers to be aware of and deliberately cross value systems. For example, in my experience faculty are typically not opposed to advocates, but they are opposed to advocates with old data, research, and ideas the antithesis of scholarship. Certainly the growing professionalism of the field of disability support services will help to facilitate collaboration with academic disciplines.

This growth is perhaps best exemplified by the activities during the 1990s of the Association on Higher Education and Disability (AHEAD) in establishing professional standards and a code of ethics for disability service providers. Also encouraging are recommendations for services to incorporate a data based approach to service and its evaluation (Brinckerhoff, Shaw & McGuire, 1993).

Upon reviewing the evolving role of faculty and the current literature describing approaches to faculty education, it becomes apparent that if we do not re-examine our assumptions and broaden our questions pertaining to faculty development we have the potential to endlessly recreate the wheel in faculty education approaches pertaining to students with disabilities. In Mowday and Nam (1997) Bok commented "the most important question facing American universities today is whether to transform themselves from institutions in which individual professors teach classes into communities joined in a common effort to find better ways to help students learn" (Mowday & Nam, 1997, p.122).

Beyond providing faculty with information on legal compliance and updates, Bok provides an exemplary future focus for faculty education efforts in the area of disabilities. Aspiring to a common effort to help students learn raises and updates the benchmark for what constitutes access to knowledge and ways of knowing for college students with disabilities.

The educational enterprise at the post-secondary level provides us abundant examples of environments where access to facilities must be ensured for students with physical and/or learning disabilities and where access to instructional materials, media, and educational technologies must be ensured for students with sensory impairments and learning disabilities. As these next-generation information systems come on line and are integrated into our societies, they can either be a potential new tool and equalizer for people with disabilities or they can be a major new barrier people with disabilities will face to their ability to learn and get things done. It is very important that we develop practical access strategies and incorporate these access strategies into the information systems from the beginning. The cost (Berkowitz & Greene, 1989; Chirikos, 1989; Czajka, 1984; LaPlante, 1988) of not having the access strategies is too great and the cost to do it later will be much greater and more disruptive than if done in the initial implementation.

An interesting analogy often used by writers when writing on the topic of universal design is that of the curbcuts or curb ramps built in sidewalks to allow access by individuals in wheelchairs. It costs no more to pour a curbcut when the curb is originally poured than it does to pour the traditional curb. If, however, we first pour all the sidewalks and curbs, and then come back later with a jackhammer to try to add curbcuts, it is a very expensive process. Another interesting fact is that for every individual who uses the curbcuts for wheelchair access, there are perhaps 10 to 100 individuals who use the curbcuts for bicycles, and skateboards. Thus, the accommodation which was put in for individuals with disabilities has proved to be widely useful to other people as well.

The Trace Center (www.trace.wisc.edu) has found a similar phenomenon with the introduction of access features in computers. Special features such as MouseKeys (Vanderheiden, 1994) that have been built into the computer to allow access by individuals with motor impairments have also been used by graphic artists, computer-aided designers, and a wide variety of other individuals to facilitate their work. The Trace Center has also found the same thing in information systems (Rose & Meyer, 2002). Information systems that are easily usable by individuals who cannot see, for example, will also be easily accessible to individuals who may want to access them while they are driving their car and cannot take their eyes off the road to watch the information system screen.

The key to providing access to next-generation information systems appears to be use of a structure which allows flexibility and user specification of both interface (control) and display formats (Newell & Cairns, 1987; Norman & Draper, 1986). It can with little difficulty be shown that inflexible interfaces which are designed to be accessible to individuals with one type of disability can be completely inaccessible to individuals with another type of disability. In fact, there is no single interface technique or strategy which is good for all individuals with disabilities. Similarly, interfaces which are usable or efficient for individuals with particular disabilities may be inefficient or not very friendly to an individual with full sensory and motor capabilities. Accessibility therefore does not appear to be addressable with any particular interface strategy, but rather through the development of a suite of compatible and consistent alternative interface strategies and an underlying structure which allows the user to choose a combination of control and display strategies for the information.

These developments and manufacturing trends have sparked increased discussion within the human factors community. There is little question that human factors research and principles can be a benefit to those who are designing special devices for persons with functional limitations. However, the open question is, "Should the mainstream design of products include consideration of people who have disabilities or are elderly?" (In other words, should mass market products be made more accessible via their initial design?) Yet this is likely to represent a major change in scope for the human factors field. The specific role of human factors with regard to design for disability/aging is yet to be determined. Such a change must also be well considered in terms of effects on personnel, curricula and economic perspectives. It is useful to break this complex question into the following component questions (Berkowitz & Greene, 1989; Chirikos, 1989; Czajka, 1984; LaPlante, 1988):

- Who is included in the category of "disabled and elderly persons"?
- How large is the disabled and elderly population?
- Can't the needs of disabled or elderly persons be handled separately or as exceptions?
- What can the human factors field do for this group?
- Is it economically and practically feasible to include disabled and elderly persons in the design process for mass market products?

- What are the "benefits" of incorporating disability and aging considerations into mainstream human factors activities?
- What are the "costs"?

One such approach is the Wisconsin Seamless Human Interface Protocol (Vanderheiden, 1994). This protocol is designed to provide a blueprint for designing interfaces which would allow for a consistent and very adaptable behaviour across a wide variety of information appliances. Each interface using the protocol would share a common set of underlying behaviours yet could have very individual human interfaces and physical as well as graphic design. Preliminary work has given its designers cause for cautious optimism that such a flexible, multi-modal interface can be developed which will provide accessibility for individuals with a wide variety of disabilities, while at the same time allowing designers to create unique, highly customized, and powerful interfaces for their information systems. At the same time, it is showing how complicated the process of developing a set of conventions for this protocol can be, and how difficult it can be to reconcile them with specific individual characteristics and behaviours of existing interface protocols. Work is continuing, and they hope to have several prototype/evaluation interfaces constructed over the next few years to evaluate the protocol.

Conclusion

Incorporating disability considerations in our research and teaching within the field of educational technology will require substantial effort both as individuals and as a field. Before we can effectively incorporate disability and aging issues into our curriculum we will need to better define and refine this area during the next few years. The basic principles involved in accessible design need to be explored and defined further. More specific data regarding the different areas of impairment as they relate to design need to be gathered, condensed and made available to researchers and designers. Some design guidelines exist (Lifchez & Winslow, 1979; Sorenson, 1979; Newell, 1987; Newell & Cairns, 1987; Calkins, 1988; Vanderheiden, 1988; Enders & Hall, 1990; Mueller, 1990) but much more work is needed in the delineation and documentation of the basic principles of accessible design.

It seems apparent, however, from the demographics and trends in our population, that an increasing number of the professionals and educational programs in educational technology and human factors design for disability and aging must merge into the normal design process. Aside from the significant benefits to society, these efforts should also make our field more exciting and relevant and lead it into new directions and to new insights.

CHAPTER III

METHODS AND PROCEDURES

This chapter discusses the methods and procedures used in the present study. A detailed description of the two methodological techniques employed in the present study is presented -- that is, the survey and semi-structured interviews with the Concordia University faculty. I discuss the sample and procedures for collecting data. I also provide specifics regarding data analysis procedures. The chapter concludes with a brief discussion of content validity.

Research Design

The role of the faculty is vital to providing educational experiences and programs that ensure equal opportunity for all students. The purpose of in-service training in this regard is to provide direction for positive interaction between faculty and students. Jastram (1979); Morris, Leuenberger and Aksamit (1987); Mangrum and Strichart (1988); Fichten, Goodrick, Tagalakis, Amsel, and Libman, (1990) found a significant positive relationship between in-service training and faculty attitudes toward and knowledge about students with disabilities. These studies and others, described earlier in Chapter II of this dissertation, provide substantial support for the importance of in-service training in increasing knowledge and improving attitudes of faculty toward students with special needs.

A number of factors enter into the design, implementation, and evaluation of a quality staff development course for faculty. Quality staff development results in an immediate and/or delayed discernible impact on practice, attitudes, and beliefs. Such impact is the result of ongoing support toward growth and change over time. A 1-hour lecture to a large faculty group is often of little value to individual faculty members or to students.

Recognizing the effectiveness of developing in-service training models which encompass training over internet, listservs, e-mail, or CD-ROM when provided in various self-paced formats, I proposed a three stage model for carrying out the needs analysis and faculty in-service training in chapter I. Phase one of the model involved the distribution, collection, and evaluation of faculty surveys that addressed attitudes, knowledge of various handicapping conditions, and accommodation. The findings from Phase 1 form the basis of my current study.

Phase 1

Methodology

For the first phase of the three stage model, I employed a mixed methods approach -- that is, a survey and semi-structured interviews with the Concordia University faculty.

Quantitative Survey

Quantitative Sample

The sample for this exploratory study consisted of 344 full-time and part-time Concordia University faculty members -- teaching in the faculties of: Arts & Science, Fine Arts, The John Molson School of Business (JMSB), and Engineering & Computer Science -- identified as having students with disabilities enrolled in their courses during the 2003-2004 academic year. These 344 Concordia University faculty were sent a letter -- in both hardcopy and e-mail formats -- to familiarize them with the objective of the project and to solicit their participation in the study (see Appendix A). As the reader will see in greater detail on the following pages, altogether one hundred and eighteen faculty members completed the questionnaire representing a participation rate of 34.3%; thirty of the one hundred and eighteen faculty members later participated in the follow-up semi-structured interviews.

The Survey Data Gathering Procedure

A 43 question survey was sent out (see Appendix A), to demonstrate the interest in, and the need for, online instructional technologies for delivery of professional development opportunities to educators of students with disabilities at the post-secondary level. It should be noted here that the following sources were used as guides in the preparation of the faculty survey used in the present study:

- two studies by The Fichten Research Adaptech Team designed to evaluate the use, or the utility of computer or information technologies in the postsecondary education of students with disabilities (Fichten, Asuncion, Barile, Fossey & DeSimone, 2000; Fichten et al, 2001b)

- my preliminary pilot study in which data about faculty experiences working with students with disabilities and with technology integration were gathered (Bissonnette, Schmid, & McWhaw, 2002)
- the following seven surveys developed by the Center for Instructional Technology Accessibility (CITA), University of Illinois at Urbana/Champaign, http://cita.rehab.uiuc.edu/
    1) Web Accessibility Course Evaluation (2002- 2003)
    2) Web Developers on Web Accessibility Issues and Resources (2002-2003)
    3) Evaluation of Web Accessibility Workshop (2002- 2003)
    4) Use of Microsoft Office to Create Web Resources Survey (September 2002)
    5) Higher Educational Institutions in the State of Illinois (January 2002)
    6) ADA Designing Accessible Online Instructional Materials Workshops (February 2001)
    7) UIUC Brown Bag Lunch to Web Masters Survey Result (December 2000)
- a survey conducted as part of the "Skills for Access Project", conducted by the Learning Media Unit, University of Sheffield, designed to develop a web-based resource that will provide guidance to e-learning and teaching staff on how to create accessible multimedia for learning and teaching, http://www.shef.ac.uk/sfa.

The first mailing of surveys occurred during the first week of September 2003 and went to those professors teaching "fall only courses" and those teaching "full year" (fall and winter long) courses. The same mailing procedure was followed in January of 2004 for those faculty teaching "winter only" courses. I hand-delivered surveys to faculty mailboxes to ensure accuracy during the delivery process. I also e-mailed surveys to the same target group of faculty respondents. A cover letter accompanied each Faculty Survey, outlining the importance of the study, procedures related to confidentiality of responses, and procedures for returning the survey (see Appendix A for a copy of the cover letter and corresponding Faculty Survey). Faculty were encouraged to complete the survey within fourteen working days from the date received and were provided a self-addressed internal university mail envelope for mailing the completed survey directly to me. Those who chose to return surveys via e-mail were given my e-mail address for their convenience. Potential faculty participants were also given a third option -- that is, the option to complete the survey via phone interview.

A second mailing to nonrespondents was conducted during the last week of September 2003 and was mailed out to those professors teaching "fall only courses" and those teaching "full year" (fall and winter long) courses. The second mailing to nonrespondents teaching "winter only" courses was conducted during the last week of January of 2004. Accompanying each survey was another cover letter, reminding potential respondents of the importance of the study (see Appendix B). Those who were sent a second survey were also reminded to disregard this mailing if they had already returned a survey. It is important to note that out of the 344 faculty members asked to participate in the study 118 completed surveys. Twenty-four (24) returned surveys through the Concordia University internal mail service; ninety-four (94) arranged to complete the survey via a phone interview.

Survey Data Analysis

Categorical information collected from the qualitative survey was used to analyze respondent attitudes and knowledge for teaching students with disabilities. The qualitative information from the survey questions can be classified as discrete nominal or ordinal data. Question options from the survey were coded as dummy variables to facilitate analysis. Survey data were analyzed using the SPSS Version 12.0.1 for Windows package, a general-purpose statistical package oriented towards the needs of social scientists (Agresti, 1990).

Bar graphs are provided in the document to quickly illustrate the categorical breakdowns for many questions, while the text describes the more detailed information found in frequency tables of Appendix D. Crosstabulations were used extensively in the analysis of this survey; many possible relationships between practices, attitudes and behaviours regarding students with disabilities were tested, measures of association were calculated and significance tests for two-way tables (or two-dimensional arrays) were generated. Three-way tables were also generated in which categories of the row and column variables are further subdivided to test the effects of two types of control variables: gender and/or teaching status (full-time or part-time), (SPSS®Base 12.0 User's Guide, 2003).

When three-way cross tabulations were found to be significant, adjusted residuals were calculated in order to isolate which cells of the contingency tables had observed frequencies that showed a large enough departure from expected frequencies to make it unlikely that they were random. Adjusted residuals can be interpreted like z-scores, where the threshold is the absolute value of 2. Adjusted residuals are not useful for 2 x 2 tables, however, as all 2 x 2 adjusted residuals in a table have the same absolute value that is equal to the square root of the chi-square statistic.

Interpreting the Statistics

In all tests, a 5% level of significance has been used as the cut-off point. Pearson's chi-square measure was used extensively according to measurements performed within SPSS that calculated the differences between observed data arranged in K classes and theoretically expected frequencies of K classes (Kanji, 1993)

The directional measure Goodman and Kruskal's tau was used to judge the strength of the relationships throughout the analysis of cross tabulations. The strength of relationships was measured using J.P. Guilford's scale originally created for correlations (Guilford, 1956), reproduced in Table 4.

Table 4 - Relationships Score Interpretation

Relationship Score	**Interpretation**
<(less than) .20,	slight or negligible relation;
.2 to .4 --	low, definite but small relationships;
.4 to .7 --	moderate, substantial relationship;
.7 to .9 --	high; marked relationship;
.9 to 1.00 --	very high; very dependable relationship

This scale system for significant relationships indicates that when the Goodman and Kruskal statistics is smaller than .20, the relationship is only slight or almost non-existent. On the other hand, if the Goodman and Kruskal statistic is .9 to 1.00, there is a very strong and dependable relationship. Most significant relationship in this study ranged from slight to moderate in strength.

While major findings for each crosstabulation test are discussed in chapter IV of the document and a summary table appears in Chapter V, the actual significant crosstabulation results are grouped in Appendix E (non-significant crosstabulation results are not included). A separate Appendix F is devoted to the findings regarding current technology practices by males/females and teaching status full-/part-time.

Since one of the long term goals of this dissertation research is to work toward the development of a high-quality interactive training resource for creating accessible multimedia for e-learning materials to meet the special needs of faculty teaching students with disabilities in their courses, faculty were asked three important general questions in the 43 question survey, refer to Table 1 – General questions 40, 41 and 43 from questionnaire (page 28).

As part of the triangulated methodological approach in this study, I complemented the quantitative survey with one-on-one follow-up interviews. This was done in order to learn more about situations professors encounter when making course materials available through computer-based technologies, specifically with regards to key frustrations, lessons learned, and best practices. Common questions in both the survey instrument and interviews assisted me in distinguishing attitudes and behaviors which were similar for both samples of the survey population. This design yielded compelling information about faculty use, expertise, and expectations of technology within a university community.

The Interview Procedure

The type of sampling that was used in the interview phase of this study was purposive, or theoretical, as opposed to conventional. According to Lincoln and Guba (1985),

> in purposeful sampling the size of the sample is determined by informational considerations. If the purpose is to maximize information, then sampling is terminated when no new information is forthcoming from newly sampled units; thus redundancy is the primary criterion (p.202).

A total of thirty faculty participants across the four Concordia faculties provided information to the point of redundancy.

One-on-one follow-up interviews with professors were used to learn more about the techniques used for making course materials available through computer-based technologies that is, key frustrations, lessons learned and best practices. Vignettes will be presented in Chapter IV "Results" and Chapter V "Discussion" of this Dissertation to demonstrate the divergent/convergent perspectives among faculty.

The Interview Data Gathering Procedure

In order to obtain the required information, a semi-structured interview schedule (see Appendix C) was developed for follow-up interviews with faculty. The thirty faculty informants, who participated in the follow-up interview phase of the study, were drawn from the 118 returned questionnaires if they indicated that they would agree to be interviewed. A tape recorder was used to tape those interviews for which permission to tape was obtained. The individually scheduled interviews lasted a maximum of one hour in which faculty were asked to share their thoughts/perspectives on the techniques used for making course materials available through computer-based technologies that is, key frustrations, lessons learned and best practices. The interviews were prepared to simulate a normal everyday situation in which the informants were faced with problems pertinent to the present study and asked to express their reactions to them. Each of the sections of the interview guide included an introduction and a series of questions designed to probe further into these general areas. The introduction set the theme for subsequent questions and conversation. I formulated a few key questions in order to project the informants back into the milieu of interest. It was my hope that these conversational interviews elicited the same kinds of responses that would have been generated if a teaching colleague for example, raised the same issues at this level of generality. In other words, it was hoped that these interviews picked up the informants' spontaneous and public responses concerning the faculty thoughts/perspectives on the techniques used for making course materials available through computer-based technologies (Goode & Hatt, 1952).

Those professors teaching "fall only courses", who agreed to participate in the follow-up interviews, were interviewed in December and January of 2004. Those teaching "full year" (fall and winter long) courses and those faculty teaching "winter only" courses, who agreed to participate in the follow-up interviews, were interviewed in April, May and June of 2004. I transcribed the taped interviews during the spring and summer of 2004.

In the following two chapters, then, I shall present the findings and conclusions of this study. Phase two involved an inservice mechanism for providing faculty with a package of information on disabilities. The Director of Advocacy and Support Services hired two consultants to prepare a comprehensive package of information for the following Units within Advocacy and Support Services: Office for Students with Disabilities, The International Students Office, The Centre for Native Education, and Inter-Faith Chaplaincy. This package of materials on disability information was made available both in hardcopy and web-based formats to present specific concerns and suggestions emphasizing student self-advocacy by providing classroom modifications and general instructional strategies. Phase three was even more personal as it addressed each faculty member as they encountered individual students in the classroom. In this phase of the study I examined and evaluated the use of online instructional technologies such as internet and e-mail for the delivery of additional materials to support the information contained in the Advocacy/Office for Students with Disabilities Package. Once the interviews were completed, the data were consolidated and interpreted, conclusions drawn, and recommendations made.

Content Validity

The model's content validity was established by reviewing the literature (previously described in detail in Chapter II of this dissertation), drawing upon my past experience both in the field of disability-related research and as a service provider in the university environment providing services to students with disabilities, through discussions with faculty who had interest in and/or experience teaching students with disabilities at the post-secondary level and through a pilot study, described earlier in detail in Chapter II of this dissertation (Bissonnette, Schmid, & McWhaw, 2002).]

CHAPTER IV

RESULTS

The results of this study are presented in this chapter. In Section I the quantitative data gathered from the faculty respondents are summarized. More specifically, major findings for Frequency Tables 12 to 117 (Appendix D) along with significant crosstabulation results (Appendix E) are discussed in this chapter. An additional summary table of the significant results appears in Chapter V. A separate Appendix F is devoted to findings regarding current technology practices by males/females and teaching status full-/part-time. In Section II interview data from the semi-structured interviews are summarized (see Appendix C). Where relevant, the interview data are followed by additional comments from the informants.

The Faculty Survey Results

In the fall of 2003 and winter of 2004, I sent out a total of 344 questionnaires to faculty who had at least one student with a disability registered in their courses for the 2003-2004 academic year. The 43 question survey examined faculty's experience with students with disabilities and the types of training they have received in supporting these students. The questionnaire was developed on the basis of discussions with faculty who had interest in and/or experience teaching students with disabilities at the post-secondary level and of a pilot study, described earlier in Chapter II of this dissertation (Bissonnette, Schmid & McWhaw, 2002). 118 faculty members completed the questionnaire representing a participation rate of 34.3%. It is certainly doubtful, especially with reference to the selection of participants and the return rate (possible non-response bias), whether this survey yielded information that pertains to all professors in general (Fink & Kosecoff, 1985; Gable & Wolf, 1993; Spector, 1992). The survey, however, did not so much aim at obtaining representative results as at exploring for the first time the opinions of those concerned and thus isolating indications of problems and, if possible, proposals and ideas for solving these problems. I do, however, wish to point out that due to the given small absolute number of questionnaires returned and the relatively low strength of the highly significant relationships, results concerning sub-groups of the survey population may at best be interpreted as indications of general tendencies. (While it may be that having 118 out of 344 faculty members return the survey, representing a participation rate of 34.3%, is considered good by research standards, I was hoping for a higher response rate. I felt that sending out a survey to faculty who had at least one student with a disability registered in their courses for the 2003-2004 academic year would have encouraged them to share their experiences and/or for those having students in their courses for the first time, encourage faculty to ask for help and identify their concerns).

Description of the Concordia University Survey Participants

The range in the years teaching at Concordia for those surveyed was from one to thirty eight years, 68.7% of respondents taught between one and sixteen years, and the mean (average) number of years teaching was 12.69.

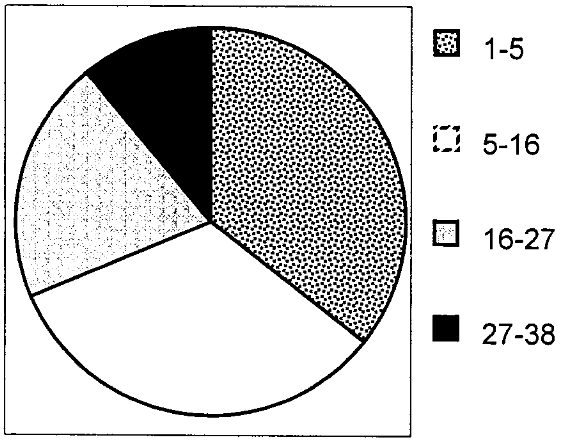

Figure 1 - Breakdown – Years Taught at Concordia

At Concordia, it is not necessary to have part-time teaching status before acquiring full-time teaching status. Therefore, the number of teaching years at Concordia does not necessarily predict teaching status, and it was found that several respondents with less than 5 years experience were full-time, while several professors with more than 16 years experience were part-time.

It is believed that this is, at least in part, responsible for the fact that any trials done using number of years or even year intervals of teaching experience against categories failed to produce meaningful or significant results. Consequently, the analysis proceeded along the lines of testing the effects of teaching status and gender directly and/or as control variables.

In the survey sample, there were 59 respondents with full time teaching status versus 43 respondents with part-time teaching status. There were also 16 respondents who were neither and trends for the variety of their faculty titles are not treated in this analysis. Altogether, 73 males and 45 females took part in the survey, 43 males were full-time and 23 males were part-time, whereas 16 females were full-time and 20 females were part-time. Therefore, males comprised 72.9% of the full-time faculty surveyed, and 53.5% of the part-time faculty. It may be expected, then, that many full-time faculty trends would be strongly influenced by trends of the male population, whereas part-time faculty scores would more equally reflect tendencies from both male and female populations.

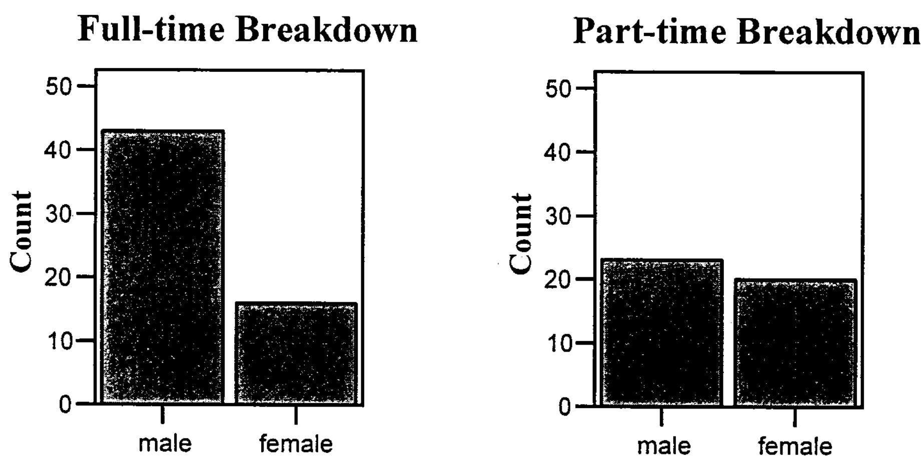

Figure 2 – Breakdown of survey respondents

Prior Experience with students with disabilities (Full time and Part time)

Of the 118 faculty members who responded, 55 (46.6%) reported that this was the first time they had a student with a disability in their course. The remaining 63 (53.4%) had already had at least one student with a disability in a previous course. 35 (29.7%) had experience with five or more students who had disabilities over the course of their careers at Concordia.

Comparing prior experiences of full-time and part-time professors, results show that close to almost three times the proportion of full-time faculty had 5 or more past experiences with students with disabilities (23 full-time or 39.0%, 6 part-time or 13.9%), whereas close to double the proportion of part-time professors had no prior experience with students with disabilities (27 part-time or 62.8%, 21 full-time or 35.6%).

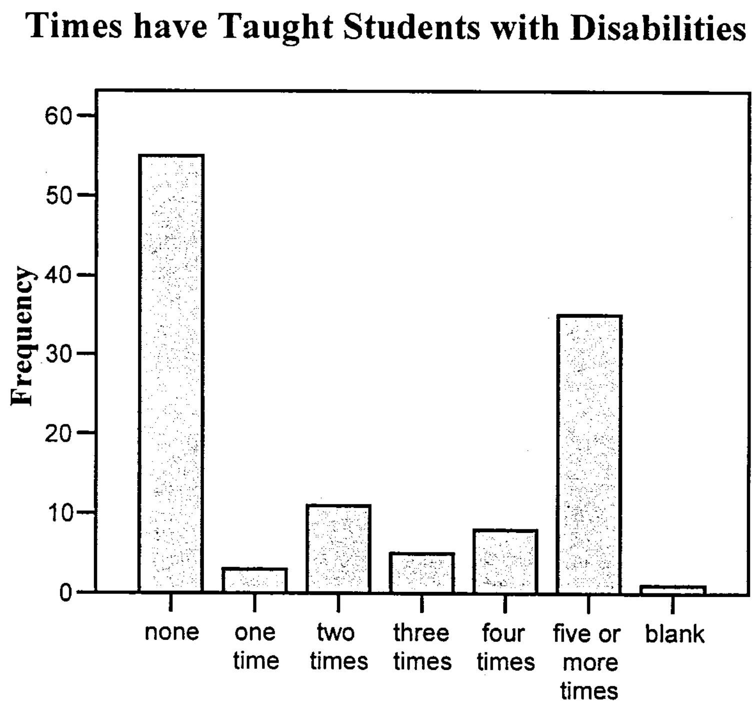

Figure 3 - Times have taught students with Disabilities

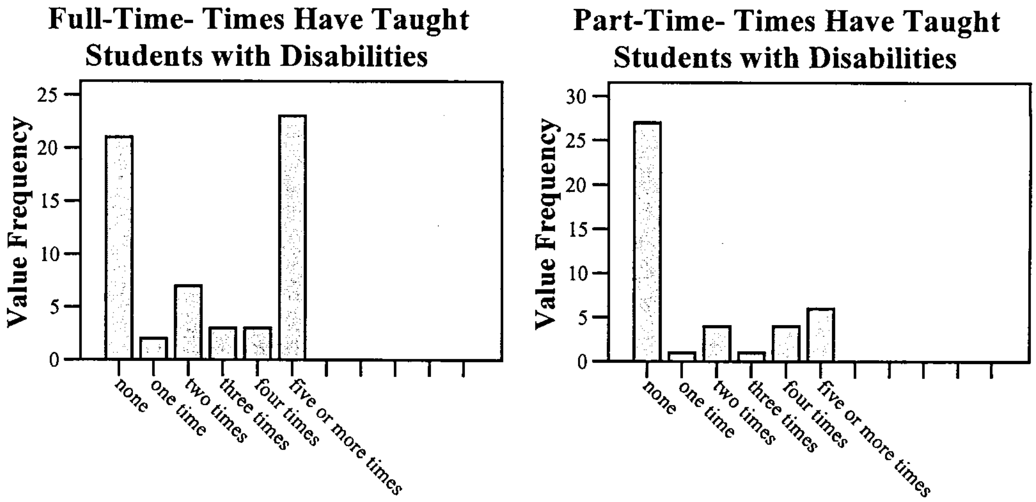

Figure 4 – Breakdown times have taught students with disabilities (full & part time)

Accessibility training for creating accessible e-learning materials for students with disabilities

When questioned about previous accessibility training, a very large number of the survey respondents, 84 professors (71.2%), did not respond at all. The remaining 34 respondents indicated prior training backgrounds as follows: 19 out of 34 respondents (55.9%) chose "no training at all"; 12 respondents (35.3%) indicated that they had received training at Concordia; another 9 described themselves as "self-taught" (26.5%); and 1 person indicated that he had training courses outside of Concordia (Figure 5). For the category of self-taught, 7 of the 9 chose other categories as well. Because 84 respondents did not answer this question at all, it is believed that the true frequency for "no training at all" is much higher than that shown. This result of low positive frequencies and incomplete representation of all survey members, particularly when past experiences (0-5+) were tested in crosstabulations, produced many small or zero cells with no recognizable patterns. These proved very problematic for SPSS to interpret in crosstabulations with other variables of the survey. Therefore, the impact of prior training on other variables could not be established.

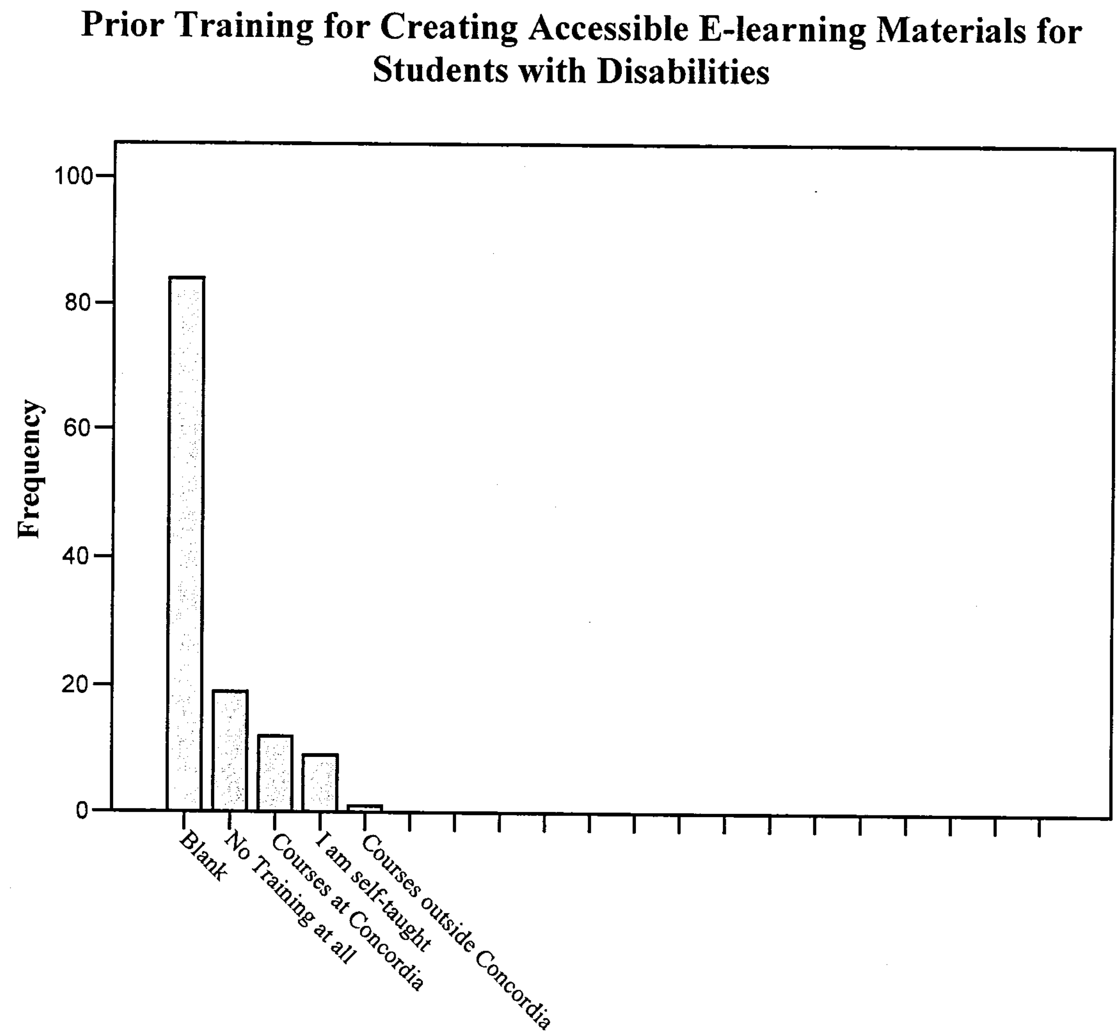

Figure 5 - Prior Training for Creating Accessible E-learning Materials for Students with Disabilities

Within the survey, I included questions about whether and how professors used technology in their courses and how they had taken into account the needs of their students with disabilities when integrating technology. I also included questions about which types of adaptive computer hardware and software they were familiar with

Technology in general

One side of the equation for setting up new accessibility training for professors involves their current technical skills or predisposition towards using technology. This section explores current technology practices by professors, while the following section examines findings for knowledge, attitudes and confidence when dealing with the needs of students with disabilities.

When asked the general question as to whether they used technology in their courses, 71 (60.2%) of the respondents asserted that they did.

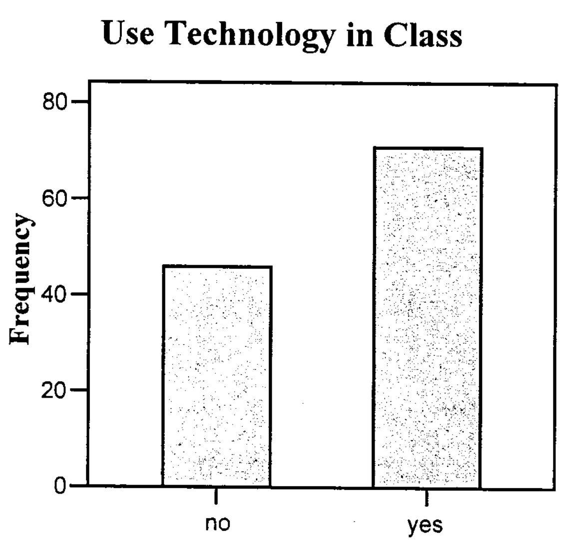

Figure 6 – Use Technology in Class

Similarly, 41 out of 59 (69.5%) of the full-time faculty respondents use technology in their courses. In crosstabulation analysis, the relationship between full time faculty and using technology is found to be significant at the 5% level with Pearson chi-square test reading .049; however the strength of the relationship was slight according to the directional measure Goodman and Kruskal tau of .033. Use of technology in this way was being made by 22 out of 43 (51.1%) part-time faculty respondents; however, the relationship between part time status and using technology is not significant as Pearson's chi-square is .108.

Crosstabulation analysis suggests that the influence of gender on full and part time faculty teaching status may be present as 52 out of 72 males (71.2%) indicated that they use technology and males comprise a 72.9% of full-time respondents claimed to use technology, whereas 19 out of 45 females (42.2%) indicated that they use technology and females comprise almost half of the part-time status (46.5%). These gender differences are significant at the 5% level as Pearson chi-square test reads .001 but the relationship is slight as the Goodman and Kruskal tau value is .089.

On the other hand, a trial using teaching status and use of technology while controlling for gender did not produce significant results for either the part-time or full-time teaching groups.

Many crosstabulations done for questions regarding current use of listed technologies throughout the survey found that most males and females actually tended to use listed hardware and software technology tools at relatively equivalent rates for more popular technologies; however, several males indicated they did much more for a couple of technologies (some website features that were less popular for the general survey population and e-learning testing). Crosstabulations treating full and part-time teaching status often showed that full-time professors used the technology tools listed at higher rates than all others, while part-time professors used them at comparatively reduced rates. Few of the gender or status (part-time, full-time) crosstabulations were in fact significant. The addition of the control variable of gender to relationships between full and part-time professors, confirmed the above findings about males and females save for two crosstabulations involving part-time females who were found to employ e-mail communications and overhead slides significantly less than females with other "teaching status".

Details of gender and teaching status results for questions about specific technologies, website features, authoring tools and validation tools have all been grouped in Appendix F, while general frequencies for the whole survey population using these technologies are presented in the document.

On the whole, the results for more specific technology questions suggested that many of the listed tools, software and hardware applications were actually used at relatively low rates or in some cases perhaps not even recognized.

Figure 7 is a bar graph representing specific technologies that respondents indicated they use in giving their courses. The technology showing highest popularity is e-mail communication with 53 respondents (44.9%), followed by PowerPoint overheads or slides with 47 respondents (39.8%) and course web sites with 36 respondents (30.5%). There were only 33 respondents (28%) providing PDF files for download.

Specific Technology Used in Class

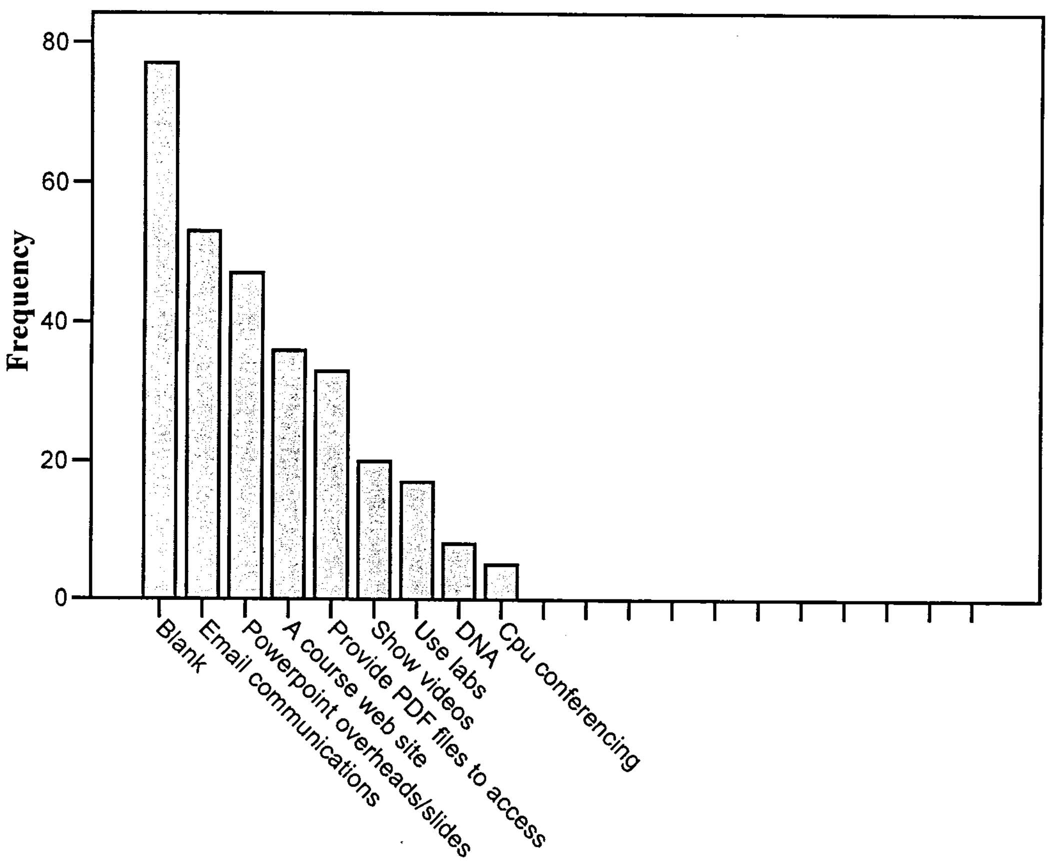

Figure 7 – Specific Technology Used in Class

While only 36 of the surveyed respondents had course websites, another survey question found that the most frequently created web feature for those who had a site was the course outline/information about courses showing 31 (86.1%) positive responses. Figure 8 shows all the web feature scores from the survey. Course notes such as PowerPoint and lists of supplementary reading materials, both of which one might expect to be very important to students, drew only 26 (72.2%) and 24 (66.7%) positive responses respectively, whereas course grades and links to other websites both drew 21 (58.3%). The absence of a large number of respondents opting for "course web page content does not apply" (8 respondents or 6.8%), in combination with low scores on web features overall is interpreted to mean that creating a web site in many cases was being considered or a website was already under construction.

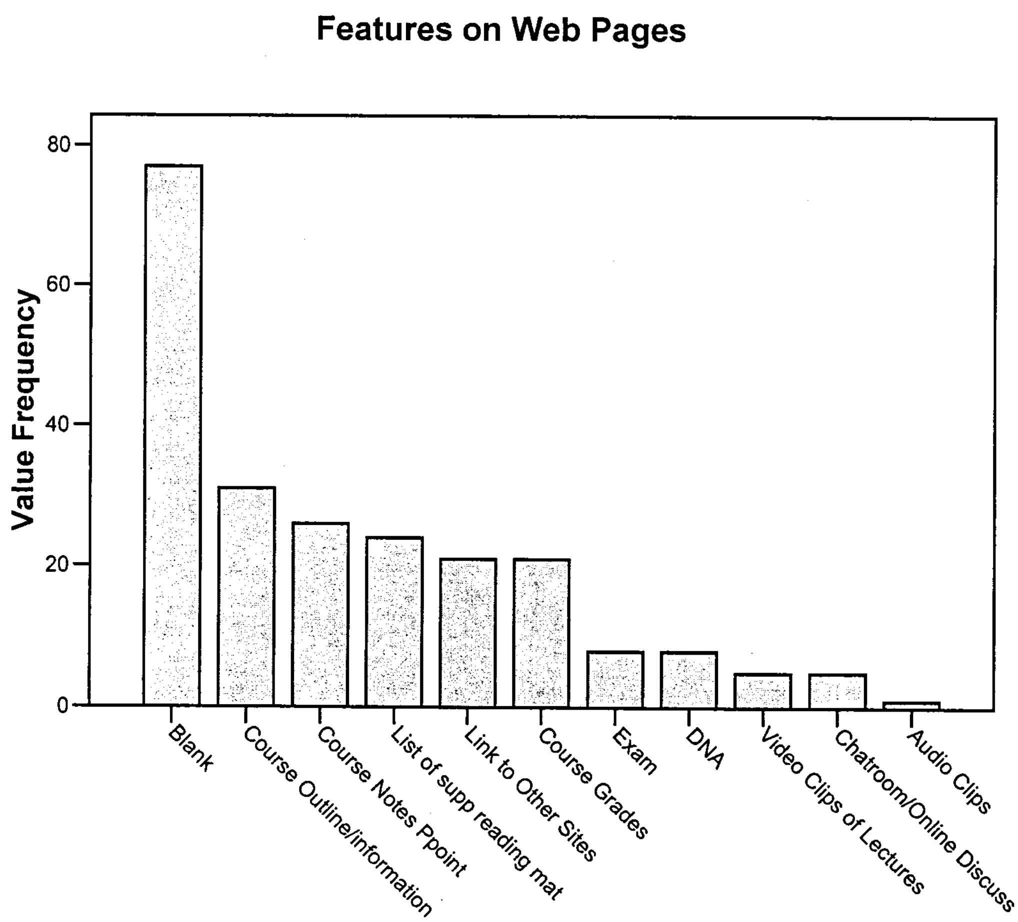

Figure 8 – Features on Web Pages

Results from the survey question as to whether respondents performed e-learning testing (Figure 9) revealed sparse e-learning testing:105 faculty respondents (92.9%) indicated that they did not do such testing; 6 course instructors (5.3%) didn't know whether they did: and only 2 respondents (1.8%) indicated that they did do it.

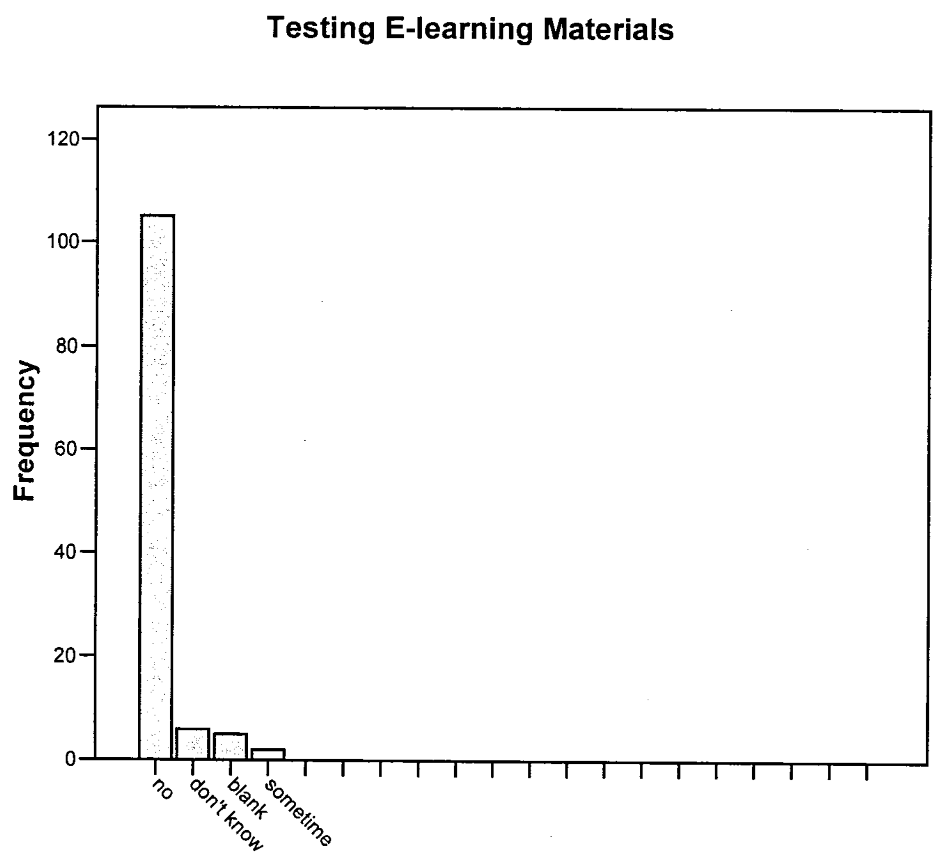

Figure 9 – Testing e-learning material

In general, for those who indicated they were testing accessibility, this was only "when time permits" or "when there is a student with disabilities in their course". To make sense of these low e-learning testing scores, it is also important to remember previous findings which showed that a rather low percentage of respondents currently have a course website, 36 respondents (30.5%), or even the most popular technology, e-mail communications with students, 53 respondents (44.9%).

Perceived Technology Benefits to students

The frequency graph in Figure 10 represents the breakdown in responses for faculty using and not using technology in their classes and perceived benefits of using technology to deliver course material to students. It can be seen that most professors believe that students derive some benefits from technology in teaching, as only one respondent within both those who do and those who do not use technology in class categories stipulated that little benefit is derived from technology. What can also be interpreted is that the benefit strength increased with the experience of actually using technology in class. Of those who do use technology in their courses, 53 respondents of the 63 faculty who responded to this question (84.1%) judged that the extent students were benefiting from technology they provided was a great deal, while 9 instructors felt students were benefiting somewhat (14.3%). On the other hand, of the 7 respondents who were not using technology in class, 4 instructors (57.1%) felt students benefited a great deal from technology, while 2 respondents (28.6%) felt students benefited somewhat. By far the most striking occurrence for faculty who do not use technology is that the largest subgroup, some 39 instructors (84.8%), did not answer the question at all. This compares to the greatest subgroup for respondents who use technology in delivering their course material which was for those who classified the technology benefit as great (84.1%). Only 8 respondents who use technology in class did not answer this question (11.3%). What may be suggested is that non-users who did not respond probably felt they didn't have the basis to judge either way, while those who were users of technology who didn't answer could not gauge the impact.

Use Technology in Class (no, yes) & Benefit of Technology to Students

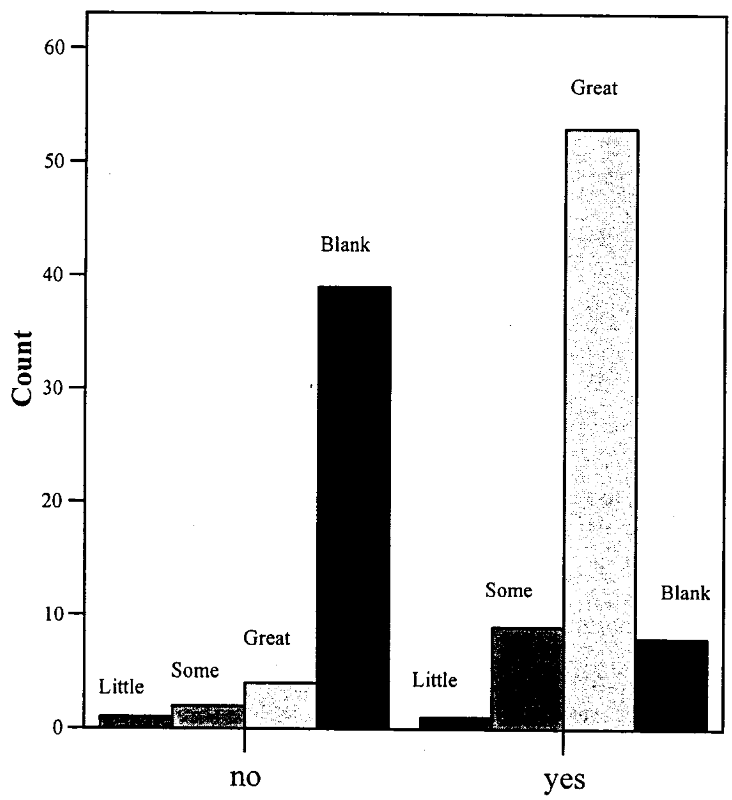

Figure 10 – Use Technology in Class (no, yes) & Benefit of Technology to Students

Despite the strong overall consensus that students do derive benefits from technology, crosstabulation analysis for the entire survey population does not show a significant relationship at the 5% level between the use of technology in class and the belief that students benefit from it.

However, in crosstabulation results for professors who do use technology, the addition of the gender control variable shows a majority of both sexes seem to agree that students make a great deal of use of technology. The proportion of females using technology who asserted that students use technology a great deal in class is higher than males, 15 out of 16 females (93.7%) and 38 out of 47 (80.8%) males. No female who uses technology chose "very little", while one male did so. Only the female relationship between use of technology and its usefulness is statistically significant according to Pearson's Chi-square measures showing .017. The directional measures indicate a definite but small relationship for females with a Goodman and Kruskal tau value of .26. It is important to bear in mind also that there are many small cell scores less than 5 that render directional measures less accurate. Adjusted residuals for the female relationship show that cells are greater than 2 for both the highest and lowest degrees of benefit for users and non-users of technology. This indicates that the impact of rather indecisive and equivalent scores for females not using technology for the benefit of technology across all categories is very different from the decisively heavy choice of "a great deal" by many females who do use technology (93.7%).

Crosstabulations using teaching status as a control in a relationships between technology in class and the usefulness of technology to students also found that a majority of full-time professors in the survey who use technology believe that students make a great deal of use of technology (34 out of 38 or 89%). Here, no full-time professor using technology agreed that students benefited only "very little" from technology. The full-time relationship was found to be significant as chi-square reads .005. The relationship is definite but negligible as the Goodman and Kruskall tau statistics reads .08. Again, there are many small scores less than 5 that make measures based on chi-square less accurate. Adjusted residuals for full-time professors using technology showed that both the lack of identification with category of little use and the assertion by the majority (89.5%) who indicated that students made a great deal of use of technology contributed to the strength of the chi-square statistic. This again was very different from the flatter distribution of scores by those who do not use technology (50% chose a great deal, 50% chose very little and some).

Alternatively, 13 out of 17 (76.5%) of part-time professors felt students benefited a great deal from technology, and 3 professors (17.6%) felt students benefited somewhat from technology. The contrast between users and non-users of technology for part-time teachers is not as remarkable as in the case of full-time teachers (66.7% non-users believed students benefited a great deal). The relationship with part-time status was not significant.

Consideration of Student Needs When Developing Technology

Another finding of interest involved technology integration and the needs of students with disabilities. Asked whether and how they had taken into account the needs of their students with disabilities when developing the technologies used in their courses, 81 out of 101 respondents to this question (80.2%) reported that they had not considered the needs of these students, while 12 respondents (11.8%) can be described as having partially taken into account the needs of their students with disabilities. A small group of 8 faculty (7.9%) definitely took into account the needs of their students with disabilities.

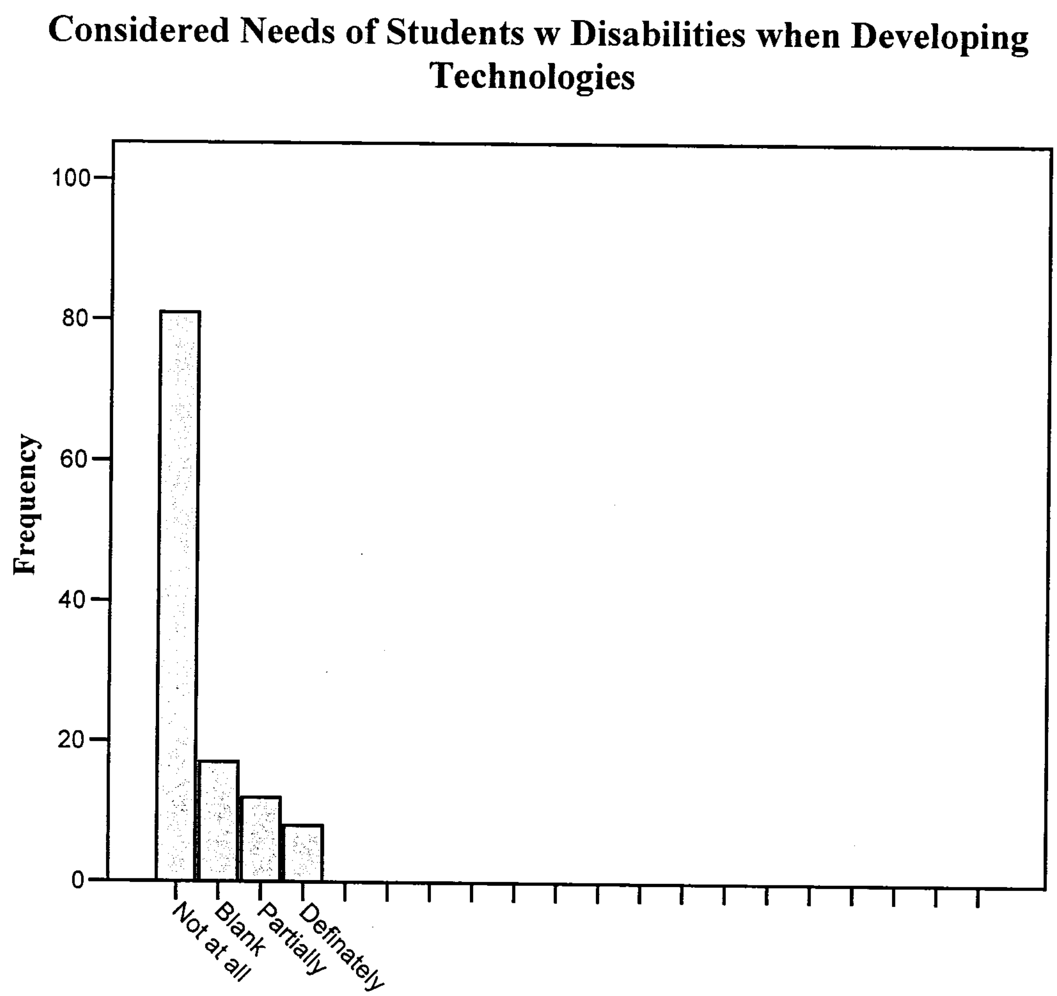

Figure 11 – Considered Needs of Students w Disabilities when Developing Technologies

a- Partially includes: would provide necessary tools, use of large print, and similar actions by 1 former teaching assistant to a professor who accommodated students with disabilities.
b- Definitely includes: use of Dreamweaver software, checking with compliance standards, utilizing a variety of mediums including closed captioning materials, materials modified by the office for students with disabilities amongst others.

Crosstabs were generated to explore the relationship between the number of past experiences with students with disabilities and the consideration of student disabilities when developing course technology. An increase in the consideration of student needs appears to be indicated by markedly dissimilar findings for teachers with the least and most amount of experiences with students having disabilities. 45 out of 47 (95.7%) of respondents who had no prior experience with students with disabilities stipulated that they did not take the needs of students into consideration at all in contrast to 17 out of 30 (56.7%) of professors with 5 or more experiences who stipulated the same. For those with no prior experiences, the middle category of partial consideration and the highest category of definitely registered the smallest proportion of scores (1 each). For those with 5 or more experiences, the greatest proportion of professors who did not choose "not at all" chose partially (9 out of 30, or 30%) . Finally, 4 professors with 5 or more experience stated they definitely would take the needs of students with disabilities into consideration in comparison to 1 professor with no prior experience (13.3% versus 2.1%). Consideration of special needs trends for faculty with five or more experiences shows a strong departure from the category of definitely "would not" to "partial" or "definitely would" categories.

According to a chi-square statistic of .006, the relationship between past experience with students with disabilities and taking the needs of students with disabilities into consideration is highly significant. However, the low Goodman and Kruskal tau score of .15 indicates that it is a negligible relationship.

Adding a control variable of gender to find out if the relationship between prior exposure to students with disabilities would be affected repeated a general trend of more consideration being taken by more experienced males. However, closer examination of the crosstabulation reveals that males with five or more experiences actually indicated less consideration than those with four experiences. Here, 14 out of 23 males (60.9%) with 5 or more experiences versus 2 out of 4 males (50%) with 4 experiences reported taking no consideration. Conversely, 5 and 4 males (21.7% and 17.4%) with 5 or more experiences claimed to take partial and definite consideration, respectively. Numbers for males having 4 experiences are 1 partial (25%) and 1 definite (25%). Largely because of this inconsistency over small subgroups of males, the chi-square statistic is not significant. On the other hand, the female relationship appears to be highly significant at .001; however it is in fact small as shown by a Goodman and Kruskal tau of .39. It is difficult to draw conclusions from the pattern shown by females where one with no prior experiences has indicated that she definitely would take needs into consideration, and no female with 5 or more experiences indicated that they would definitely take needs into consideration. The presence of many zero's in table cells makes it difficult for chi-square to measure with any accuracy. Adjusted residuals for females indicate that those with the least amount of experience and those with the most amount of experiences had the scores that influenced the significant chi-square statistic.

The control variables of full and part-time teaching status were both significant at the .05 level and generally repeated the finding that with more experience, more recognition is given to the needs of students with disabilities. Close to the same level of consideration seemed to be indicated by the full-time group versus all others (full time, not at all 43 out of 53 or 81.1%, definitely 4 or 7.4%; others not at all 37 out of 47 or 78.7%; definitely 4 8.5%). Part-time respondents on the other hand indicated clearly less consideration (part-time, not at all 30 out of 34 or 88.2%, definitely 2.9%; all others not at all 50 or 75.7% definitely 10.6%).

Looking at the simpler relationship between gender in the absence of past experiences and not taking the needs of the disabled into consideration when developing technology, there is not a marked difference for roughly 80% of both males and females; here 53 out of 66 males and 28 out of 35 females reported they would not take the needs of students with disabilities into consideration at all. A marginally greater proportion of males stipulated that they would definitely take the needs into consideration (6 males or 9.1%, 2 females or 5.7%), and more females stipulated they would take into account partial consideration of these needs. These findings are probably random as crosstabulations using gender and taking the needs of students with disabilities into consideration when developing technology did not produce significant results at the 5% level.

Trials done testing teaching status and developing technology considering the needs of students with disabilities were insignificant. Further adding a control variable of gender yielded insignificant results as well.

Results from this section and the preceding section relating to the impact of prior experience would seem to suggest that previous exposure to the needs of students with disabilities is likely to influence teachers to incorporate special needs into the design of their course technology, more than teaching status and gender alone.

Confidence in Material Accessibility

Findings for confidence levels that materials were accessible to all students asked in another question are illustrated in Figure 12. The graph illustrates that 111 of the respondents (95.7%) felt all students could access materials at least sometimes.

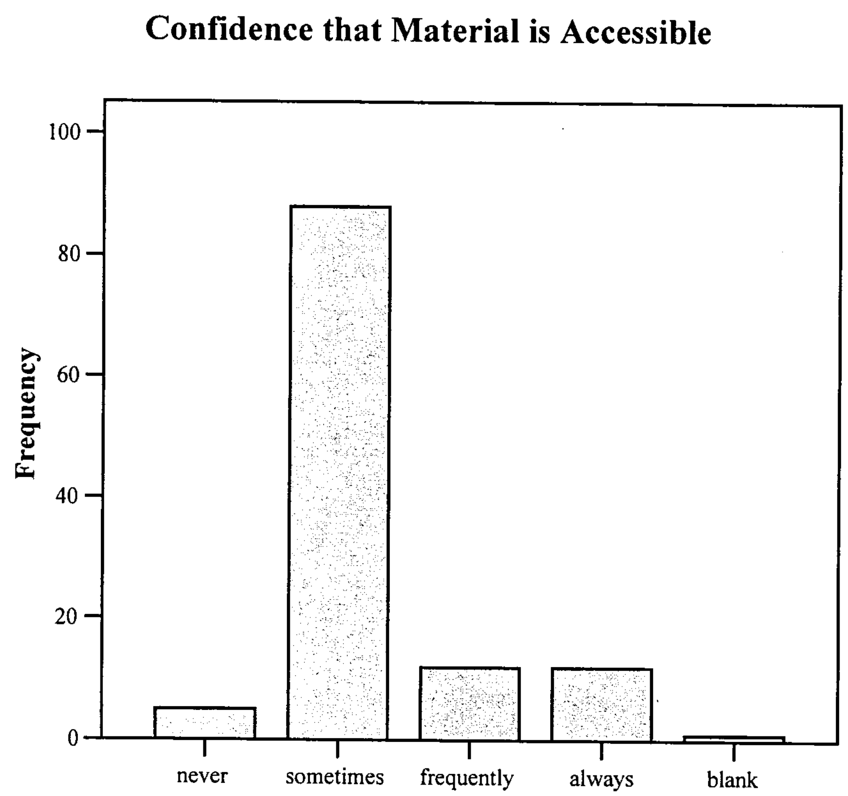

Figure 12 – Confidence that Material is Accessible

In crosstabulation analyses with the past number of experiences with students having disabilities and confidence in material accessibility of course material, only a slight association was found. The chi-square statistic is .065 and the directional measure is .068.

The low strength of the relationship may in fact be due to the popular identification with a middle of the road category (sometimes confident) for respondents with the least and more experience alike. A strong majority of respondents with no prior experience, 48 professors (87.2%), and 20 instructors (58.8%) with prior experience identified with this mid-range category. This suggests that those with no prior experience presumed that all students were able to obtain "accessibility" despite all obstacles or any disabilities, while those with prior experience perhaps believed they could benefit from more information regarding accessibility. Proportionately more respondents who had 5 or more experiences answered more than sometimes than those with no experience.

After adding a control variable of gender, we can readily observe that males expressed confidence at higher levels that materials were accessible to all students (frequently or always) when it was not their first experience with students with disabilities and particularly in the category of 5 or more prior experiences. Here, males across all numbers of experiences accounted for 11 out of 12 (91.6%) of all those who chose "always confident" which also accounted for 26.1% (6 out of 23) of the males with 5 or more prior experiences. Despite 3 or more prior experiences with students with disabilities, two males indicated that they were never confident. Any pattern for male confidence is further blurred by a couple of male respondents with no prior experience who choose "always confident".

Females' confidence patterns with experiences were more predictable in general. Similar to males, females appear to have more confidence with more experiences as well, but only one female selected the highest level of confidence after three previous experiences. Unlike males, though, none of the females who reported one or more experiences with students with disabilities reported “never being confident”. Correspondingly, only the female differences were found to be very significant for past times with students with disabilities and confidence that materials were always accessible. Pearson’s Chi-square shows a significant relationship at .000. For females, Goodman and Kruskall’s tau shows about a 39% reduction in error in predicting confidence that materials are always accessible when past experiences with students with disabilities is taken into account, which indicates a small relationship. Again the impact of the middle range popularity of “sometimes confident” by both those with the least and those with most experiences may circumvent a larger reduction in error. On the other hand, there are many cells less than 5 and quite a few which are 0 that render chi-square readings less accurate. Calculations of adjusted residuals for females showed scores higher than the threshold of 2 for many cells indicating the number of prior experiences and sometimes, as well as most cells for women with 5 or more prior experiences.

A different two-by-two crosstabulation testing for the possible relationship between teaching status and confidence of material accessibility with experience did not produce any new information. In this case, 45 out of 58 (77.6%) full-time faculty and 35 out of 43 (81.4%) part-time faculty responded that they were sometimes confident that materials were accessible to all students. 6 out of 43 (13.9%) part time faculty expressed confidence above sometimes versus 11 out of 58 (19.0%) full-time faculty.

Whereas there was no clear pattern with more experience for part-time professors than can be drawn, only the crosstabulation treating part-time professors versus all others was significant but small with a chi-square statistic at .047 and a Goodman and Kruskal tau at .23.

Knowledge of the Needs of Students with Disabilities

When questioned about their current knowledge of the needs of students with disabilities for accessing e-learning materials, only 34 respondents (28.9%) reported being familiar to various degrees with such student needs. 84 respondents (71.2%) admitted to having little or no understanding of these needs (Figure 13).

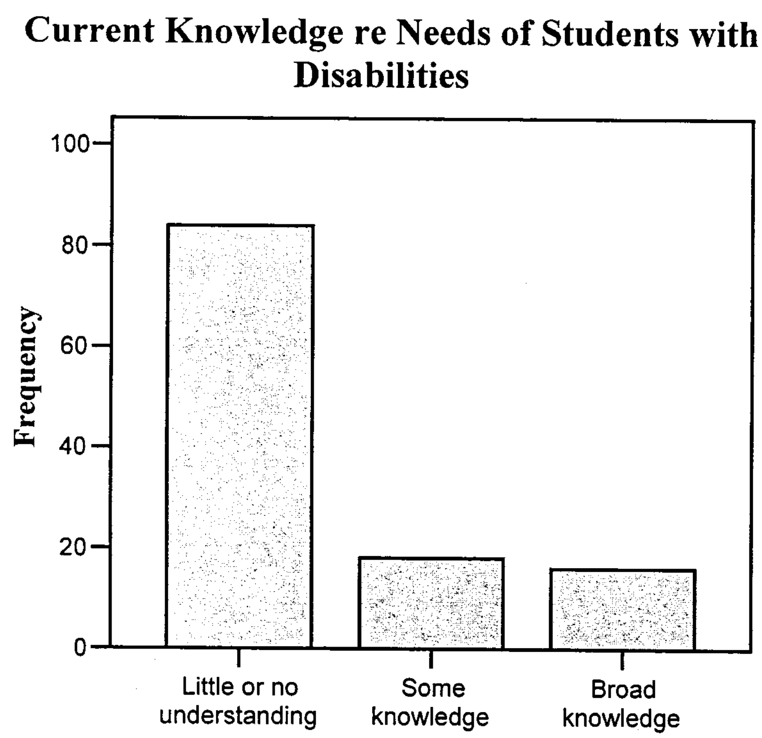

Figure 13 – Current Knowledge re Needs of Students with Disabilities

Examining the breakdown of number of prior experiences and knowledge of the needs of students with disabilities reveals an association of higher understanding with more experience in dealing with students who have disabilities. As in previous findings, this is discernable when considering the extreme ends of experience on this scale, namely none versus 5 or more experiences. 48 out of 55 faculty respondents (87.3%) who had no prior experience admitted to having little or no understanding, while 17 out of 35 respondents (48.6%) with 5 or more prior experiences admitted to having little or no understanding. With more experience, the choice of the middle knowledge category became stronger, 3 respondents (5.4%) with no prior experience chose some understanding, compared to 11 respondents (31.4%) with 5 or more experiences who chose this option. Similarly, results show that the proportion of respondents with 5 or more experiences was close to three times the proportion of respondents without prior experiences for identifying with the broad knowledge category (7 out of 35, 20.0% versus 4 out of 51, 7.3%). According to Pearson's chi-square, the relationship between past experiences with students with disabilities and knowledge of needs for access to e-learning is very significant at .000, but negligible at .15 according to the directional measure of Goodman and Kendal's tau.

Adding a control variable of gender seems to provide evidence across the sexes of the notion that more experience with students with disabilities leads to a higher level of knowledge of the particular needs for access to e-learning. Here, a high percentage of professors of both sexes with no prior experience with students with disabilities admitted to having little or no understanding of their needs (males 23 out of 28 or 82%, females 25 out of 27 or 92.6%). The stated knowledge level appears to increase with more experience. Therefore, the combined frequency for the "some" and "broad" knowledge categories for both sexes having 5 or more experiences were approximately equal to the frequency of having "no knowledge or understanding." (males 50% no knowledge, combined knowledge categories 50%, females 45.4% no knowledge, combined knowledge categories 54.6%).

Chi-square figures show significance of .009 for males and significance for females at .001. Goodman and Kendal's tau statistic shows .17 and .36 for males and females respectively pointing to a negligible and a small relationship, respectively. The statistics may be strongly influenced by the many small cells which contain zeros. Examining the adjusted residuals supports a somewhat stronger relationship for females as more cells that had impact on the significant chi-square were scattered throughout the adjusted residual table.

In a trial with full time teaching status as a control variable instead of gender, 17 out of 21 professors (80.9%) with no previous experience claimed to have little or no understanding, while 12 out of 23 with 5 or more experiences did so (52.2%). As in the breakdown with gender, for those with 5 or more experiences, cumulatively, there is almost as many respondents choosing "some and broad knowledge" as those who choose "little or no understanding". The relationship between more experience and knowledge of needs was not significant for full time professors.

On the other hand, significant results for part-time professors did provide some limited evidence that more previous experience generated more knowledge of needs for students with disabilities. It is hard to draw strong interpretations about this relationship, however because there are inconsistent trends. Whereas Pearson's Chi-square for the relationship between previous experience and knowledge was highly significant at .001, Goodman and Kruskal's tau showed that the relationship is small at .39 only. A single professor in the category of one experience opted for "broad knowledge", and there is never more than one respondent doing so for all other categories of prior experience. An increase into the middle category occurs for professors with 4 experiences. Adjusted residuals over the threshold of 2 were scattered through the cells for three or less experiences for part time professors, sometimes where one respondent for the number of experiences chose "broad knowledge." Adjusted residual scores for the cells pertaining to those with five or more experiences, where 4 out of 6 part-time professors chose little or no knowledge (67%), had little effect on the chi-square significance.

Barriers to Creating Accessible E-learning Material and Compliance Goals

Respondents were asked to select their most significant barrier to creating accessible e-learning materials for students with disabilities, but in many cases they chose several (Figure 14). 63 respondents (53.4%) cited a lack of time and personal resources as the primary barrier preventing them from creating accessible e-learning, by far the most common barrier, ahead of difficulties in developing a prioritized management plan for redesign with 54 respondents (45.8%), lack knowledge of HTML and other technology to create accessible resources with 53 respondents (44.9%) and lack of support for authoring tools with 52 respondents (44.1%). The lack of knowledge of the needs of students with disabilities was chosen by 13 respondents (11%).

Another area explored in the survey related to intended compliance to accessibility goals. Despite designations of "double" and "triple" or "customized" none of the goals is actually greater than another. Examining compliance goal frequencies for accessibility, 101 faculty respondents (85.6%) reported no goal at all, 10 respondents (8.5%) reported they planned to comply with WC3 WCAG 1.0 double-AA, while the remainder was split between complying with customized, goals, one person (.8%), and WCAG1.0 triple-AAA and other goals (3 respondents or 2.5% each).

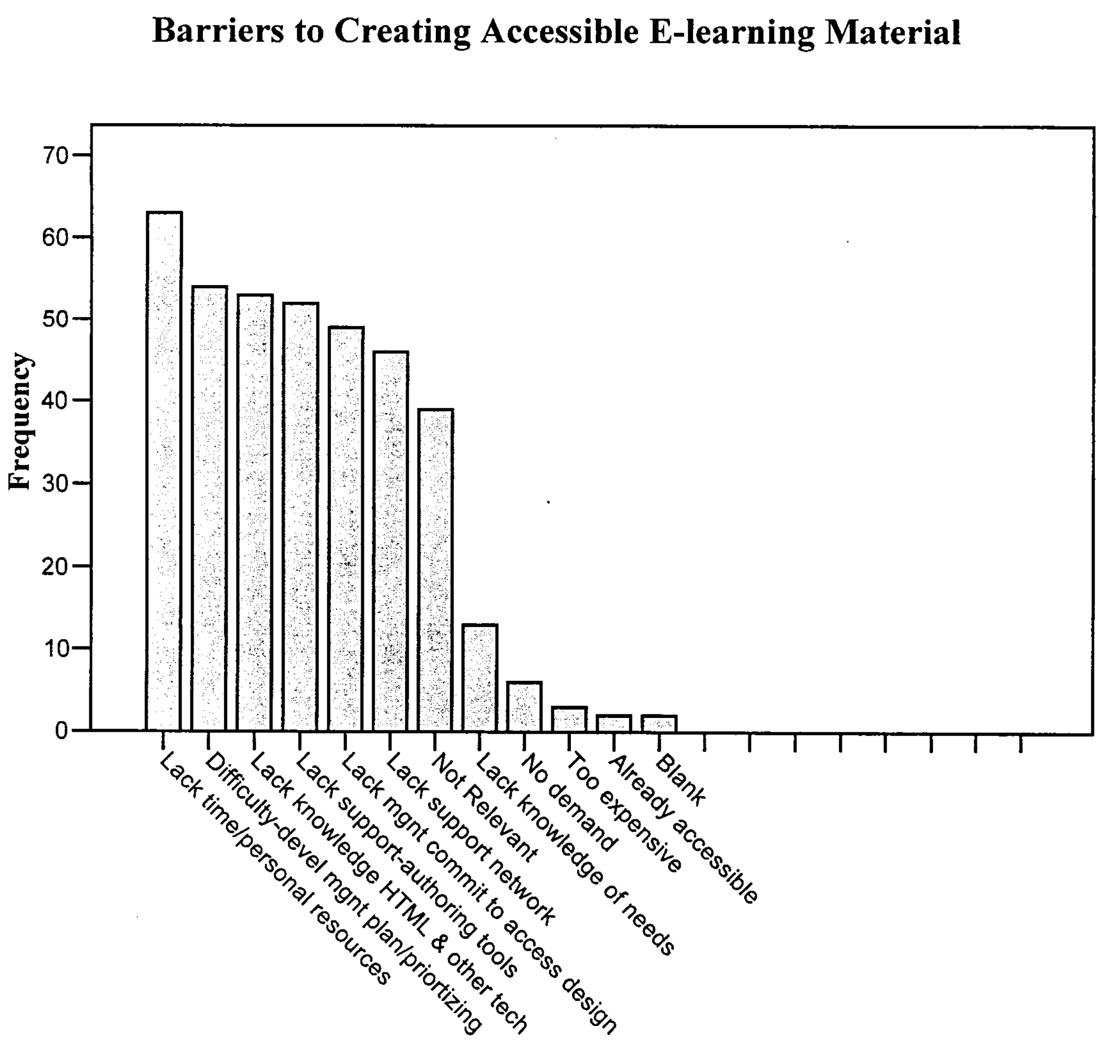

Figure 14 – Barriers to Creating Accessible E-learning Material

The projected time interval chosen to reach these goals sampled in another question was most often more than 2 years with 82 respondents (75.9%), however, 14 respondents (12.6%) chose not relevant (Figure 15). This low count for not relevant comes as somewhat of a surprise given that 85.6% of the respondents claimed not even having a goal, and may in fact reflect a open-mindedness or flexibility towards upcoming academic protocols by those who initially claimed they did not have a goal but chose something other than not relevant .

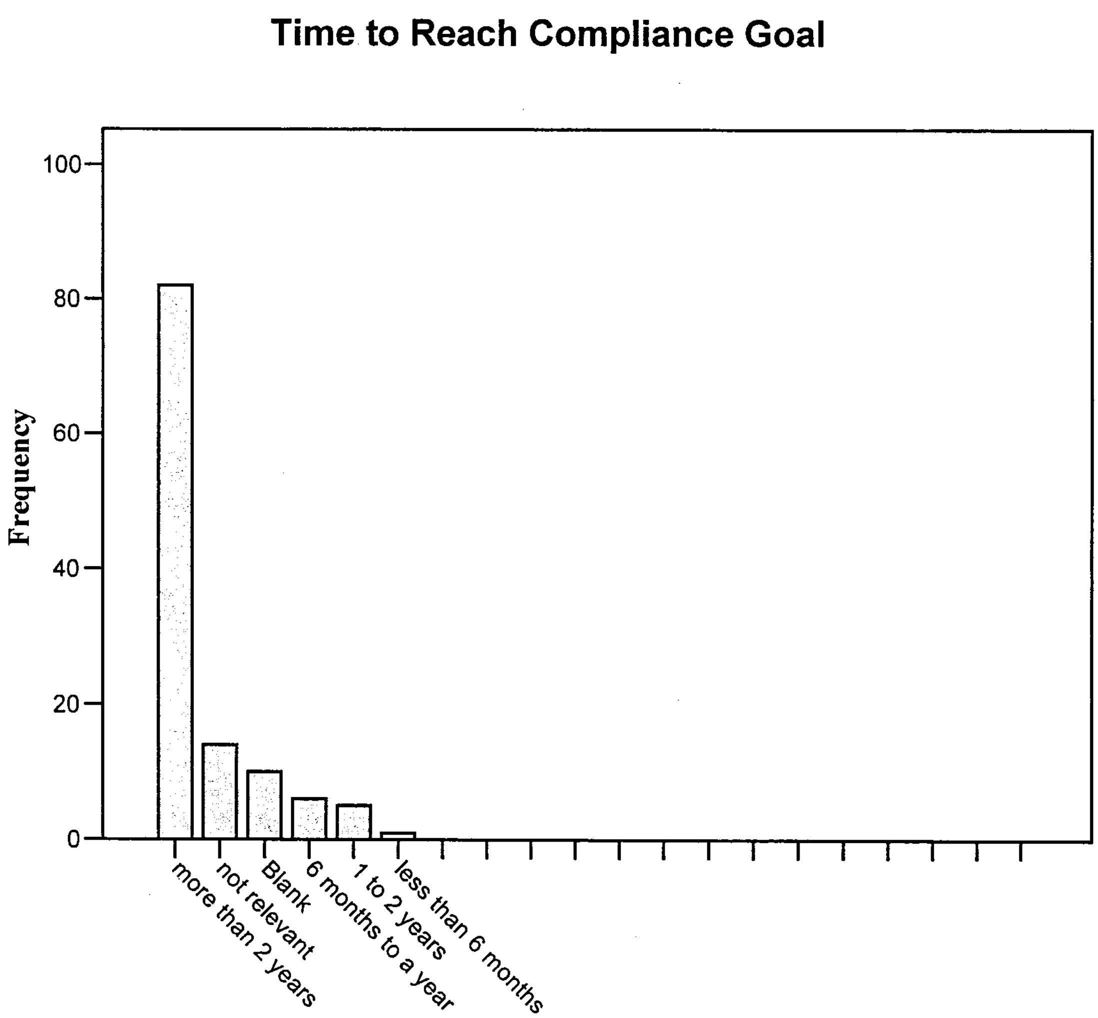

Figure 15 – Time to Reach Compliance Goals

This interpretation is reinforced by frequencies of a crosstab table of compliance goals versus the time interval to reach these goals, as 77 out of 82 (93.9%) of respondents who chose 2 or more years had in fact indicated no access goal previously. The significance of .000 for Pearson's Chi-square indicates these differences were not due to chance. On the other hand, the directional measure of Goodman and Kendal's tau of .23 indicates only a small relationship.

Entering a control variable of gender shows high significance for compliance goals versus time to reach these goals for both males and females. Similar patterns continue to be manifested for the extremely high number of respondents making up the category 2 or more years to reach their goal who indicated no prior goal: 42 out of 46 males and 35 out of 36 females (91.3% male, 97.2% female). Interesting here is that 10 males chose intervals less than 2 years (15.6%) while only 2 females did so (4.5%). Females had a stronger small relationship than males for the relationship for compliance goals and time to reach these goals. (Kruskal and tau scores were .36 for females, and .23 for males). Adjusted residuals show that most cells for no goal categories and other goal cells for males and females for time frames of 1 to 2 years and more than 2 years contributed to the significant chi-square figure as they were larger than the threshold of 2. Complying with W3C 1.0 double for males and triple for females also impacted the significance of chi-square. However, most cell frequencies are low, not much new information can be taken from the residuals. The exception to this is the previously mentioned high proportion of respondents who selected no goal initially and then chose relatively long time frame to achieve a goal. Perhaps the only interpretation that can be taken from these results, then, is the inference that respondents may not be aware of what compliance goals they may be obliged to meet in the future but realize that it will take time to set up all conditions for compliance.

Tests with teaching status and the relationship between goals and time to goal also produced significant results. For both full-time professors, the table of adjusted residuals indicates that many cells across all goal categories contributed to the significant chi-square statistics. Those who previously had no goal constituted the largest group of those selecting more than 2 years. (Full time 37 out of 40, 92.5%, part-time 32 out of 33, 97%). For part-time professors, no goals, and the W3C 1.0 double goal for a time frame of 6 months to a year were important to the significant chi-square. For all analyses with compliance goals using control variables, the existence of many 0 cells may have strongly influenced results.

Confidence Using Various Technologies

Survey respondents were asked which from a list of technologies they currently used to create e-learning materials to meet the needs of students with disabilities, and further to rate the degree of confidence they had in using them, from not at all confident to very confident (Table 5). The option of selecting "does not apply" appeared at the top of the listing, and 42 respondents indicated that it did not. However, Microsoft Word, Power Point and Excel, software packages that are familiar to many respondents in general who use computers to create documents, were technologies that were to be rated on the list for e-learning confidence. It was found that overall, respondents had the most confidence for Word (confident, 81 out of 103, 78.6%, very confident 11 10.7%), PowerPoint (confident, 80 out of 102, 78.4% confident, very confident 7 6.9%) and Excel (confident, 12 out of 78 15.4%, very confident 7 or 9.0%).

Table 5 - Confidence for using Various Technologies

Confidence for using Various Technologies						
Does not apply : 42						
Technology	**Blank**	**Not at all**	**Not very**	**Confident**	**Very**	**Total**
Word	7	-	4	81	11	103
PowerPoint	8	5	2	80	7	102
Excel	9	48	2	12	7	78
Portdoc Form	13	50	3	9	1	76
HTML	12	58	-	6	-	76
Cascading sheets	15	58	2	1	-	76
Java script	14	59	2	1	-	76
Dbase tech.	17	57	2	-	-	76
XML Gen cont	18	57	-	1	-	76
Real video/audio	17	58	-	1	-	76
Macro flash	16	58	1	1	-	76
Active server pages	14	61	1	-	-	76
Quick time video/audio	17	58	-	1	-	76
Quick time VR	18	57	-	1	-	76
Mpeg video/audio	17	58	1	-	-	76
PHP	17	59	-	-	-	76
JavaServ pages	18	58	-	-	-	76
Java servlets	18	58	-	-	-	76
Java applets	18	58	-	-	-	76
Act X cont	18	58	-	-	-	76
Macro shockwave	16	60	-	-	-	76
Avid media	18	58	-	-	-	76
Adobe premiere	18	58			-	76
3D studio/max	18	58	-	-	-	76
Micro video/audio	17	59	-	-	-	76
Syn mult. lang	18	58	-	-	-	76
Scalable vector	18	58	-	-	-	76
Magpie	18	58	-	-	-	76
Other tech	75	1	-	-	-	76

Outside Microsoft applications very little confidence was expressed. Some of the technologies that respondents were less confident about using to create accessible e-learning included at the higher end of confidence range PDF (confident 9 out of 76, 11.8% and very confident 1 or 1.3%) and HTML (confident 6 or 7.9%, very confident 0).

Some video applications did find a single person confident as did JavaScript and Flash. For most applications, the lowest confidence level, "not at all" had the strongest adherence with a large percentage of other respondents leaving the rating for the particular applications blank: JavaScript (59 or 77.6% of users not at all confident 14 blank or 18.4%), Flash (58 not at all confident 76.3%, 16 blank or 21.0%), Shockwave (not at all confident 60 or 76.9%, 16 blank or 21.0%).

Table 6 - Gender Confidence for Microsoft Applications

Gender Confidence for Microsoft Applications						
Does not apply: 22 males, 20 females						
Confidence Level	**Word**		**PowerPoint**		**Excel**	
	Male	Female	Male	Female	Male	Female
Blank	6	1	6	2	7	2
Not at all	-	-	4	1	30	18
Not very	2	2	1	1	1	1
Confident	49	32	50	30	8	4
Very	10	1	6	1	7	0
Part-time totals	**67**	**36**	**67**	**35**	**53**	**25**
Application totals		**103**		**102**		**78**

Table 7 - Full-time Teacher Confidence for Microsoft Applications

Full-time Teacher Confidence for Microsoft Applications						
Does not apply: 15 full-time, 27 other						
Confidence Level	**Word**		**PowerPoint**		**Excel**	
	Full-time	Other	Full-time	Other	Full-time	Other
Blank	4	3	4	4	5	4
Not at all	-	-	3	2	33	15
Not very	1	3	2	0	0	2
Confident	44	37	42	38	3	9
Very	5	6	3	4	4	3
Part-time totals	**54**	**49**	**54**	**48**	**45**	**34**
Application totals		**103**		**102**		**78**

Table 8 - Part-time Teacher Confidence for Microsoft Applications

Part-time Teacher Confidence for Microsoft Applications						
Does not apply: 18 part-time, 24 other						
Confidence Level	**Word**		**PowerPoint**		**Excel**	
	Part-time	Other	Part-time	Other	Part-time	Other
Blank	2	5	2	6	3	6
Not at all	-	-	2	3	15	33
Not very	2	2	0	2	1	1
Confident	30	51	32	48	6	6
Very	3	8	1	6	1	6
Part-time totals	**37**	**66**	**37**	**65**	**26**	**52**
Application totals	**103**		**102**		**78**	

Crosstabulations for gender and Microsoft applications showed males to express confidence at higher levels than females (Table 6). It was rare for females to relate to "very confident" for any category, while males did so for Microsoft applications, 10 out of 11 for Word (90.9%), 6 out of 7 for PowerPoint (85.7%) and 7 out of 7 for Excel (100%).

However, if we consider the cumulative scores of confident and very confident, we may suggest that the gender scores are quite similar for Word and PowerPoint: Word (cumulative male score 59 out of 61 or 96.7% cumulative female score 33 out of 35 or 94.3%,), PowerPoint (cumulative male score 46 out of 61 or 91.8%, cumulative female score 31 out of 33 or 93.9%,). For Excel there was a larger proportionate difference which suggested males were more confident (cumulative male score 15 out of 46 or 32.6%, cumulative female score 4 out of 23 or 17.4%). Interestingly, more males left these Microsoft application ratings blank altogether. These relationships were found to not be significant.

Briefly looking at teachers who responded by teaching status and considering the groupings of "confident" and "very confident" together for the Microsoft applications (Tables 8 and 9), respondents who were full-time teachers showed more confidence compared to all others for Word (full-time 49 out of 50 or 98% versus other 43 out of 46 or 93.5%), and less confidence for the other two applications, PowerPoint (full-time 45 out of 50 or 90% versus other 42 out of 44 or 95.4%), and Excel (full-time 7 out 40 or 17.5% versus 12 out of 29 or 41.4%). To be noted for excel too is the larger proportion of full-time teachers who chose "not at all confident" versus all others (33 out of 40 or 82.5% versus 15 out of 29 or 51.7%).

Conversely, part-time respondents indicated less confidence for Word compared to all others (part-time 33 out of 35, or 94% other 59 out of 61 or 96.7%), and more for the other two applications, PowerPoint (part-time 33 out of 35, or 94.3%, other 54 out of 59 or 91.5%). It is interesting to compare the "very confident" for part-time respondents versus all others. Here, we see that teachers with status other than part-time accounted for most of the highest ratings, (Word 8 out of 11 or 72.7%, PowerPoint and Excel 6 out of 7 each or 85.7%). Whereas it is apparent from the gender comparisons that most of these were males, it is to be remembered that in the all others category for both full and part time comparisons were included 16 respondents who are neither full nor part-time teachers.

Only the relationship for full-time professors and excel was significant, but negligible only with the Goodman Kruskal tau at .079. Adding a control variable of gender produced significant result for males only. This relationship was small with a directional measure of .20. However, the adjusted residuals showed that the large 'not at all category' (23 out of 29 or 79%), was largely responsible for the strength of this statistic.

Medium for Interactive Training

When questioned about their preferred medium for interactive training, most respondents chose more than one (Figure 16). The most popular category chosen by 98 out of 114 respondents was a website (85.0%) followed by printed material selected by 94 respondents (82.2%) and CD-Rom chosen by 93 instructors (81.6%). 91 respondents (79.8%) indicated a combination of the three mentioned above. For those who chose other and gave examples, a common specification by them was a trainer.

Interestingly, as a group, more females requested the three most popular categories than males: 60 out of 73 males and 38 out of 44 females (82.2% males vs 86.6% females) requested websites; 55 males and 39 females (78.6% males vs 86.4% females) requested printed material; 55 males and 38 females (75.3% males vs 86.4% females) requested CD ROM; and finally 50 males and 41 females (71.4% males vs 93.2%) females requested a combination of the above. Only the relationship for gender and a combination of medium was significant with chi-square at .005; however, the relationship is actually negligible with the Goodman and Kruskal tau of .070. While this is not strong and none of the relationships of media by themselves with gender were significant, there seems to be an overall indication that proportionately more females want as much information as possible.

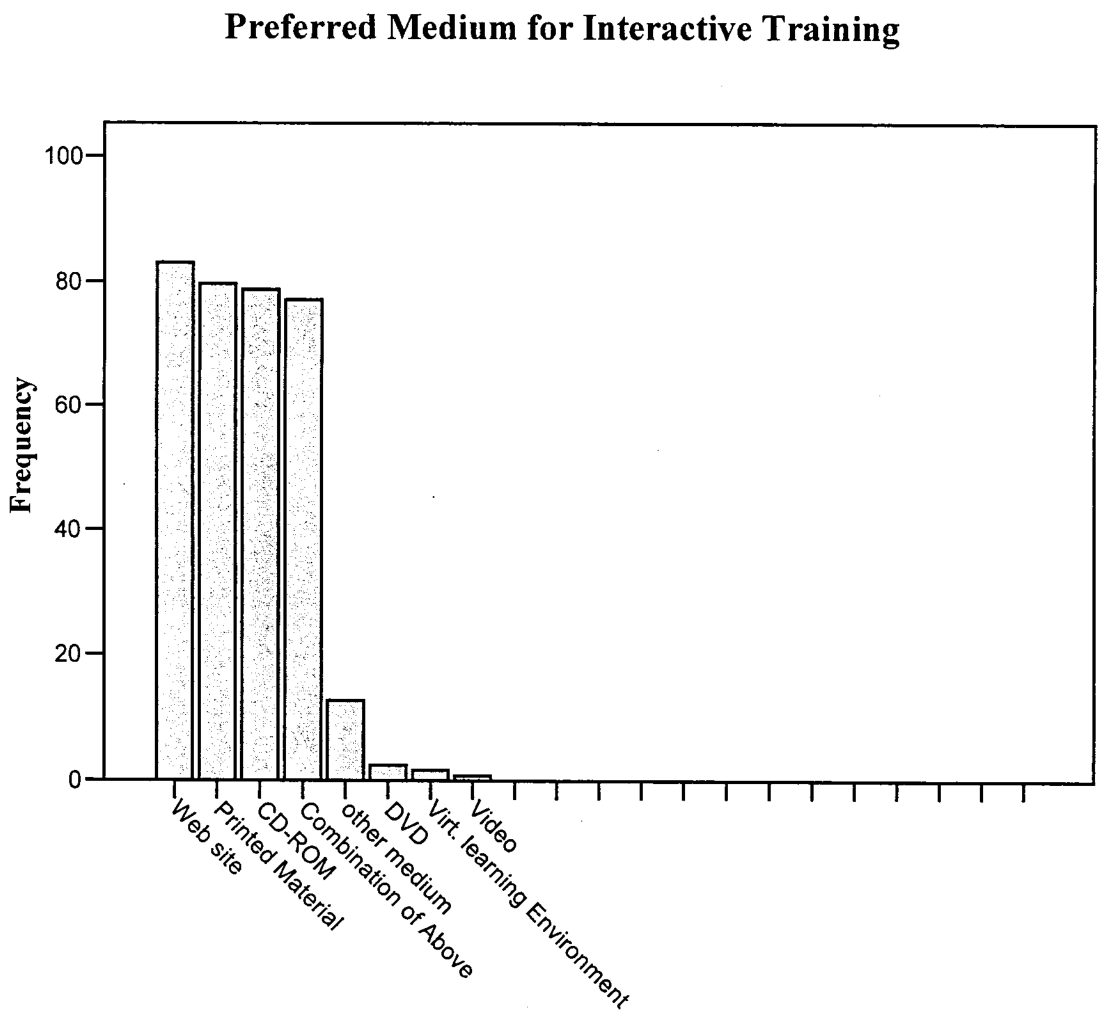

Figure 16 – Preferred Medium for Interactive Training

Looking then at teaching status and requested media for interactive training, full time status respondents requested the top two applications and a combination of media at similar rates to all others, and were less interested in CD-ROMs (full-time CD-Rom 43 out of 57, 75%, others CD-ROMS 50 out of 57, 87%). None of the relationships were significant at the 5% level.

Compared to all others, part time respondents requested the three top categories at a higher rate: 60 out of 71 other than part time professors and 38 out of 43 part-time professors (84.5% others vs 88.4%) part time faculty requested websites; 58 other than part time professors and 36 part time professors (81.6% others vs 83.7% part-time) requested printed material; 55 other than part-time teachers and 38 part time teachers (77.4% others vs 88.4% part time) requested CD ROMs. Requesting these media at higher rates by part-time professors may reflect the influence of females. No part-time relationship with medium was significant.

Controlling for gender in the crosstabulations of full- and then part-time teaching status and the top three requested media only found the crosstab with CD ROMs for part-time females to be significant according to a Chi-square test score of .016. This relationship is negligible with reference to the Goodman and Kruskal's score of .132. Here the 100% acceptance of CD-ROM's by females translated into strong adjusted residuals that showed these cells contributed to the overall significance score.

New Knowledge Areas

The survey provided a list of new knowledge areas from which respondents were asked to choose all those they would consider important for learning how to create accessible learning and teaching resources to meet the specific needs of students with disabilities. An overwhelming majority indicated all listed categories (Figure 17). Although findings from the section relating to barriers showed that most respondents (89%) did not select a lack of knowledge for the needs of students with disabilities as a barrier, here the most desired knowledge area was better knowledge of problems students with disabilities face, selected by 108 out of the 115 responding professors (93.9%). Obtaining better knowledge of different accessible design technologies that students with disabilities may use was close in the selection with 107 respondents choosing it (93.0%).

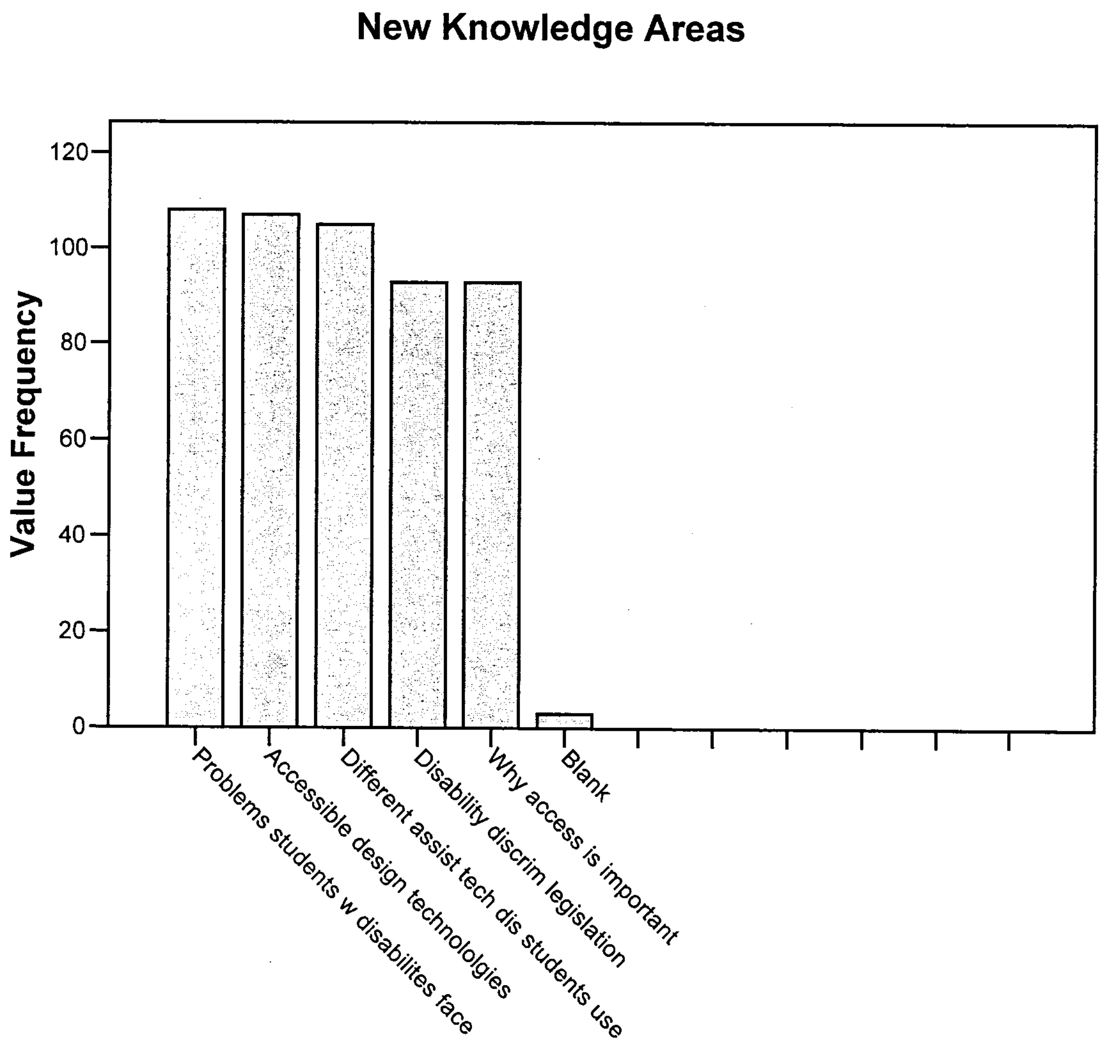

Figure 17 – New Knowledge Areas

Obtaining better knowledge of assistive technologies students with disabilities use was selected by 105 respondents (91.3%). Both better knowledge of discrimination legislation and more knowledge about why accessibility is important were chosen by 93 instructors (80.9%).

High rates for importance on all topics seems to suggest an awareness by respondents that they may be missing information regarding disabilities and may further point to an openness to learning about and accommodating for the needs of students with disabilities.

Crosstabulations showing the relationship between new knowledge areas and the extent of current knowledge respondents have show that those who claimed to have the least amount of knowledge almost unanimously checked off most categories. On a percentage basis, the desirability of all new knowledge categories appeared to have an inverse relationship with the extent of general knowledge respondents claimed to have for the first three categories, better knowledge of problems students with disabilities face, better knowledge of accessible design techniques, and better knowledge of assistive technologies. For the remaining two categories, the percentage of interest for those who claimed to have a "broad knowledge" is more than for those who have "some knowledge." Only better knowledge of different assistive technologies was not significant. Most relationships are significant with Pearson's Chi-square at .000 but negligible for all five categories as the highest reduction in error shown by Goodman and Kruskal's tau is 12%.

Examining the relationships with gender as a control variable and new knowledge areas given current knowledge base showed different patterns for males and females patterns across the five categories. Males showed decreasing interest with more knowledge on a percentage basis for the first two categories relating to problems students face and accessible design techniques. For the remaining 3 categories, males who had a broad knowledge base showed a greater interest than the middle group with some knowledge, as did females for discrimination legislation. None of the male relationships proved to be significant at the 5% level.

On the other hand, crosstabs for females showed those with the least amount of knowledge had the most or equal to the most interest shown by the other two categories for most knowledge areas, at or nearing 100% across all categories. The heaviest level of interest was shown was where all females were interested in better knowledge of assistive technology regardless of their current knowledge base. For this category, it was impossible to calculate directional statistics or perform residual analysis to indicate the strength of the relationship for females because of the constant. Another interesting phenomenon is that of those who claimed having little or no understanding of needs, only males indicated that they were not interested in having areas of new knowledge with one exception in the area of discrimination legislation when one female indicated she was not interested. In contrast to findings for males, four out of five new knowledge areas were for females given current knowledge level were significant at the 5% level but directional measures of Goodman and Kruskall tau were only as high as .24. This indicates that these relationships can be classified as small only. This is probably in part due to many 0's in the "no" category for females. Adjusted residuals above 2 found for the category little or no knowledge was important to the chi-square significance in all the female crosstabulations. In the case of knowledge as to why access is important, all three of the subcategories of current knowledge contributed to the strength of the chi-square statistic.

The crosstabulations of full-time teaching status and new knowledge areas revealed decreasing interest with more knowledge for two categories, accessible design techniques and different assistive technologies. For the last two categories regarding disability legislation and why access is important, those with the highest amount of knowledge showed greater interest than the middle category. For knowledge of problems faced, however, those who indicated the middle level of knowledge showed the most interest (100%). Only the relationship with better knowledge as to why accessibility is important was significant at the .5% level. This relationship is slight with a Goodman and Kruskal statistic of .12. Standardized residuals reveal that both little and some knowledge categories contributed to the significance of the chi-square statistic.

In the case of part-time professors, those with little knowledge seemed to show strong interest for having all knowledge areas, where the lowest interest score was 88.8% for both knowledge of disability discrimination legislation and why access is important. There was a trend towards an inverse relationship demonstrated for desirability of new knowledge areas with increasing knowledge across three of five knowledge areas. For better knowledge of accessible design, 100% of respondents with some knowledge of needs showed interest. All part-time relationships were significant ranging in strength from negligible to moderate with Goodman and Kruskal tau's varying between .027 for assistive technology and .41 for accessible design techniques. Adjusted residuals above 2 found for the little and broad categories in most cases, support the significance of the observations for part time professors and interest in new knowledge areas.

Accessibility Topics

When asked which accessibility topics they would like to have addressed to facilitate the creation of accessible e-learning materials for students with disabilities, respondents on the whole demonstrated highly polarized interest levels for more information regarding the listed topics: interest was very high for most categories and very low for a few. On the high end, assistive technology and accessibility had the greatest interest being selected by 103 out of 106 respondents (97.2%), while 100 respondents selected accessible curricula (94.3%) and 99 selected accessible design principles (93.3%). Accessibility and PowerPoint was chosen by 97 respondents (91.5%), while web development tools and accessibility was chosen by 96 respondents (90.6%) as was accessible HTML. Seven other categories polled ranged found 92 to 95 respondents interested (78% to 80.5%).

On the low end were seven rather technical categories (roughly 35% of the categories) that had 7 or fewer respondents showing interest (<=6.6%) interest. These categories probably had in common the least prior exposure, and all but one or two respondents chose the lowest confidence level, "not at all confident" for using them. Correspondingly, JavaScript or Java applets and Director/Shockwave were selected by 2 respondents (1.9%).

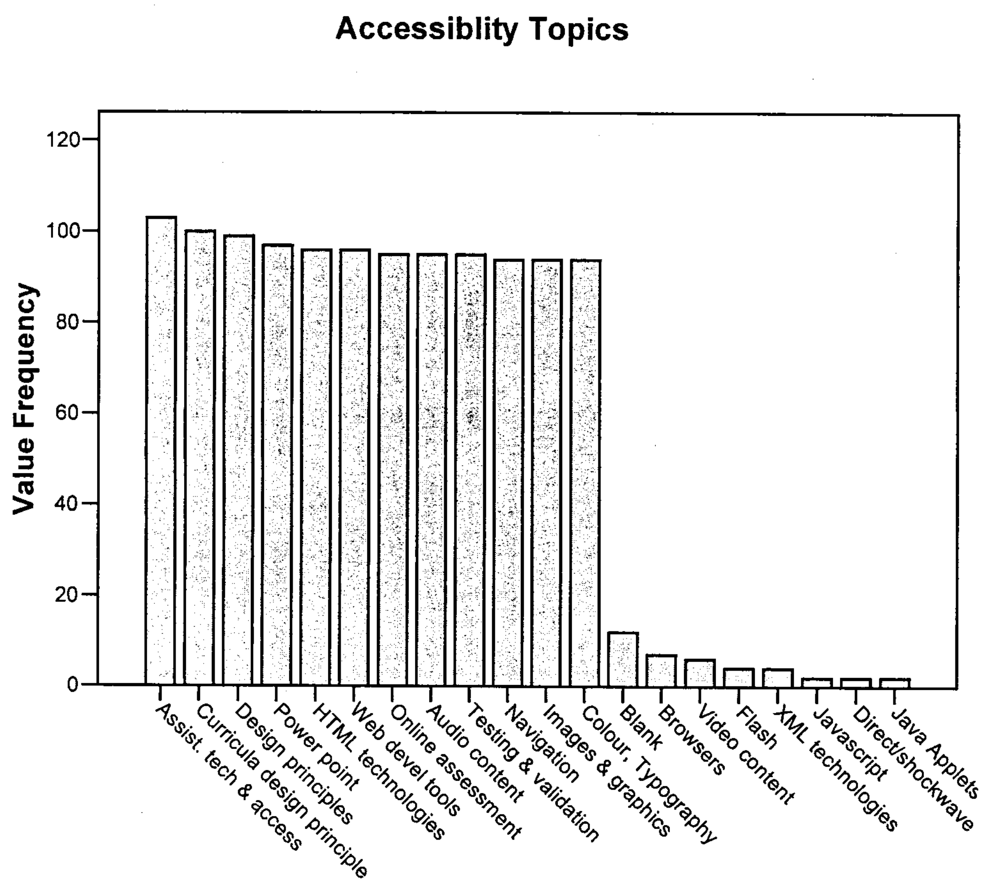

Figure 18 – Accessibility Topics

Crosstabulations involving gender and the highest scoring accessibility topics revealed some familiar patterns. Females expressed a somewhat higher level of interest than males for most categories which had generally shown popularity levels at or above the 78% for the survey population. Here, for the women answering this question, the range of interest was between 39 out of 44 (88.6%) for web development and HTML, to 44 (100%) for assistive technology and accessibility. For the men answering this question, the range of interest was between 53 out of 62 (85.5%) for colour and typography to 59 (95.2%) for assistive technology and accessibility. It is worthwhile mentioning that males showed more blanks across the board on any category as compared to females (11 males versus 1 female) which may mean that they were not familiar with the technologies listed or how they could help in providing the appropriate information for students with disabilities.

The crosstabulation statistics for gender and the most popular accessibility topics showed that none of these relationships were significant at the 5% level. Females expressed slightly less interest than males in web development tools (57 males 91.9%, 39 females 88.6%) and several categories that had been below the 6.6% general interest level. This includes accessibility and video content, browsers and accessibility, accessibility and flash, and accessibility and XML technologies.

For crosstabulations involving teaching status and the most popular accessibility topics revealed that full time teaching status showed only slightly more interest compared to all others for a single category, assistive technology and accessibility, 52 out of 59 full-time versus 51 out of 59 respondents from all other teaching status' (88.1% versus 86.4%). For all other categories, the full time professors showed equal interest or were within seven percentage points below all others.

Looking at part time status professors, a higher rate of interest was shown for most categories when compared to all others. The biggest difference in interest was roughly 11% for accessibility and PowerPoint where 38 out of 39 part-time professors responding chose it (97.4%), and 59 out of 67 professors from all other categories chose it (88.1%). The exceptional categories with lower part-time interest were browsers and accessibility and accessibility and video content which were also of lesser interest by females as a group. None of the most popular accessibility topics for crosstabs with either part time or full time teaching status were significant. Adding a control variable of gender did not yield any significant results. This means that all observations or trends for full or part-time teachers and accessibility topics are probably due to chance only.

Qualitative Descriptive Data Taken from the Follow-Up Interviews with Faculty

Summary of interview responses

In this Section the interview data from the semi-structured interviews are summarized (see Appendix C). Where relevant, the interview data are followed by additional comments from the thirty faculty informants.

The interview data provide information of a testimonial nature, giving us another level of information on how informants felt about serving students with disabilities. The interview schedule was developed on the basis of discussions with faculty who had interest in and/or experience teaching students with disabilities at the post-secondary level and of a pilot study, described earlier in Chapter II of this dissertation (Bissonnette, Schmid, & McWhaw, 2002). It is certainly doubtful, especially with reference to the selection of participants (those who participated in the follow up interviews may be characterized as keen participants in the provision of accommodations to students with disabilities -- leading to possible response bias), whether this interview data may be considered representative by all the readers. The interview schedule, however, did not so much aim at getting representative results as at exploring in greater depth for the first time the opinions of those concerned and thus isolating indications of problems and, if possible, proposals and ideas for solving these problems. I, therefore, do not consider it to be particularly harmful, if the interviews were not representative. I do, however, wish to point out that due to the given small absolute number of thirty informants, results concerning faculty may at best be interpreted as indications of a general tendency.[1]

Attitudes and Experiences teaching Students with Disabilities

The attitudes of faculty informants were the initial starting point of the follow-up interviews. Since one of the primary objectives of the study is to provide a general picture of the existing knowledge of faculty of the specific needs of students with disabilities in their classes, information was obtained about basic attitudes toward both physical and learning disabilities. The interviews were designed to move from general personal attitudes towards disabilities to the specific level of interpersonal dealings within an academic environment at the post-secondary level. Major societal attitudes are discussed first because they determine to a great extent the way people react in specific situations. Indeed, I am suggesting to the reader that these interview informants, through their personal Vignettes, point out some important dynamics that we need to review and understand. Let us start with general attitudes.

General Attitudes

From a sociological perspective, it is helpful to summarize what interview informants said about what happens in their daily interactions with people as they socially create their world. In our daily contacts/interactions we communicate with each

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1 For more on the methodology see Ommerborn & Schuemer 2000.

other in verbal and nonverbal ways. We stimulate, influence and modify each other's behaviours by verbal and nonverbal communications. But what happens, when say, to put it in the context of the post-secondary environment the student and a professor interact with each other as they negotiate around dealing with the requirements of a course. I am suggesting that the normal interaction pattern is often thrown out of balance. Several faculty informants said that they, when confronted for the first few times by a student with a disability who said that they could not do something and asked for a particular dispensation, gave in to them, assuming in the words of one informant “that's got to be that way”. This faculty view is consistent with a body of literature, described earlier in Chapter II that suggests that faculty in general, are less comfortable with students with physical and learning disabilities and to have lower academic expectations in working with these students than with students without disabilities (Houck, Asselin, Troutman, & Arrington, 1992; Leyser, 1989; Minner & Prater, 1984).

Research findings also show, however, that faculty attitudes are not uniform. Markedly more positive attitudes were found among faculty informants who reported more than five prior teaching experiences with students with disabilities of various types throughout their teaching careers. Five (16.7%) of the informants described a similar proactive approach in supporting students with disabilities. They described situations in which they were very concerned about student' requests to hand in a paper on audiocassette in degree and honours courses. The students (some with visual impairments and others with learning disabilities) were trying to renegotiate how the papers and assignments would be handled because the instructors wanted footnotes and references included. The students, upon further questioning by course instructors, did not know how to use the advanced features in word for such writing/referencing paper components. The students were good students; and fortunately the professors, because they had some knowledge of how adaptive computer hardware and software worked with mainstream hardware and software, wanted to make sure that they were taking full advantage of what was available to them, given that they had the technology in their possession. This finding from the interviews again supports previous literature in this area pointing to faculty willingness to provide accommodations, researchers indicate that faculty are often willing to provide accommodation for students with physical and learning disabilities but are concerned with maintaining academic integrity (Houck, Asselin, Troutman, & Arrington, 1992; Matthews, Anderson, & Skolnick, 1987; Nelson, Dodd, & Smith, 1990; Nelson, Smith, & Dodd, 1991). As Matthews et al. (1987) noted, faculty "would accommodate to a point, but not to the extent of lowering certain course standards involving instruction, assignments, exams, and academic policy" (p. 49).

Utilizing insights from symbolic interactionist literature and the specific work of Erving Goffman (Goffman, 1963), I shall frame the responses from the faculty informants under the concept of "Handicapism".

"Handicapism" is a paradigm through which to understand the social experience of those described as "disabled," and "handicapped". "Handicapism" is a set of assumptions and practices that promote the differential treatment of people because of apparent or assumed physical, mental or behavioural differences. The assumptions and practices need to be understood in relation to face-to-face interaction, culture and social structure and the college environment of the classroom. Two terms, "prejudice" and "stereotype" are inherent in this analysis.

Prejudice

Prejudice is any oversimplified and over generalized belief about the characteristics of a group or category of people. Prejudice toward the "handicapped" is indicated by such indicting assumptions as:

- They are innately incapable;
- They are naturally inferior (the mind set is "thank God I'm not you");

Stereotype

Prejudice is the general disposition, while stereotype refers to the specific content of the prejudice directed towards specific groups. The blind are great musicians; the deaf are great painters. Although inaccurate, a stereotype is often steadfastly maintained. The maintaining processes are themselves part of "Handicapism". First, peers and culture support the transmission of stereotypes and therefore constantly reinforce them. Second, and perhaps most importantly, "handicapped" people are treated in ways that correspond to their stereotypes and are rewarded for living up to others' image of them. Thus they learn the role of the "handicapped" and fall victim to the self-fulfilling prophecies.

In looking at the interaction patterns there is the tendency for the disability (the alleged difference) to take on tremendous significance in the non-handicapped person's mind -- it becomes the master status. This often results in the non-handicapped person either being overly gracious and overly sympathetic: ("It must be hell to go through what you go through"); or patronizing; or in some other ways be insensitive or ignore people with disabilities.

Interview data on faculty integration of technology into their courses

Twenty-eight out of the thirty (93.3%) faculty informants indicated that they were using technology in their courses in the following ways (refer to Table 9):

Table 9 - Description of Technologies used in Courses

PowerPoint overheads or slides in class:	24	80.%
Show videos:	6	20%
E-mail to communicate with students:	22	73.3%
Computer-mediated conferencing for student discussion:	13	43.3%
Use labs (language)	1	3.3%
Have a course web site:	21	70%
Provide PDF files for students to access or download:	18	60%

Twenty (66.7%) of the interview informants, who reported using technology in their courses, felt that the students were taking advantage of the technology provided.

Interview informants felt that those students with disabilities who were using adaptive technologies were gaining benefits in the following areas:

- Easier to write essays and other written contributions
- Easier access to information
- Internet access
- Making communication with instructors possible / easier
- Making it possible / easier to participate in, chats
- Making communication with fellow students possible / easier
- Making communication with fellow students possible / easier
- Making it possible / easier to research for literature

- Easier ordering of library books
- Making study of course material possible / easier even for the visually impaired (e.g. by enlarged presentation of texts on screen)
- Diverse possibilities for use other than study purposes

Eleven (36.7%) of the interview informants felt that students with disabilities were not fully utilizing technologies of either a mainstream or adaptive design. Interview informants felt that the presentation of www-sites or of multimedia-were key areas where those students with disabilities were areas where full participation was problematic. Faculty felt that their lack of general knowledge about disabilities contributed to this problem and asked for future training in these areas of web design and multi media presentations.

Interview data on student needs for technology integration

When asked how they had taken into account the needs of their students with disabilities when developing the technologies used in their courses, twelve (40%) of the informants indicated that they had not considered the needs of these students while six (20%) reported partially taking into account the needs of their students with disabilities. Two (6.7 %) informants said that they had definitely taken into account the needs of their students with disabilities. Only six (20%) of the thirty faculty informants said that they were familiar with adaptive computer hardware and software for students with disabilities. Only nine (30%) had consulted with the Concordia University Office, "Services for Disabled Students", about which types of adaptive technologies are available to these students.

Interview data on accessible e-learning materials

While the present study demonstrates that faculty at Concordia are willing to make accommodations for students with disabilities in the classroom such as providing handouts with larger fonts or describing graphics or PowerPoint slides to students who are visually impaired, faculty informants did not indicate that they were ensuring the accessibility of their e-learning materials and websites for students with disabilities. The finding that many faculty interviewed had not taken into account the needs of their students with disabilities seems to represent a crisis in providing access to technology for this population. The present study confirms an earlier study (Fichten et al, 2000) that there is a lack of awareness by faculty on how to make technology accessible to students with disabilities. It further points to very practical problems in designing for access of e-learning materials as some of the following informant comments will show. Faculty informants indicated that the following were significant barriers to creating accessible e-learning materials for students with disabilities: 15 (50%) of the informants pointed to a lack of time as the primary barrier preventing them from creating accessible e-learning, by far the most common barrier, ahead of difficulties in developing a prioritised management plan for redesign Ten (33%) informants described a lack of support for authoring tools and a lack of knowledge of the needs of students with disabilities as additional barriers.

The interview informants were asked if they used software packages such as PowerPoint, Word and Excel, in the preparation of their course materials. Those faculty informants who indicated that they were using these packages spoke in considerable detail about problems they had encountered when creating content and described their need to develop skills on specialized creation tools to meet the requirements of students with disabilities. Those faculty, describing themselves as regular and confident users of Microsoft products, asked for specific access related information on the following:

- Word Accessibility
- Excel Accessibility
- PowerPoint accessibility (what are the Accessibility Problems with PowerPoint?, procedures for extracting PowerPoint content into a Word document and/or text file)
- E-mail and chat accessibility

Faculty informants indicated that there was also a need for access related information in the following areas:

- Designing accessible web pages (the need for tips for accessible web design using Concordia's Site Generator)
- Information on accessible web checker products)

Word Accessibility

Three faculty informants reported that they provide electronic versions of their course content to students, including those with disabilities in one of 2 different ways.

They provide an electronic document on a disk or as an e-mail attachment, or they may post it online where the students can access it. Based upon prior experience working with students with visual and learning disabilities, concerns were expressed about what to do when a student is not comfortable using Word. One informant asked: "Do faculty have the right to expect the student to develop that minimal know-how to use their adaptive technology to read the file format provided to them?". The informant felt that providing a Word document should provide no technical accessibility issues at all.

The three informants also expressed concern over knowing what the disabilities of the students were. If the student is blind and using a screen reader, one informant noted, then such considerations as: format features and font sizes to convey information had to be addressed.

Finally, one informant (who described herself as an "advanced user of Word") raised concerns about the inclusion of Pictures. Noting that she had included pictures for purely decorative purposes that would not assist the learning of students with visual and or some types of learning and cognitive disabilities, she acknowledged that such a style of picture inclusion would indeed give rise to a complication. At the same time, however, she noted that pictures that actually enhance the communication or provide a redundant communication of what is in the text will be extremely helpful for students who are primarily visual learners including those with learning disabilities.

Excel Accessibility

In order to understand the issue of accessibility raised by faculty when using Excel, it is important for the reader to understand what spreadsheets are. Spreadsheets are essentially two-dimensional representations of a number of separate items with the spreadsheet portraying how the items relate to each other. Someone looking at a spreadsheet normally quickly grasps the big picture showing the major relationships and then understands the cells, columns and rows in that context. Understanding the different ways that users who are blind or who have limited vision experience a spreadsheet will help the creator design a spreadsheet that will minimize their problems.

Someone accessing a spreadsheet with a screen reader first hears the individual cells and has to explore the spreadsheet part by part in order to build a mental construct of the overall picture with its relationships. Once the overview has been understood, the screen reader user can return to understand the parts in terms of this larger context. Modern screen readers now include enough intelligence to help the user construct the big picture more easily, that is, piece by piece. A user with limited vision using screen magnification software has a somewhat similar problem. While he or she can see several cells and parts of columns and rows at one glance, the screen magnification software still restricts the field of vision to one region of the spreadsheet. This user has to scroll left, right, up and down to construct a mental picture of the whole spreadsheet and to understand its relationships. Users who have learning disabilities are capable visually of looking at the entire spreadsheet at a glance. However, it may be a confusing jumble for them meaning they may not grasp the major relationships of the spreadsheet either. They may benefit from restricting their field of vision to smaller regions and build a picture piece by piece like someone with low vision.

Two faculty informants who reported working with students and Excel files, raised the question: “How can we design a spreadsheet to make the task of these students with disabilities easier?" They asked for specific tips to be developed and made available to them in this area.

PowerPoint: A Look at its Present Usage by Faculty

In order to better understand the issues being raised by informants around the Accessibility Problems of PowerPoint, it is helpful at the beginning of the discussion to recall what PowerPoint was designed to do. PowerPoint was designed as presentation software, that is, as software that a speaker can use to provide visual reinforcement for a lecture to a group of people. It is intended to fill some of the functions of a blackboard. It can have bullets providing a framework for the presentation. When listeners have their minds wander, the outline can help them refocus and find where they are in the presentation. Like a blackboard, it enables the presenter to provide visual enrichment, pictures, charts, graphs where the speaker can focus the audience on a complex set of items, statistics for example, and make detailed reference to such items.

Because PowerPoint is on a computer and not on a static blackboard, the presentation can be further enriched with sounds, animations and a host of similar multimedia features. The slide can appear a line at a time or fly in from the side. The presentation can be much more than white chalk on a blackboard. It can have different background and foreground colours. Different parts can be in different colours to be attention-getting. The background can be patterned in a variety of ways. The possibilities are limited more by the designers imagination than by the technology itself.

In discussing the accessibility problems of PowerPoint for students with disabilities, four faculty informants presented two scenarios to illustrate their concerns.

First I shall present the situation where accessibility problems arise in a lecture-type face-to-face presentation. Then, I shall describe what informants said about what problems exist when they handed a PowerPoint file to a student with a disability.

Accessibility problems in a face-to-face lecture:

The informants began by stating what they felt to be obvious--that is, the major problem is that anyone in the class who is totally blind or who has severe limited vision cannot read the PowerPoint display. They noted that so long as they adequately verbalized their content during the presentation/lecture, these students would not miss any significant content. The informants noted that as long as they remembered to read the slide or made sure that they covered the content verbally then all students would be included. One informant spoke of his use of pictures and graphics; he noted that he had to develop a conscious strategy designed to provide an actual description or two of his students would have missed out on key concepts in the course.

One informant noted that anyone in the class who has limited vision but who can see the display or class participants with either visual or cognitive processing disabilities will have different accessibility issues. These issues focus around Colour contrast, font style and size. Foreground and background colour contrast is usually significant for both low vision people and those with learning disabilities. Font style and size are similarly important for both groups. Cluttered displays with patterned background will be confusing for both groups as well.

Accessibility problems of PowerPoint for persons with disabilities when viewed on their own computer:

The last comments about colour, font etc. for users with low vision and with learning disabilities are the same on their computer as in a lecture hall. However, to some extent this is not as difficult if the user has sophisticated screen magnification software that will let them modify some of the display features for their specific needs. When the presentation is given to a user who is blind, the problems will vary depending on the screen reading software the user has and on the user's skill in using that software. One faculty informant mentioned that he found it easier than he expected to deal with the access issue because his student was using a recent version of the Freedom Scientific JAWS screen reader software he discovered would interface with PowerPoint. It will read text on slides very well. When text comes in from the top or sides, this usually will work too. The informant noted that images are a problem.

The same informant reported that he was surprised that a second visually impaired student, who was registered in the same course, using a different screen reader software package, was not able to use the PowerPoint presentation at all. The informant spoke of his search for a way to help the student. He eventually found a way to extract PowerPoint content into a Word document.

All informants asked that tip sheets be made available to help in this area of course presentation. Informants felt that the Concordia should develop a web site containing these and other tips for helping faculty deal with access issues.

E-mail and Chat Accessibility

Twenty of the faculty informants spoke of their extensive use of e-mail for communicating with students -- everyone will already be familiar with it. "You can be assured of easy communication", one informant noted.

Many people are also avid users of chat or instant messaging programs. Many students are addicts of this means of communicating with their friends. While chat programs were at one time inaccessible for adaptive software, all of the major chat programs are now accessible, that is, the major programs such as Yahoo and Microsoft. In contrast, the chat programs in courseware systems usually are not accessible, as was noted by six faculty informants. One informant reported that WebCT (World Wide Web Based Course Tools) was a problem: "When the chat was designed to be a group discussion, keeping track of multiple simultaneous discussions was difficult."

Most faculty informants who used desktop messaging software to communicate with students using adaptive software said that they found such desktop messaging software useful to talk individually with a single student by scheduled appointment.

Site Generator and accessible Web Page Design

Because Site Generator, developed in-house by Instructional and Information Technology Services (IITS) at Concordia University, was the tool used by faculty in 2003/2004 for the creation of course web sites (the year I conducted my research) I asked faculty informants to talk about their experiences working with it. Site Generator enabled faculty to create a course Web site without any technical knowledge and without having to install any software. Site Generator gave faculty an electronic location for academic material, as well as a platform for downloadable hand-outs, files, and links to reference material. Site Generator was also used for a multitude of other tasks, including online quizzes, discussion boards, managing assignments, as well as a chat system where professors select from a public or private real-time discussion forum. The system was designed to operate as a word processor, with cut and paste and other Word functions and allowed faculty to organize course and academic material online from anywhere in the world -- all without downloading software and with no HTML experience.

One informant described how he had come to use Site Generator to build web sites for his four courses. He reported that he liked the fact that he no longer had to reiterate his lecture material to students who had missed a class. He uses his sites to post lecture notes, post links – anywhere from 10 to 30 – so that his students can easily access supplemental information.

Informants were very pleased that they had the opportunity to take a three-hour training course, offered by the IITS Training & Development Group where they could complete the initial phase of building their Web site. One faculty informant noted that IITS had also created a very helpful "SG Help and Tutorials CD" which is given to those upon completion of the course.

Accessibility checkers

In order to understand the comments about site generator made by one faculty informant about his efforts to check his course materials for accessibility, it is necessary to provide the reader with a very brief description of Online checkers. Online checkers work with a Web browser. A URL is entered into the edit field and a report of accessibility issues appears in the browser. There are three popular checkers: Bobby, Cynthia Says and The WAVE. They are free and provide a good start in evaluating Web pages.

Onboard checkers are software programs that can be installed on a creator's computer. Generally speaking, they are more sophisticated and allow page creators to evaluate an entire site or portion of a site at one time. Courseware systems such as Blackboard, WebCT, Ecollege and Site Generator present a problem for accessibility checkers. Once content has been placed in any of these systems, online checkers will not work, because the systems require a username and password to enter the system. There is work being done to remedy this situation.

When informants were asked if they had tested their materials created through Site Generator to ensure that all of the web-based materials are Bobby compliant, faculty were generally not aware of this and other testing tools. According to one informant who tried testing his site with Bobby, "the frames based - MS internet explorer oriented site generator programme is anything but Bobby compliant." Informants were all in agreement that a list of what needs to be on a university/course website has to be developed by the Office for Students with Disabilities (OSD) and IITS. A short list of what might make websites at Concordia more accessible for students with disabilities, potential students and faculty should also serve as a useful flyer for faculty orientation for those faculty members who prefer to design their own websites, noted two informants.

Training

Faculty respondents indicated that they would be interested in receiving further training. Twenty-five of the interview informants asserted that they would prefer receiving hands-on just-in-time training when they have a student with a specific disability who requires accommodations in their courses. With regard to the type of technology used, the informants felt that a web site approach was preferable. There was general agreement among informants that the topic areas in Figure 16 should be included for training in a guide to creating accessible e-learning: accessible design principles, accessible navigation, assistive technology and accessibility, accessible on-line assessment and accessibility and video. One informant asked for specific advice and examples of how to utilize accessible design principles in creating multi-media learning resources.

The issues, described above, highlight the need for an institutional response to the broad issue of providing support to faculty for the design and development of accessible e-learning materials within an electronic classroom. The institutional implications are discussed in greater detail in Chapter V.

CHAPTER V

SUMMARY AND CONCLUSION

This chapter includes a summary of the components of this study (purpose, problem, methods and procedures, and results). Limitations of the study are also presented, and the practical strategic implications for those involved in providing support to faculty adopting educational technology are outlined and discussed. A discussion of how the present study contributes to the body of knowledge on the topic of the use, or the utility of computer or information technologies in the postsecondary education of students with disabilities is provided. The chapter concludes with suggestions and recommendations for future research.

Summary of the Study

Purpose

As faculty learn to integrate computer-based communications technologies into their courses, we have an opportunity to train faculty and administrators to become more aware and interested in the potential for including students with disabilities into full participation in education through the uses of technology. If we are to meet the needs of professors who are under pressure to learn "on-the-fly," and require immediate access to information and resources critical to the success of students in their classrooms today, we must develop new and innovative ways to support them with the information they need.

Problem

Utilizing the concept of "universal design" in this study, I explored the effectiveness of new, online technologies for the provision of just-in-time, customized learning programs to meet their urgent need for information on accommodation for students with disabilities.

To address the topic of faculty education I first examined the body of literature on the role of faculty in providing access for college students with disabilities and how this role is being defined and clarified over time. Various sources in the literature were also examined that serve to shape the faculty role including students with disabilities, and faculty themselves. Next, current practices in faculty education pertaining to college students with disabilities were reviewed. Implications of the discrepancies between the evolving faculty roles and current educational practices were then discussed. Guiding questions were proposed for expanding efforts and models in faculty education that keep pace with the evolving faculty role in providing access for college students with disabilities as they learn to integrate the new technologies into their courses.

The present study further explored training over internet, listservs, e-mail, or CD-ROM that can be provided in various self-paced formats. Using 344 Concordia University faculty members identified as having students with disabilities enrolled in their courses during the 2003-2004 academic year as a test bed, my research was carried out to demonstrate the interest in and the need for online instructional technologies for delivery of professional development opportunities to educators of students with disabilities at the post-secondary level.

Methods and Procedures

I proposed a three stage model for carrying out the research and faculty inservice training in chapter I. Phase one of the model involved the distribution, collection, and evaluation of faculty surveys that addressed attitudes, knowledge of various handicapping conditions, and accommodation. The findings from Phase 1 form the basis of my current study.

Phase 1: Methodology

For the first phase of the three stage model, I employed a mixed methods approach -that is, a survey and semi-structured interviews with the Concordia University faculty.

The sample for this exploratory study consisted of 344 full-time and part-time Concordia University faculty members--teaching in the faculties of: Arts & Science, Fine Arts, The John Molson School of Business (JMSB), and Engineering & Computer Science-- identified as having students with disabilities enrolled in their courses during the 2003-2004 academic year. Altogether one hundred and eighteen faculty members completed the questionnaire representing a participation rate of 34.3%.

As part of the triangulated methodological approach in this study, I complemented the quantitative survey with one-on-one follow-up interviews. This was done in order to learn more about situations professors encounter when making course materials available through computer-based technologies, specifically with regards to key frustrations, lessons learned, and best practices. Common questions in both the survey instrument and interviews assisted me in distinguishing attitudes and behaviours which were similar for both samples of the survey population. This design yielded compelling information about faculty use, expertise, and expectations of technology within a university community.

In the following section of this chapter I shall present a summary of the results and findings and conclusions of this study.

Results

Summary of the Faculty Survey Results

Table 10: Summary of the Qualitative Descriptive Data Taken from the Follow-Up Interviews with Faculty

Relationship Trends	Survey Population	Male	Female	Full-time	Part-time
Use Technology(tech) to deliver material					
Use of technology in course delivery was associated more with full-time teaching status and with males.	N/A	Sig., slight	Sig., slight	Sig., slight	Not sig.
Use Tech & Tech. Benefits to Students					
Higher benefit ratings were associated with more tech deployment in delivering courses.	Not sig.	Not sig.	Sig., small	Sig, slight	Not sig.
Past # Experiences & Consideration of Student Needs when Developing Tech.					
Consideration was associated with more experiences.	Sig., slight	Not sig.	Sig., small	Sig. slight	Sig., small
Past # Experiences & Confidence in Material Accessibility					
Greater confidence was associated with more experiences.	Sig., small	Not sig.	Sig., small	Not sig.	Sig., small
Past # Experiences & Knowledge of Needs of Students with Disabilities					
Higher self-ratings of knowledge of needs were associated with more experiences.	Sig., slight	Sig., slight	Sig., small	Not sig.	Sig., small
Compliance Goals & Time to Reach Compliance					
Longer times to reach compliance were associated with fewer no current goals.	Sig., small	Sig., small	Sig., small	Sig., small	Sig., small
Current knowledge & Desirability of New Knowledge Areas (various categories).					
More interest in new knowledge areas was associated with less current knowledge.	Most sig., slight	None sig.	Most sig, slight to small	Most insig, except one slight.	All sig, slight to moderate

Summary of the Qualitative Descriptive Data Taken from the Follow-Up Interviews with Faculty

Attitudes and Experiences teaching Students with Disabilities

The attitudes of faculty informants were the initial starting point of the follow-up interviews. Since one of the primary objectives of the study is to provide a general picture of the existing knowledge of faculty of the specific needs of students with disabilities in their classes, information was obtained about basic attitudes toward both physical and learning disabilities. Several faculty informants said that they, when confronted for the first few times by a student with a disability who said that they could not do something and asked for a particular dispensation, gave in to them, assuming that, in the words of one informant, "that's got to be that way."

My research findings also showed, however, that faculty attitudes are not uniform. Markedly more positive attitudes were found among faculty informants who reported more than five prior teaching experiences with students with disabilities of various types throughout their teaching careers. Five (16.7%) of the informants described a similar proactive approach in supporting students with disabilities.

Technology integration

Twenty-eight out of the thirty (93.3%) faculty informants indicated that they were using technology in their courses in the following ways:

Table 11 - Description of Technologies used in Courses

PowerPoint overheads or slides in class:	24	80.%
Show videos:	6	20%
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Have a course web site:	21	70%
Provide PDF files for students to access or download:	18	60%

Twenty (66.7%) of the interview informants, who reported using technology in their courses, felt that the students were taking advantage of the technology provided.

Interview informants felt that those students with disabilities who were using adaptive technologies were gaining benefits in the following areas:

- Easier to write essays and other written contributions
- Easier access to information
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- Making communication with instructors possible / easier
- Making it possible / easier to participate in, chats
- Making communication with fellow students possible / easier
- Making it possible / easier to research for literature
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- Diverse possibilities for use other than study purposes

Eleven (36.7%) of the interview informants felt that students with disabilities were not fully utilizing technologies of either a mainstream or adaptive design. Interview informants felt that the presentation of www-sites or of multimedia-were key areas where those students with disabilities were areas where full participation was problematic. Faculty felt that their lack of general knowledge about disabilities contributed to this problem and asked for future training in these areas of web design and multi media presentations.

Technology integration and students with disabilities

When asked how they had taken into account the needs of their students with disabilities when developing the technologies used in their courses, twelve (40%) of the informants indicated that they had not considered the needs of these students while six (20%) reported partially taking into account the needs of their students with disabilities. Two (6.7 %) informants said that they had definitely taken into account the needs of their students with disabilities. Only six (20%) of the thirty faculty informants said that they were familiar with adaptive computer hardware and software for students with disabilities. Only nine (30%) had consulted with the Concordia University Office, "Services for Disabled Students", about which types of adaptive technologies are available to these students.

Accessible e-learning materials

While the present study demonstrates that faculty at Concordia are willing to make accommodations for students with disabilities in the classroom such as providing handouts with larger fonts or describing graphics or PowerPoint slides to students who are visually impaired, faculty informants did not indicate that they were ensuring the accessibility of their e-learning materials and websites for students with disabilities. Faculty informants indicated that the following were significant barriers to creating accessible e-learning materials for students with disabilities: 15 (50%) of the informants pointed to a lack of time as the primary barrier preventing them from creating accessible e-learning, by far the most common barrier, ahead of difficulties in developing a prioritised management plan for redesign Ten (33%) informants described a lack of support for authoring tools and a lack of knowledge of the needs of students with disabilities as additional barriers.

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Faculty informants indicated that there was also a need for access related information in the following areas:

- Designing accessible web pages (the need for tips for accessible web design using Concordia's Site Generator)
- Information on accessible web checker products)

Training

Faculty respondents indicated that they would be interested in receiving further training. Twenty-five of the interview informants asserted that they would prefer receiving hands-on just-in-time training when they have a student with a specific disability who requires accommodations in their courses. With regard to the type of technology used, the informants felt that a web site approach was preferable. There was general agreement among informants that the following topic areas should be included for training in a guide to creating accessible e-learning: accessible design principles, accessible navigation, assistive technology and accessibility, accessible on-line assessment and accessibility and video. One informant asked for specific advice and examples of how to utilize accessible design principles in creating multi-media learning resources.

Discussion of the Implications of the Results of the Present Study

Results from this exploratory case study of Concordia University have provided a unique opportunity to identify practical strategic implications for those involved in providing support to faculty adopting educational technology. An analyses of the data sets resulted in four emergent themes:

- benchmarks of technology integration,
- faculty expectations for building technical skills,
- enhancements to the culture of educational technology
- technology as a new social context for learning.

Benchmarks of Technology Integration

"Educational technology" does not have a universal definition. It is a complex mix of hardware and software embedded in various educational contexts. The present study outlines Concordia University's definition, addressing those tools used by faculty and students in the service of education. Technologies integrated into this definition included course Web sites, PowerPoint, discussion boards, e-mail, library reserves, and use of the Web for research.

Faculty Expectations for Building Technical Skills

Faculty wanted to improve their ability to use educational technology effectively. Faculty reported in the surveys and interviews that they, as well as instructional design support staff, are being encouraged and even pressured to put increasing amounts of course content online. Sometimes this is for an online course, and sometimes it is for a "hybrid course" which is being conducted partly in a campus classroom and partly on the Web. Faculty and staff who are only learning to integrate basic computer applications as part of their personal work such as word processors, PowerPoint and e-mail find themselves facing technical hurdles they had hoped to avoid. To add to this burden, faculty informants expressed concern about the additional requirement that this content has to be designed in such a way as to meet the technical requirements for that content to be accessible for students with disabilities using specialized interfaces. While open to doing what was necessary to make course content accessible, they felt that this added dimension was an overwhelming task for them. The result may be that many technically challenged faculty and content designers may not comply with such requirements.

One side of the equation for setting up new accessibility training for professors involves their current technical skills or predisposition towards using technology. The present study explored current technology practices by professors as well as the data for knowledge, attitudes and confidence when dealing with the needs of students with disabilities. As has already been noted, several faculty informants said that they, when confronted for the first few times by a student with a disability who said that they could not do something and asked for a particular dispensation, gave in to them, assuming that

"that's got to be that way." This faculty view is consistent with a body of literature, described earlier in Chapter II that suggests that faculty in general, are less comfortable with students with physical and learning disabilities and to have lower academic expectations in working with these students than with students without disabilities (Houck, Asselin, Troutman, & Arrington, 1992; Leyser, 1989; Minner & Prater, 1984).

My research findings also show, however, that faculty attitudes are not uniform. Significantly more positive attitudes were found among faculty informants who reported more than five prior teaching experiences with students with disabilities of various types throughout their teaching careers. The implication for training here is that those involved in developing professional development activities must factor in at the outset the general attitudes that faculty bring to the table, based upon their feelings about those with disabilities. It is a general starting point and needs to be addressed with activities designed to help individuals identify their culturally understood attitudes towards disability in general and those specific ones they will encounter in the classroom.

The present study confirms earlier studies (Banks & Coombs, 1998; Fichten, Asuncion, Barile, Fossey & DeSimone, 2000) that suggests that professors generally don't know what kinds of things to do to ensure that students have full access to their electronic course materials. It raises the question of how best to incorporate computer technologies into courses in specific disciplines at a time when such computer technologies are not yet evolved. More specifically, the present discussion gives us an opportunity to look at workplace learning -- that is, the interplay between the workplace and the university in facilitating desired faculty training and learning that can lead to success. The role of the faculty is vital to providing educational experiences and programs that ensure equal opportunity for all students. The purpose of inservice training in this regard is to provide direction for positive interaction between faculty and students. Jastram (1979); Morris, Leuenberger, and Aksamit (1987); Mangrum & Strichart (1988); Fichten, C.S., Goodrick, G., Tagalakis, V., Amsel, R. & Libman, E. (1990) found a significant positive relationship between inservice training and faculty attitudes toward and knowledge about students with disabilities. The present study, along with others, described earlier in Chapter II of this dissertation, provide substantial support for the importance of inservice training in increasing knowledge and improving attitudes of faculty toward students with special needs.

From the interviews it became clear that faculty wanted university technical support in a just-in-time basis. They also wanted to receive training to assist them in developing and using technology to enhance their pedagogy -- that is, they were asking for training in how to effectively develop, use, and integrate educational technologies into their curricula. An institutional responsibility was identified-universities should consider assisting faculty with integrating technology uniformly across curricula. Faculty wanted the university to continue to support them in building information literacy skills into the courses they teach.

The findings, described above, highlight the need for an institutional response to the broad issue of providing support and training/professional development to faculty for the design and development of accessible e-learning materials within an electronic classroom. The suggestions below are not exhaustive, but are here to provide an overview of what an institution needs to consider when developing a support system to assist those faculty who wish to design and create accessible e-learning materials. Some of the suggestions have come from business literature, and have been adapted to an instructional institution's needs and concerns (Chiarelli, 2000, Chapter 3, "Computer technology and teamwork").

Time frame

A problem that occurs for many organizations is underestimating the amount of time needed for the development of a support system to assist those faculty who wish to design and create accessible e-learning materials (Mason & Bacsich, 1998). Martin et al. (1997) suggest that the time needed for development can range from three to six months, if not more, and will be relative to the amount of preparation an institution will need to do. Development and preparation issues can include:

- Creating the organizational infrastructure to support those faculty who wish to produce accessible e-learning materials. This can involve developing, organizing and maintaining the administrative aspects of a system for those creating accessible e-learning materials.
- The amount of modifications and changes that will have to be made to the curriculum in order to make it accessible to a population of users--including those with disabilities (Martin et al., 1997).
- Developing and printing manuals (Mason & Bacsich, 1998), job aids and/or other text- based information (electronic or print-based).
- The time needed to train and/or hire staff or faculty to work within an electronic environment to create accessible e-learning materials (Martin et al., 1997). For an

instructor developing an electronic classroom alone, time is still needed to learn and organize this new form of instruction.

- Organizing and providing learners with the technology they will need. This can include obtaining the technology (mainstream and adaptive hardware and/or software) (Martin et al., 1997) and preparing discs etc…(Mason & Bacsich, 1998) in order to deliver the instruction (Martin et al., 1997).

Funding

Another important issue an organization needs to consider is whether or not there is enough funding to design and produce accessible e-learning materials for learners with and without disabilities (Martin et al., 1997). This funding could include the financial resources for:

- The number of personnel that may have to be trained or hired to deal with the technology and the design and production of accessible e-learning materials (Martin et al., 1997).
- The cost of instructional materials that may have to be designed and/or developed (electronic and/or print-based).
- Technology to deliver the accessible e-learning materials. Both the software and hardware along with the technological infrastructure can be costly to set up and maintain.

Personnel

In order to produce accessible e-learning materials personnel will be needed to restructure, redesign, implement, and deliver the design and produce accessible e-learning materials.

- Within the organization who is available to assist in the development of production of accessible e-learning materials (e.g., faculty, instructional designers, graphic designers, computer technicians/programmers) (Martin et al., 1997)?
- Do faculty, instructional designers, graphic designers, computer technicians/programmers understand the issues around the design and production of accessible e-learning materials? If this understanding is lacking it may be necessary to develop instruction and/or training for faculty (Woods, 1996).

Resources and Facilities

An organization needs to determine how resources and facilities will be used and distributed within the institution and to those designing and producing accessible e-learning materials. It is imperative that the organization provide easy access to information, resources and facilities that are essential for those engaged in this production process to complete their work objectives (Mankin et al., 1996). This can involve creating specific plans and strategies to deal with the allocation of both resources and facilities (Cleland, 1996). Both Mankin et al. and Cleland are speaking from a business point of view, but these same issues are relevant within a university instructional environment.

- What resources and facilities will be available for faculty (Cleland, 1996)? Some examples are: learning materials (text-based or electronic), access to electronic and/or traditional libraries, computers and software.
- How will resources and facilities be distributed to faculty (Cleland, 1996) such as printed material, software, computers etc.? Will informational materials (e.g., manuals, job aids or other instructional materials) be mailed out or sent electronically? Will the organization have software it can easily distribute to learners or will learners have to buy it themselves?

Enhancements to the Culture of Educational Technology

Technology adoption can thrive only in a culture that supports it. In the interviews with faculty the majority of informants described the present culture and support for appropriate educational technology use as still in its nascent form. Several faculty suggestions to enhance the culture of technology included curriculum awards, release time for technology change, or crediting teaching with technology in the tenure review process.

The present study indicates that faculty are still learning about the new technologies and are interested in receiving information on the hardware and software products out there on campus -- what one faculty informant called "e-Culture".
E-Culture is a term that nicely describes:

- Information technologies
- Internet

- Communications and Telecommunications
- Intercom
- Telephone
- Instant Messaging
- Email
- Daily Living
- Appliances
- Audio visual
- Security system

The presence of this e-culture and its impact on faculty at today's universities and colleges is something the study informants commented on, indicating that they were struggling to integrate it into both their personal and working lives. E-culture, in all its forms, is found at:

- Work
- Workstation
- Copier
- Fax
- Public / Shared Systems
- Transportation
- Building Directories
- Phone in the office
- Podium and equipment

Libraries are rapidly evolving e-everything

- Library Catalogs
- Journals, Magazines & Newspapers
- Reference: Encyclopedias, Dictionaries . . .
- E-Books, E-Texts and Multimedia
- Reserves and Course Materials

At Concordia University--as well as at other colleges and universities today--students face e-Culture from the time they think of admission to the time they graduate

- Academic/career advising
- Academic resources
- Admissions
- Financial aid/tuition
- Getting around campus
- Housing
- Student organizations
- Student services
- Student Life

Those involved in providing inservice training to faculty must strive to equip course instructors so that they bring access to technology and learning to all students. One way for teachers to do that is to learn as much technology as they can, learn how to integrate that technology into their teaching and into their teaching practice and their subject curriculum. They should be familiar with technology in their own classrooms. The individual instructor's ability to embrace technology is key to changing access to online education. For those working in the field of disability services to students in colleges and universities, accessibility is about "making sure that everyone has the same information." The following two findings from the present study will be helpful to those involved in professional development activities: "new knowledge areas" and "accessibility topics"

New Knowledge Areas

Universities need to allocate resources to research that assists in facilitating thoughtful, effective, and innovative educational technology uses. This research should assist the university in integrating technology in a manner driven by pedagogical objectives, institutional standards, and student learning. There are technologies widely accepted and desired by both faculty and students. Increasing the use of these technologies requires institutional change.

When looking at strategic implications, we must look at campus-wide institutional mission statements. Mission statements must be drafted for technology adoption -- taking into account the special needs of both students and faculty with disabilities. Students and faculty have dramatically different expectations of appropriate levels of technology integration. Universities need to develop an institutional statement of expectations of technology integration and proficiency.

Higher education institutions need to consider developing detailed plans for assessing technology. Faculty are hesitant to adopt technologies that have not undergone enough research to demonstrate substantial learning gains. Universities need to develop strategies designed to assess learning gains when educational technologies are integrated into curricula and then use these strategies to assess technology in the classroom.

Educators need to assess their students' information literacy. They may wish to consider integrating content into their curricula aimed at developing their students' literacy skills. Higher education research needs to explore student uses of emerging technologies. To enhance the culture of educational technology requires facilitating clear communication among all community members. Higher education must not head blindly into the future. Large-scale institutional assessments of educational technology using multiple methods, such as this study, must be ongoing.

As part of this problem of understanding the needs of students with disabilities as faculty struggle with the emerging technologies is the need to train faculty to understand "universal design" and the benefits of these new technologies for all people with disabilities. While the philosophy and practice of Universal Design have been applied to the built environment in general, many people, particularly in Disability Support Services, see it as a means of making accessibility operational in both the online and classroom-based environment.

The significance of the present study

The significance of the present study -- indeed its contribution to the body of knowledge in the fields of disability studies and educational technology is to clearly state that universal Design is a conceptual framework for designing and developing inclusive environments. It stems from an attitude, not a prescriptive set of procedures. Its tenets challenge us to think beyond mere legal compliance by promoting new ways of viewing disability and access. Universal design reframes the concept of accessibility from "special features for a few" to good design throughout the lifespan. We are only beginning to explore the possibilities.

The present study is significant because it helps look with a fresh perspective on the question: How does the concept of "reasonable accommodations" fit in a universal design paradigm? The goal of universal design is to create environments that are usable by a variety of people to the greatest extent possible without modifications. However, we've learned from experience that no environment can ever be made completely accessible to all individuals; individual accommodations play an important role in these cases. Indeed, the second principle of universal design, "flexibility in use," speaks directly to the need for environments to be designed in ways that are amenable to accommodations. Rather than expecting a cookbook remedy for all access questions, universal design presents a framework that incorporates accessibility at the design level and encourages constant attention to the ideal of universality.

The present study is important to those working directly with students with disabilities because it raises the general question: How would approaching my work from a universal design perspective make a difference to me: (Banks & Coombs, 1998; Fichten, Asuncion, Barile, Fossey & DeSimone, 2000; Bowe, 2000; Christophersen, 2002; Preiser & Ostroff, 2001; Rose & Meyer, 2002)

...As a disability service provider? The role of a disability professional widens beyond the confines of the individual situation (documentation review, accommodation determination and coordination, funding requests for disability-specific changes, etc.). Attention shifts from individual accommodations that must be repeated each semester to sustaining, system-wide re-design aimed at increasing usability for all constituencies. Incorporating a universal design philosophy provides the opportunity to interact with the campus community in a variety of new and exciting ways: as a marketer, a coalition builder, a consultant, a specialist, etc.

...As an administrator? Universal design provides administrators at the highest levels of institutional governance with a framework to increase diversity, improve campus climate and reduce potential costs associated with retrofitting traditional designs. By adopting a universal design paradigm as an integral part of capital planning, maintenance, and growth, the campus community is encouraged to search for better, more inclusive ways of addressing all its constituencies. The result is that people all across campus spend less time, energy and money negotiating access, applying temporary "fixes," retrofitting environments and navigating physical and virtual spaces.

...As a faculty member? Incorporating the principles of universal design into the design of a class enhances the accessibility of the curriculum to a variety of diverse learners: minority students, second-language learners, returning students, students with disabilities, etc. While re-envisioning the design of a course may seem overwhelming at first, experience has shown that once faculty members experience the increase in student engagement and learning that is achieved through a universally designed curriculum, they can't imagine returning to the traditional lecture format.

Contribution to Knowledge

When one looks at education at the post-secondary level today one sees that faculty are increasingly expected to integrate students with disabilities into their mainstream classrooms. The knowledge and skills required may not be part of their previous experience or training and, in addition, such training may not be readily available to them at the time that it is required, due to the restrictions of time or campus location. My research has been developed specifically to address these issues. Concordia University is well positioned to act as a test bed to demonstrate the use and effectiveness of online instructional technologies for delivery of professional development opportunities to educators of students with disabilities at the post-secondary level. Since many of the faculty in our current audience are located in four different faculties and on two different campuses, I had a unique opportunity to study the potential benefits to participants who might otherwise find it difficult to attend professional development programs. As well, the participants in this research came from a variety of teaching environments - that is, the four Concordia faculties. This research will build on the existing programs developed by the McConnell Project, gathering feedback from participants and potential participants, to determine how best to meet their needs for online professional development.

Another challenge for faculty dealing with the integration of students with disabilities into their courses is keeping current on emerging assistive technologies that may be used by students to access information or communicate with peers and teachers. Investigation of gaps in knowledge regarding use of these technologies will allow me, the Centre for the Study of Learning and Performance (CSLP), and other organisations, to take steps to remedy this need, benefiting both the educators, and their students. Online learning facilitates this process because of the course developer's ability to quickly update course content to reflect emerging strategies for accommodation of learners with special needs. This research will contribute to knowledge regarding areas of need for support in use of online instructional technologies among faculty members. As the reader has already seen in greater detail in chapter II "Review of the Literature", equipment, training programs, opinion, technological adaptations, case studies, demonstration projects, web sites, on-line journals and policy statements proliferate. While recent research has detailed the difficulties that students with disabilities face at the college and university levels, little is known about how faculty are taking into account the needs of this population as they incorporate technology into their courses. A recent survey (Fichten, Asuncion, Barile, Fossey & DeSimone, 2000) of a small number of faculty found that professors generally do not know what to do to ensure that students with disabilities have full access to electronic course material or how access problems can be solved. A survey (Fichten et al, 2001b) of providers of services for students with disabilities at the university and college levels in Canada reported that there is a lack of awareness of faculty with the computer-related needs of these students.

While these studies have provided us with preliminary information on faculty awareness of technology integration and its effects on students with disabilities, the small sample size in the first study and the fact that service providers were surveyed rather than faculty in the second study makes it difficult to draw any substantive conclusions. Information involving faculty is essential at the local level to: a) guide policy development and implementation at the institutional level in creating and maintaining technology infrastructure support, b) inform professional development of faculty, advising them on the use of accessible technologies as they create content and pedagogical strategies, and c) advise students with disabilities on the acquisition and use of adaptive technologies and strategies to enhance their academic experience. As an example of faculty development, the institution should offer training and support for software that affords accessibility (often involving a choice at no additional cost in purchase, assistance in courseware development and effective and efficient delivery). The present exploratory study will serve both as a template for the kinds of data post-secondary institutions need to gather, and will offer advice on how said data are most effectively acquired.

In addition, the present study will be used to develop and implement recommendations, and share findings to a broad audience of educational programmers across Canada and internationally.

In Canada, the Centre for the Study of Learning and Performance (CSLP), Concordia University, represents one of the major initiatives providing professional development specifically addressing the needs of faculty who teach with a diverse range of needs, including students with disabilities. As a major contributor in the field, members of the CSLP Research Team, along with myself, are well positioned to share findings with other organizations and institutions engaged in similar activities.

These include:

- Adaptive Technology Resource Centre, University of Toronto. The Adaptive Technology Resource Centre advances information technology that is accessible to all; through research, development, education, proactive design consultation and direct service (http://atrc.utoronto.ca/).

- The NODE Learning Technologies Network, based in London, Ontario, is a not-for-profit electronic network, facilitating information and resource-sharing, collaboration and research in the field of learning technologies for post-secondary education and training. The NODE's Web site is a focal point for information and discussion forums on issues related to teaching, learning and technological development. I have followed some of the activities of NODE through online forum moderation and their online journal. Outcomes of this study will be among my contributions to NODE.
- EASI, based in Rochester New York, is a virtual organization that serves the education community by providing information and guidance in the area of access-to-information technologies by individuals with disabilities. Outreach programs include both on-site and on-line workshops, and use of web casting to research and disseminate information to colleges, universities, K-12 schools, libraries and into the workplace. Sharing the results of my study with EASI will provide them with insight into further enhancement of their online activities, and facilitate distribution of findings to a broader audience via their web site.
- SET-BC, is a provincial resource program established to assist school districts to educate students whose access to the curriculum is restricted primarily due to physical handicap or visual impairment. This group will directly benefit from my contribution of findings regarding areas of need and web-based delivery of professional development.

- EvNet: Network for the Evaluation of Education and Training Technologies provides evaluation services customized to the needs of education and training organizations (EvNet site - http://socserv2.mcmaster.ca/srnet/tools/tktoc.htm). This partnership among 60 public, private and non-profit organizations represents a $4.3 million research consortium assessing instructional technologies in work sites, schools, colleges, and universities. Findings of this study will make a direct contribution to the body of knowledge being developed by this group.

While the findings of this study will have direct applications in the delivery of online professional development opportunities for faculty at colleges and universities, the results will also be of interest to other groups, individuals and organizations who are undertaking similar programs. Further exploration of the accessible, "just-in-time," self-directed model of learning, in combination with development of online networks or communities that share concerns, has applications among many similar professional audiences.

Dissemination

With the dissertation completed, it is my expectation that portions of my work will be published in both print and electronic formats, and disseminated via national and international networks which recognize the value and relevance of the present study in the fields of educational technology, special education, and faculty training. This will include organizations such as SET-BC (Special Education Technology, British Columbia), The NODE Learning Technologies Network, based in London, Ontario, TRACE Centre at Wisconsin University, EASI: Equal Access to Software and Information (Rochester Institute of Technology), DO-IT (Disabilities, Opportunities, Internetworking and Technology) at University of Washington, and others.

I would like to ultimately make this research available in some published form to Ministries of Education across Canada, directed to the attention of advisory groups and committees responsible for training related to special education. As a researcher in the field of educational technology and disability services, I shall be well positioned to disseminate and act on the findings of this study.

The study and its results will be submitted for publication to the major journals associated with research in adult education, special needs, web-based instruction, and Internet development.

Results will be presented at various annual conferences associated with adaptive technologies, distance education, and disability. Specifically, I shall submit papers and presentations to:

1) The CSUN: Annual International Conference: "Technology And Persons With Disabilities"
2) Closing the Gap: "Computer Technology in Special Education and Rehabilitation"

Where do we go from here?

In recognition of the potential impact of a universal design paradigm on higher education, I am part of a new generation of scholars actively involved in universal design research and promotion.

With the present study as a starting point, the sites, listed below, give further support for the development of faculty inservice training materials that incorporate dimensions of Universal Design highly relevant to educational settings:

- CAST (http://www.cast.org/udl/index.cfm?i=7) focuses on dissemination and professional development in Universal Design for Learning.
- Curriculum Transformation and Disability, University of Minnesota (http://www.gen.umn.edu/research/ctad/) helps postsecondary faculty make their classes more accessible to all students, using a Universal Instructional Design model.
- The Facultyware Project, University of Connecticut (http://www.facultyware.uconn.edu/) has the goal of using Universal Design to assure inclusive college teaching for students with learning disabilities.
- Ivy Access (http://www.brown.edu/Administration/Dean_of_the_College/uid/), a joint endeavor of the Ivy League institutions, educates faculty to use Universal Instructional Design effectively in teaching students with non-visible disabilities.
- Universal Design Education Online (http://www.udeducation.org/) supports educators and students in teaching and studying Universal Design.

Institutional Coordination

One of the questions raised in the present study is how to develop institutional coordination processes that support accessibility in online teaching and learning. The faculty informants assert that universities and colleges need to develop plans that take into account the realities of how universities function and offer a direction with strategies on how to solve problems. (Paul Bohman,WebAIM,"University Web Accessibility Policies: A Bridge Not Quite Far Enough," http://webaim.org/coordination/articles/policies-pilot

- WebAIM, "Strategies for Coordination and Leadership," http://webaim.org/coordination/
- Kristine Neuber, George Mason University, "Developing A Model to Support Web Accessibility at the Post-Secondary Level: A Case Study," http://www.gmu.edu/accessibility/webreform

Faculty/Staff Professional Development

Another focus of the present study is collaborative and professional development models that often emerge from efforts by faculty and staff to redesign the learning environment. Numerous endeavours of this kind have been initiated at university campuses in the last five years. A short, very selective list of projects includes:

- AccessIT, University of Washington, http://www.washington.edu/accessit/index.php
- Georgia Tech Research on Accessible Distance Education (GRADE), http://www.catea.org/grade/
- Partnership Grant, Ohio State University, http://www.acs.ohio-state.edu/grants/dpg/index.html
- PEEL Project, University of Arizona, http://www.utc.arizona.edu/utc_peel_main.htm

- Web Accessibility for All, University of Wisconsin, http://www.cew.wisc.edu/accessibility/

Universities and Technology Environments

The results of this study confirm that learning technologies are rapidly reinventing themselves and that many faculty are coming to an understanding of this problem. An example of this may be found in the widespread use of streaming media in higher education. Many faculty members now enhance PowerPoint slides by webcasting lectures related to them. These present accessibility challenges to students who are unable to play video or hear audio. Rendering streamed PowerPoint lectures accessible requires much time and expertise.

Universities need to develop coordination plans that will not only implement accessibility but also take into account the pace of development in new technologies. Clearly they cannot do this in isolation from society. Great strides have already been made in developing ways to regulate and monitor information technology. The amended Section 508 standards (http://www.section508.gov/) developed by the Access Board in 1998 provide comprehensive guidelines for the formatting of Web content. The IMS standards (http://www.imsproject.org/) develop and promote the adoption of open technical specifications for interoperable learning technology.

Universities in Canada and the United States will need to work in partnership with these initiatives to ensure that all students have access to educational opportunities. These centers of excellence suggest models universities might follow in making online teaching and learning accessible while keeping pace with technological development:

- Center for Instructional Technology Accessibility (CITA), University of Illinois at Urbana/Champaign, http://cita.rehab.uiuc.edu/
- Institute on Disabilities, Temple University, http://disabilities.temple.edu/index.htm
- TRACE Center, University of Wisconsin, Madison, http://trace.wisc.edu/

Limitations of the Present Study

The first limitation of this study involved the type of research design used. It is certainly doubtful, especially with reference to the selection of participants and the return rate (possible non-response bias), whether this survey yielded information that pertains to all professors in general (Fink & Kosecoff, 1985; Gable & Wolf, 1993; Spector, 1992). The survey, however, did not so much aim at obtaining representative results as at exploring the opinions of those concerned and thus isolating indications of problems and, if possible, proposals and ideas for solving these problems. I do, however, wish to point out that due to the given small absolute number of questionnaires returned and the relatively low strength of the highly significant relationships, results concerning sub-groups of the survey population may at best be interpreted as indications of general tendencies.

Second, survey instruments can produce unreliable information which can lead to erroneous results. In order to address this limitation, all attempts were made to develop both a reliable and valid instrument. An item analysis -- that is, my earlier study carried out during the 2001-2002 academic year (Bissonnette, Schmid, & McWhaw, 2002) and subsequent examination of construct validity data enabled me to eliminate or adjust biased or ambiguous items and improve the format of the survey. Questions were written in a non-threatening manner. Appropriate steps to ensure confidentiality were taken and return of information directly to me in an anonymous fashion were built into the data gathering process. Each survey was coded for follow-up, and faculty participants were assured that reporting of findings was done only at the group level.

The third limitation results from the terminology used in the survey. Every attempt was made to provide an explanation or examples for types of disabilities asked about. The terms "access technology" and "e-learning" were defined at the beginning of both the survey and the semi-structured interviews in an attempt to remove some of the confusion faculty might have regarding the subject matter of the study. Even though these steps were taken, there still exists the possibility that a faculty member might have misinterpreted terminology or misunderstood a question and subsequently introduced error into the results.

The fourth limitation of this study involved findings pertaining to the crosstab analysis. Crosstabulations were used extensively in the analysis of this survey; many possible relationships between practices, attitudes and behaviours regarding students with disabilities were tested, measures of association were calculated and significance tests for two-way tables (or two-dimensional arrays) were generated. Three-way tables were also generated and when they were found to be significant, adjusted residuals were calculated in order to isolate which cells of the contingency tables had observed frequencies that showed a large enough departure from expected frequencies to make it unlikely that they were random. Further exploration of other factors related to the knowledge level of faculty, use of technology, as outlined in chapters IV, V and Appendix G, should take place.

Fifth, non-response is an important source of error in surveys, and appropriate steps were taken to present the study effectively and enlist the cooperation of faculty participants. Follow-up mailing procedures were also conducted to improve response rates. The result was that 34.3% (118 out of 344) surveys were returned -- which is, in my opinion, a reasonable rate of return.

The sixth limitation involves the generalization of the results of this study. Care should be taken to limit the generalization of the results to other universities and colleges. Since faculty working at Concordia University may or may not be similar to faculty at other Canadian and U.S. universities, it is important to realize the environment in which the study took place. The present study will serve both as a template for the kinds of data post-secondary institutions need to gather, and will offer advice on how said data are most effectively acquired.

Conclusion

Recommendations for Future Research

An examination of the findings from this study show that there is a need for future research regarding faculty use of computer or information technologies in the postsecondary education of students with disabilities. This was especially evident in the fact that the variables used in this study accounted for only a small amount of the variance in the criterion measures. Many unanswered questions exist regarding faculty and training on the use of computer or information technologies in the postsecondary education of students with disabilities. The following are some recommendations for future research:

1. As a follow up to the present study I would like to conduct an "action research " project, in collaboration with the staff of the Concordia University Office for Students with Disabilities (OSD) and by interested faculty, where inservice materials and support would be available in a just-in-time learning approach. Such action research would focus around the collaboration with individual faculty members, and how both OSD and the faculty member make adjustments in light of their understanding of the shared goal of the collaboration -- namely, the quality of access for students with disabilities, and by extension, the concomitant goal of enhanced learning for all students.

2. Since the present study is situated in an emerging small body of literature, which evaluates the use, or the utility of computer or information technologies in the postsecondary education of students with disabilities [searches of the ERIC, PsycINFO, and MEDLINE data bases show at this time that in spite of the proliferation of information, with the exception of the present research and that of the Fichten, Adaptech Research Team (Fichten, Barile, & Asuncion, 1999-2001)], there is virtually no empirical research which evaluates the use or the utility of computer or information technologies in the postsecondary education of students with disabilities. The present study will serve both as a template for the kinds of data post-secondary institutions need to gather, and will offer advice on how said data are most effectively acquired.

3. Other factors or variables that influence faculty use of computer or information technologies in the postsecondary education of students with disabilities should be explored such as demands on faculty workload (e.g., number of classes, class size); and motivation and personality characteristics of faculty.

4. The effect of faculty training on the use, or the utility of computer or information technologies in the postsecondary education of students with disabilities has yet to be comprehensively researched. Quasi-experimental studies need to be conducted, with faculty samples from both CEGEPs in Quebec and across Canada at both the community college and university levels to help to clarify the relationship between training and the attitudes toward the use of computer or information technologies in the postsecondary education of students with disabilities.

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APPENDIX A

Letter and survey sent to faculty

LETTER TO THE FACULTY OF CONCORDIA UNIVERSITY

Sent out: September 2003, January 2004, April 2004

Mr. Leo Bissonnette, a doctoral student in the Department of Education - Educational Technology is conducting a study designed to look at the use of instructional technology to support teaching and learning and the specific needs of students with disabilities as faculty develop new pedagogical strategies for all students. The present study will further explore training over internet, listservs, e-mail, or CD-ROM that can be provided in various self-paced formats. Using the Concordia University faculty target audience as a test bed, you are invited to participate in a joint inservice training programme offered by Advocacy and Support Services and Teaching and Learning Services, my dissertation research will be carried out during the 2003-2004 academic year to demonstrate the use and effectiveness of online instructional technologies for delivery of professional development opportunities to educators of students with disabilities at the post-secondary level.

I propose a three stage model for carrying out the research and faculty inservice training: Phase one of the model involves distribution, collection, and evaluation of faculty surveys that address attitudes, knowledge of various handicapping conditions, and accommodations designed to take advantage of instructional technology to support the specific needs of students with disabilities. Phase two involves an inservice mechanism for providing faculty with a package of information on disabilities. (Ann Kerby Director of Advocacy and Support Services hired two consultants to prepare a comprehensive package of information for the following Units within Advocacy and Support Services for distribution to faculty: Office for Students with Disabilities, The International Students Office, The Centre for Native Education, and Inter-Faith Chaplaincy. This package of materials was made available both in hardcopy and web-based formats to faculty through the above mentioned Advocacy and Support Services units as well as through the Teaching and Learning Services at Concordia University in order to present specific concerns and suggestions emphasizing student self-advocacy and suggesting classroom modifications and general instructional strategies). Phase three is even more personal as it addresses each faculty member as they encounter individual students in the classroom. In this phase of the study I shall examine and evaluate the use of online instructional technologies such as internet and e-mail for the delivery of additional materials to support the information contained in the Advocacy/Office for Students with Disabilities Package. One-on-one interviews with professors will be used to learn more about the techniques used for making course materials available through computer-based technologies that is, key frustrations, lessons learned and best practices. Vignettes will be presented to demonstrate the divergent/convergent perspectives of faculty. In addition, other strategies will be employed such as: reviewing course materials made available on web sites, and adaptation of course handouts into text files, for which the qualitative coding technique will be used appropriately.

During the first phase of the research, conducted throughout the 2003-2004 academic year, I am asking you to complete the attached survey designed to address attitudes, knowledge of various handicapping conditions, and accommodation. You should be able to complete the questionnaire in a maximum of 40 minutes.

At the end of the academic term after you have received faculty inservice training, you will then be asked to participate in an interview of a maximum of one (1) hour in which you, the course instructor, will be asked to share your thoughts/perspectives on the techniques used for making course materials available through computer-based technologies that is, your key frustrations, lessons learned and best practices. You will be asked to share Vignettes with me to demonstrate the divergent/convergent perspectives of faculty.

I would ask you to complete the attached survey within the next two weeks and return it to me in the self-addressed internal university mail envelope. If you prefer, you may choose to complete the electronic version of the survey, sent out to you today and return it using the Reply Command.

QUESTIONNAIRE FOR CONCORDIA UNIVERSITY FACULTY

DISSERTATION RESEARCH PROJECT CONSENT FORM

I understand that I am asked to participate in the study by completing a survey and a follow-up interview. I understand that all information I provide will be kept strictly confidential and will not be used for any purposes other than this study.

I understand that I am free to ask any questions concerning the methodology of this project at any time. I may, for any reason, withdraw from the study at any time. Should I wish to, I am free to discuss the project with:

Leo Bissonnette
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Montreal, Quebec H3G 1M8
Tel: (514) 848-2424 Ext. 3518; Fax: (514) 848-3524
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Or

Mr. Bissonnette's dissertation supervisor, Dr. Stephen Shaw
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E-Mail: shaws@vax2.concordia.ca

Or

Michelle Hoffman, Compliance Officer, Concordia University,
at (514) 848-2424 Ext. 7481 or by email at
michelle.hoffman@concordia.ca.

Participating in this study is purely voluntary. I understand that any information I provide will remain strictly confidential, and that my privacy will be completely protected. I understand that any statements I make will never be linked directly to me. I understand that by responding to the survey questions I agree to have the data I provide included in the study's final report.

Consent form for your signature is on the following page.

DISSERTATION RESEARCH PROJECT CONSENT FORM

I have carefully studied the above and understand this agreement.

I freely consent and voluntarily agree to participate in this study.

NAME (please print) ______________________________

SIGNATURE ______________________________

DATE ______________________________

DEPARTMENT ______________________________

If at any time you have questions about your rights as a research participant, please contact:

Michelle Hoffman, Compliance Officer, Concordia University,
at (514) 848-2424 Ext. 7481

OR

by email at michelle.hoffman@concordia.ca.

QUESTIONNAIRE FOR CONCORDIA UNIVERSITY FACULTY
DISSERTATION RESEARCH PROJECT

Name: ____

E-Mail: ____

Your name and e-mail will be used only for follow up contact.
Both will be removed from the data file before it is analyzed.

May I contact you further about your use of instructional technology to support teaching and learning and the specific needs of students with disabilities?

☐ Yes

☐ No

If you do not wish to participate in this survey, please return it in the enclosed self-addressed envelope to my attention.

Leo Bissonnette
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E-Mail:Leo.Bissonnette@CONCORDIA.CA

You should be able to complete the questionnaire in a maximum of 40 minutes.

About You

1. Gender:

   ☐ Male

   ☐ Female

2. Number of years teaching at Concordia: _________

3. Faculty:

   ☐ Arts & Science

   ☐ Fine Arts

   ☐ JMSB

   ☐ Engineering & Computer Science

   ☐ Other: ____

4. Rank: (Please check all that apply)

   ☐ Full-time Faculty

   ☐ Part-time Faculty

   ☐ Chair

   ☐ Professor Emeritus

   ☐ Professor

   ☐ Associate Professor

   ☐ Assistant Professor

   ☐ Lecturer

   ☐ Extended Term appointment

   ☐ Limited Term appointment

   ☐ Probationary appointment

Continuation of question # 4.

☐ Tenured appointment

☐ Research appointment

☐ Visiting Scholar (e.g. visiting associate professor)

☐ Appointment in Residence (e.g. writer in residence, executive in residence)

☐ Academic Chairs or Special Professorship

☐ Other ____

5. Do you serve in an administrative capacity?

☐ No

☐ Yes (specify):

____

____

____

6. For how many courses, where you have a student with a disability registered, are you the primary instructor during the 2003-2004 academic year (fall and winter)?

Course Name (s) & Number(s) (with disabled students):

a) ______________________________________

b) ______________________________________

c) ______________________________________

d) ______________________________________

e) ______________________________________

f) ______________________________________

7. Is this the first time that you have had a student with a disability in your class?

a)

- ☐ Yes (Go to 7. c)
- ☐ No (Go to 7. b then continue on to 7. c)

b) How many times have you had a student with a disability in your class in the past?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5+

c) Have you accommodated students with any of the following disabilities (Please check all that apply):

- ☐ Learning Disabilities - documented disabilities that may affect reading, processing information, remembering, calculating, and spatial abilities.
- ☐ Mobility Impairments - may make walking, sitting, bending, carrying, or using fingers, hands or arms difficult or impossible.
- ☐ Health Impairments - affect daily living and involve the lungs, kidneys, heart, muscles, liver, intestines, immune systems, and other body parts (e.g., cancer, kidney failure, AIDS).
- ☐ Mental Health/Psychiatric Impairments - mental health and psychiatric disorders that affect daily living.

Continuation of question # 7 c).

- ☐ Hearing Impairments - make it difficult or impossible to hear lecturers, access multimedia materials, and participate in discussions.
- ☐ Blindness - refers to the disability of students who cannot read printed text, even when enlarged.
- ☐ Low Vision - refers to students who have some usable vision, but cannot read standard-size text, have field deficits (for example, cannot see peripherally or centrally but can see well in other ranges), or other visual impairments.
- ☐ Attention Deficit Disorder (ADD) - is a biologically based condition causing a persistent pattern of difficulties resulting in one or more of the following behaviors: inattention, hyperactivity, impulsivity.
- ☐ Other (please explain)____________________________________

  ____

8) The questions a) –i) below refer to specific disabilities checked off in question 7 c) above.

a) If you checked **Learning Disabilities** in question **7. c)** how have you accommodated these students in your class (Please check all that apply):

- ☐ Does not apply
- ☐ Note takers and/or audio taped class sessions
- ☐ Captioned films
- ☐ Extra exam time, alternative testing arrangements
- ☐ Visual, aural, and tactile instructional demonstrations
- ☐ Computer with speech output, spellchecker, and grammar checker

Continuation of question # 8.

b) If you checked **Mobility Impairments** in question **7. c)** how have you accommodated these students in your class (Please check all that apply):

☐ Does not apply

☐ Note taker

☐ Lab assistant, group lab assignments.

☐ Classrooms, labs, and field trips in accessible locations.

☐ Adjustable tables, lab equipment located within reach.

☐ Class assignments made available in electronic format.

☐ Computer equipped with special input device (e.g., speech input, Morse code, alternative keyboard).

c) If you checked **Health Impairments** in question **7. c)** how have you accommodated these students in your class (Check all that apply):

☐ Does not apply

☐ Note taker or copy of another student's notes.

☐ Flexible attendance requirements and extra exam time.

☐ Assignments made available in electronic format, use of email to facilitate communication.

d) If you checked **Mental Health/Psychiatric Impairments** in question **7. c)** how have you accommodated these students in your class (Please check all that apply):

☐ Does not apply

☐ Note taker, copy of another student's notes, or recording of lectures.

☐ Extended time on assignments and tests.

☐ A non-distracting, quiet setting for assignments and tests.

Continuation of question # 8.

e) If you checked **Hearing Impairments** in question **7. c)** how have you accommodated these students in your class (Please check all that apply):

☐ Does not apply

☐ Interpreter, real-time captioning, FM system, note taker.

☐ Open or closed-captioned films, use of visual aids.

☐ Written assignments, lab instructions, demonstration summaries.

☐ Visual warning system for lab emergencies.

☐ Use of electronic mail for class and private discussions

f) If you checked **Blindness** in question **7. c)** how have you accommodated these students in your class (Please check all that apply):

☐ Does not apply

☐ Audio taped, Brailled or electronic-formatted lecture notes, handouts, texts.

☐ Verbal descriptions of visual aids.

☐ Raised-line drawings and tactile models of graphic materials.

☐ Braille lab signs and equipment labels, auditory lab warning signals.

☐ Adaptive lab equipment - (e.g., talking thermometers and calculators, light probes, and tactile timers).

☐ Computer with optical character reader, speech output, Braille screen display and printer output.

Continuation of question # 8.

g) If you checked **Low Vision** in question **7. c)** how have you accommodated these students in your class (Please check all that apply):

- ☐ Does not apply
- ☐ Seating near front of class.
- ☐ Large print handouts, lab signs, and equipment labels.
- ☐ TV monitor connected to microscope to enlarge images.
- ☐ Class assignments made available in electronic format.
- ☐ Computer equipped to enlarge screen characters and images.

h) If you checked **Attention Deficit Disorder (ADD)** in question **7. c)** how have you accommodated these students in your class (Please check all that apply):

- ☐ Does not apply
- ☐ Note taker, copy of another student's notes, or recording of lectures.
- ☐ Extended time on assignments and tests.
- ☐ A non-distracting, quiet setting for assignments and tests.

i) If you checked **Others** in question **7. c)** how have you accommodated these students in your class (Please explain)

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Your Use of Technology

9. Do you use technology in your course?

   - ☐ Yes - Please continue with the next question # 10.
   - ☐ No - Please go to question # 16.

10. What technologies do you use in your course(s)? (Please check all that apply)

    - ☐ Use PowerPoint overheads or slides in class
    - ☐ Show videos
    - ☐ Use e-mail to communicate with students
    - ☐ Use computer-mediated conferencing for student discussion (e.g., FirstClass, Web CT).
    - ☐ Use labs (e.g., language)
    - ☐ Have a course web site (Please see question # 11).
    - ☐ Provide PDF files for students to access or download
    - ☐ Other (please specify)

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11. If you have a course web page, what is on it? (Please check all that apply)

- ☐ Does not apply
- ☐ Course outline /information about course
- ☐ Course notes such as PowerPoint
- ☐ Links to other web sites
- ☐ Video-clips of your lectures
- ☐ Audio-clips of your lectures
- ☐ Chat room or on-line discussion area
- ☐ List of supplementary reading material
- ☐ Exams
- ☐ Course grades
- ☐ Other (please specify)

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12. Did you develop (design) your web page?

- ☐ Does not apply
- ☐ Yes - Please go to question # 14.
- ☐ No - Please continue with the next question.

13. If you did not develop (design) your web site, who developed (designed) it for you? (Please check all that apply).

- ☐ Academic Technology
- ☐ IITS
- ☐ Staff member in your department/faculty
- ☐ Student
- ☐ Other (please specify)

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14. To what extent do you feel all of your students are taking advantage of the technology you are providing in your course(s)?

- ☐ Very little
- ☐ Some
- ☐ A great deal

15.

a) Please briefly describe what added value technology is bringing to your students' learning experiences that they otherwise would not get?

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15.

b) Please briefly describe what added value technology is bringing to your students with a disability and their learning experiences that they otherwise would not get?

Your Knowledge of the Technologies and the Needs of Students with Disabilities

16. I am confident that my curriculum materials are accessible to all students with disabilities.

- ☐ Always
- ☐ Frequently
- ☐ Sometimes
- ☐ Rarely
- ☐ Never

17. When you were developing the technologies used in your course (e.g. web site, PowerPoint presentations, etc), how did you take into account the needs of students with disabilities?

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18. Please select the statement that best describes your knowledge of the needs of students with disabilities when accessing e-learning materials:

- ☐ I have a broad knowledge of the needs of students with a wide range of disabilities
- ☐ I have some knowledge of the needs of students with certain specific disabilities
- ☐ I have a little knowledge of some of the needs of students with disabilities.
- ☐ I have little or no understanding of the needs of students with disabilities.

19. Please describe a recent scenario where you needed to find a solution to a problem associated with the accessibility of e-learning materials for students with disabilities. Describe the scenario and how you went about finding a solution to the problem:

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20. If you create accessible e-learning materials to meet the needs of students with disabilities, please indicate which of the following resources you frequently use for finding accessibility information. (Please check all that apply).

- ☐ Does not apply
- ☐ Refer to websites from accessibility organisations (e.g. EASI, The Adaptive Technology Resource Centre .
- ☐ Refer to web sites that are technology/vendor specific (e.g. Macromedia, QuickTime, Adobe)
- ☐ Refer to the W3C's Web Content Accessibility Guidelines
- ☐ Refer to accessibility materials and tutorials found on the Internet
- ☐ Refer to learning materials provided by Concordia University
- ☐ Refer to discussion boards on the Internet
- ☐ Refer to books and other printed material on accessibility
- ☐ Refer to other colleagues at Concordia University
- ☐ Refer to external accessibility experts
- ☐ Refer to other resources

21. If you chose: **Refer to other resources** in question **# 20**, please describe these other resources that you use for advice on accessible design for students with disabilities.

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22. What is your current long-term goal for making the e-learning materials that you develop accessible to students with disabilities?

- ☐ No goal at this point
- ☐ Compliance with customised set of guidelines
- ☐ Compliance with W3C WCAG 1.0 Single-A Accessibility Requirements
- ☐ Compliance with W3C WCAG 1.0 Double-AA Accessibility Requirements
- ☐ Compliance with W3C WCAG 1.0 Triple-AAA Accessibility Requirements
- ☐ Other

23. If you answered: **Other** in question **# 22,** please describe your long term accessibility goal:

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24. How long do you think it will take to reach your accessibility goal?

- ☐ Less than 6 months
- ☐ 6 months to a year
- ☐ 1 to 2 years
- ☐ More than 2 years
- ☐ Not relevant

25. What, for you, is the most significant barrier to creating accessible e-learning materials for students with disabilities?

- ☐ Lack of knowledge of the needs of people with disabilities
- ☐ Lack of knowledge of using HTML and other technologies to create accessible resources
- ☐ Lack of support for authoring tools
- ☐ Too expensive
- ☐ Lack of time and personal resources for redesigning current resources to be more accessible
- ☐ Difficulty in developing a management plan or prioritising redesign of learning and teaching resources
- ☐ Lack of support network
- ☐ Lack of management commitment to accessible design standards and resources
- ☐ No problems, resources are already accessible
- ☐ Currently there is no demand for accessible resources
- ☐ Not relevant

26. Please indicate the nature of any training you may have had in creating accessible e-learning materials for students with disabilities. (Please check all that apply)

☐ No training at all

☐ I have attended training course(s) at Concordia University

☐ I have attended training course(s) outside of Concordia University

☐ I am self-taught

27. If you answered: **I have attended training course(s) at Concordia University** in question # **26**, please provide details of the extent of the training you received within Concordia University, and who provided it.

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28. If you answered: **I have attended training course(s) outside of Concordia University** in question # **26**, please provide details of the extent of training you received that was not provided by Concordia University, and who provided it.

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29. If you answered: **I am self-taught** in question **# 26**, please describe what resources you have used in developing your skills in accessible design (e.g. web resources, books, contact with colleagues etc):

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30. Do you validate HTML and/or other markup you create?

- ☐ Yes
- ☐ No
- ☐ Sometimes
- ☐ Don't know

31. If you answered: **Sometimes** in question **# 30**, please indicate as best you can the circumstances when you do validate HTML.

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32. Are the e-learning materials you create tested for their accessibility to meet the special needs of students with disabilities?

- ☐ Yes
- ☐ No
- ☐ Sometimes
- ☐ Don't know

33. If you answered**: Sometimes** in question # **32**, please indicate as best you can the circumstances when you do carry out accessibility testing of your e-learning resources.

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34. If you answered: **Yes** in question # **32**, which of the following methods do you use for accessibility testing and checking? (Please check all that apply)

- ☐ Accessibility Validation tools (e.g. Bobby, A-Prompt, Ask Alice, Lift Online)
- ☐ Mark-up Validation tools (e.g. W3C Markup Validation Service)
- ☐ Evaluation with disabled users
- ☐ Check against Web Content Accessibility Guidelines
- ☐ Testing using assistive technologies (e.g. screen readers, alternative input devices)
- ☐ Human Judgement
- ☐ Other

35. If you answered: **Other** in question # **34**, please describe other accessibility checking methods you use.

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36. What authoring tools do you use to create e-learning materials? (Please check all that apply)

- ☐ Does not apply
- ☐ Site Generator
- ☐ Netscape Composer
- ☐ Microsoft Front Page
- ☐ Macromedia Dreamweaver
- ☐ Macromedia Flash
- ☐ Macromedia Director
- ☐ Microsoft Office (Word, Powerpoint etc)
- ☐ Adobe Acrobat
- ☐ Adobe Go Live
- ☐ Virtual Learning Environment (e.g. WebCT, BlackBoard)
- ☐ BBEdit
- ☐ Courseware (e.g. Question mark Perception)
- ☐ Text Editor (.e.g. Notepad)
- ☐ Captioning Software (e.g. MAGPie)
- ☐ Other, please name the other authoring tools you use.

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37. Which of the following technologies do you use in the creation of e-learning materials to meet the needs of students with disabilities?

- Please select all that apply and
- Please rate how confident you are in making the technology accessible to students with a range of disabilities by circling one of the four choices - e.g.

  Very confident - [Confident] - Not very confident - Not at all confident

- ☐ Does not apply
- ☐ HTML

  Very confident - Confident - Not very confident - Not at all confident
- ☐ Cascading Style Sheets

  Very confident - Confident - Not very confident - Not at all confident
- ☐ Macromedia Flash

  Very confident - Confident - Not very confident - Not at all confident
- ☐ Macromedia Shockwave

  Very confident - Confident - Not very confident - Not at all confident
- ☐ Portable Document Format (PDF)

  Very confident - Confident - Not very confident - Not at all confident
- ☐ Microsoft Power Point

  Very confident - Confident - Not very confident - Not at all confident
- ☐ Microsoft Word

  Very confident - Confident - Not very confident - Not at all confident
- ☐ Microsoft Excel

  Very confident - Confident - Not very confident - Not at all confident
- ☐ Javascript

  Very confident - Confident - Not very confident - Not at all confident
- ☐ Active Server Pages (ASP)

  Very confident - Confident - Not very confident - Not at all confident

Continuation of question # 37

☐ PHP

Very confident - Confident - Not very confident - Not at all confident

☐ Java Server Pages (JSP)

Very confident - Confident - Not very confident - Not at all confident

☐ Java Servlets

Very confident - Confident - Not very confident - Not at all confident

☐ Java Applets

Very confident - Confident - Not very confident - Not at all confident

☐ Active-X Controls

Very confident - Confident - Not very confident - Not at all confident

☐ Database technologies

Very confident - Confident - Not very confident - Not at all confident

☐ XML-generated content

Very confident - Confident - Not very confident - Not at all confident

☐ Real Video or Audio

Very confident - Confident - Not very confident - Not at all confident

☐ Avid Media Composer

Very confident - Confident - Not very confident - Not at all confident

☐ Adobe Premiere

Very confident - Confident - Not very confident - Not at all confident

☐ Quicktime Video or Audio

Very confident - Confident - Not very confident - Not at all confident

☐ Quicktime VR

Very confident - Confident - Not very confident - Not at all confident

☐ 3D Studio Max

Very confident - Confident - Not very confident - Not at all confident

Continuation of question # 37.

- ☐ Microsoft (Windows Media) Video or Audio

  Very confident - Confident - Not very confident - Not at all confident

- ☐ MPEG Video or Audio

  Very confident - Confident - Not very confident - Not at all confident

- ☐ Synchronised Multimedia Integration Language (SMIL)

  Very confident - Confident - Not very confident - Not at all confident

- ☐ Scalable Vector Graphics (SVG)

  Very confident - Confident - Not very confident - Not at all confident

- ☐ MAGpie

  Very confident - Confident - Not very confident - Not at all confident

- ☐ Other technologies - Please list other technologies you use, and your level of confidence in using them to create content that is accessible to students with a range of disabilities.

  Very confident - Confident - Not very confident - Not at all confident

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38. Please indicate whether you test the e-learning material you create for its compatibility with the following browsers to meet the needs of students with disabilities? (Please check all that apply)

- ☐ Does not apply
- ☐ Internet Explorer on Windows
- ☐ Internet Explore on Macintosh
- ☐ Netscape Navigator, version 6 or above
- ☐ Netscape Navigator, version 4 or below
- ☐ Mozilla
- ☐ Opera
- ☐ Konqueror
- ☐ Safari
- ☐ PDA or mobile phone browser
- ☐ I design to follow standards rather than specific browsers
- ☐ Other

39. If you answered: **Other** in question # **38**, Please list additional browsers used for testing.

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Future Training Needs

40. One of the long-term goals of this dissertation research is to work toward the development of a high-quality interactive training resource on how to create accessible multimedia for e-learning materials to meet the special needs of students with disabilities. Which of the following formats would you find most useful for this type of resource?

- ☐ An instructional guide that provides you with a well structured step-by-step route through each topic.
- ☐ A reference that allows you to look up specific topics as required.
- ☐ A resource that offers a combination of the above approaches.
- ☐ Other - Please describe your preferred format:

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41. What would be your preferred medium for this type of training resource?

- ☐ CD-ROM
- ☐ DVD
- ☐ Web site
- ☐ Virtual Learning Environment
- ☐ Printed Material (books, booklets, instruction manual)
- ☐ Video
- ☐ Combination of the above
- ☐ Other medium - Please give details of your preferred medium:

____

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42. Which of the following do you consider important when learning how to create accessible learning and teaching resources to meet the specific needs of students with disabilities? (Please check all that apply)

- ☐ Better knowledge of the problems that students with disabilities face when accessing e-learning materials.
- ☐ Better knowledge of accessible design techniques.
- ☐ Better knowledge of different assistive technologies that disabled students may use.
- ☐ Better knowledge of disability discrimination legislation.
- ☐ More knowledge about why accessibility is important.
- ☐ Other - Please provide more details of what you consider important:

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43. Which of the following accessibility topics would you like to see addressed in a guide to creating accessible e-learning materials to meet the specific needs of students with disabilities? (Please check all that apply)

- ☐ Assistive technology and accessibility
- ☐ Browsers and accessibility
- ☐ Accessible design principles
- ☐ Accessible curricula design principles
- ☐ Accessible on-line assessment
- ☐ Accessible navigation
- ☐ Accessible HTML (tables, forms, page structure)
- ☐ Accessible images and graphics
- ☐ Accessibility and colour

Continuation of question # 43.

- ☐ Accessibility and typography
- ☐ Accessibility and audio content
- ☐ Accessibility and video content
- ☐ JavaScript and accessibility
- ☐ Accessibility and Flash
- ☐ Accessibility and Director/Shockwave
- ☐ Accessibility and PowerPoint
- ☐ Accessibility and XML technologies (including SVG and SMIL)
- ☐ Accessibility and Java applets
- ☐ Testing and validation
- ☐ Web development tools and accessibility
- ☐ Other - Please provide more details of what you would additionally like to see addressed by the resource.

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Many thanks for taking time to complete this questionnaire. If you have any final comments please feel free to enter them here.

Thank you!

THANK YOU FOR YOUR PARTICIPATION!!

APPENDIX B

Reminder letter sent to Faculty

FOLLOW UP LETTER TO PROFESSORS

September 15, 2003

Dear Professor X:

I recently wrote to you requesting your participation in my dissertation research, with the support of Advocacy and Support Services. The rapidly expanding use of technology in instruction is the primary forum for discussion in this dissertation as faculty develop new pedagogical strategies for all students. The present study will further explore training over internet, listservs, e-mail, or CD-ROM that can be provided in various self-paced formats. Using the Concordia University faculty target audience as a test bed, along with newly hired faculty for the 2003-2004 academic year invited to participate in a joint inservice training programme offered by Advocacy and Support Services and Teaching and Learning Services Program of New Teacher Orientation, my dissertation research will be carried out during the 2003-2004 academic year to demonstrate the use and effectiveness of online instructional technologies for delivery of professional development opportunities to educators of students with disabilities at the post-secondary level. I propose a three stage model for carrying out the research and faculty inservice training: Phase one of the model involves distribution, collection, and evaluation of faculty surveys that address attitudes, knowledge of various handicapping conditions, and accommodation. Phase two involves an inservice mechanism for providing faculty with a package of information on disabilities. (Ann Kerby Director of Advocacy and Support Services hired two consultants to prepare a comprehensive package of information for the following Units within Advocacy and Support Services: Office for Students with Disabilities, The International Students Office, The Centre for Native Education, and Inter-Faith Chaplaincy). Using this package of materials made available both in hardcopy and web-based formats to present specific concerns and suggestions emphasizing student self-advocacy and suggesting classroom modifications and general instructional strategies. Phase three is even more personal as it addresses each faculty member as they encounter individual students in the classroom. In this phase of the study I shall examine and evaluate the use of online instructional technologies such as internet and e-mail for the delivery of additional materials to support the information contained in the Advocacy/Office for Students with Disabilities Package. One-on-one interviews with both professors and students will be used to learn more about the techniques used for making course materials available through computer-based technologies that is, key frustrations, lessons learned and best practices. Vignettes will be presented to demonstrate the divergent/convergent perspectives of both faculty and students. In addition, other strategies will be employed such as: reviewing course materials made available on web sites, adaptation of course handouts into textfiles, and documented participant observations that is, of students using various forms of adapted technology to access course materials, for which the qualitative coding technique will be used appropriately.

During the first phase of the research, conducted during the month of September 2003, I am asking you to complete a survey designed to address attitudes, knowledge of various handicapping conditions, and accommodation. At the end of the academic term after you have received faculty inservice training, you will then be asked to participate in an interview of a maximum of one (1) hour in which you, the course instructor, will be asked to share your thoughts/perspectives the techniques used for making course materials available through computer-based technologies that is, your key frustrations, lessons learned and best practices. You will be asked to share Vignettes with the researcher to demonstrate the divergent/convergent perspectives of both faculty and students. In addition, other strategies will be employed such as: reviewing course materials made available on web sites, and adaptation of course handouts into textfiles.

I would ask you to complete the attached survey within the next two weeks and return it to me in the self-addressed internal university mail envelope. If you prefer, you may choose to complete the electronic version of the survey, sent out to you today and return it using the Reply Command.

All aspects of ethics involving human participants are being adhered to (e.g., confidentiality, freedom to not participate or withdraw).

Once the study is completed, we would be more than happy to share our results with you. If you have any questions about the study, please contact either:

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Montreal, Quebec H3G 1M8
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tel: (514) 848-3518; fax: (514) 848-3524

Or

Mr. Bissonnette's dissertation supervisor, Dr. Stephen Shaw
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1455 ouest, boul. de Maisonneuve LB-589-4
Montréal, Québec H3G 1M8
Tel.: (514) 848-2044
Fax: (514) 848-4520
E-Mail: shaws@vax2.concordia.ca

Or

Michelle Hoffman, Compliance Officer, Concordia University, at (514) 848-7481 or by email at michelle.hoffman@concordia.ca.

Regards,

Leo Bissonnette

APPENDIX C

Semi-Structured Interview Schedule

The thirty faculty informants participated in the study voluntarily. A tape recorder was used to tape those interviews for which permission to tape was obtained. The individually scheduled interviews lasted a maximum of one (1) hour in which faculty were asked to share their thoughts/perspectives on the techniques used for making course materials available through computer-based technologies that is, key frustrations, lessons learned and best practices.

The questions, found below, were used during the interview sessions.

SEMI-STRUCTURED INTERVIEW SCHEDULE FOR CONCORDIA UNIVERSITY FACULTY
DISSERTATION RESEARCH PROJECT

Name: ____

Your name will be removed from the data file before it is analyzed.

1. Let us start the interview with a general discussion of your attitudes towards individuals with disabilities and then move to a more specific discussion of your attitudes towards students you have taught in your courses.

In order to get us talking, I put out for your consideration the concept of "Handicapism."

Handicapism

- A paradigm through which to understand the social experience of those described as "disabled," and "handicapped."

- Set of assumptions and practices that promote differential treatment of people because of apparent or assumed physical, mental or behavioural differences

--Face-to-face interactions

--Culture and social structure

--College environment of the classroom

Prejudice

- Oversimplified and over-generalized beliefs about the characteristics of a group or category of people

Stereotype

- Stereotype refers to the specific content of the prejudice directed towards specific groups

--The blind are great musicians;

--The deaf are great painters

2. For how many courses, where you have a student with a disability registered, are you the primary instructor during the 2003-2004 academic year (fall and winter)?

3. Is this the first time that you have had a student with a disability in your class?

a)

☐ Yes (Go to 3. c)

☐ No (Go to 3. b then continue on to 3. c)

b) How many times have you had a student with a disability in your class in the past?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5+

c) Have you accommodated students with any of the following disabilities:

- ☐ Learning Disabilities - documented disabilities that may affect reading, processing information, remembering, calculating, and spatial abilities.

- ☐ Mobility Impairments - may make walking, sitting, bending, carrying, or using fingers, hands or arms difficult or impossible.

- ☐ Health Impairments - affect daily living and involve the lungs, kidneys, heart, muscles, liver, intestines, immune systems, and other body parts (e.g., cancer, kidney failure, AIDS).

- ☐ Mental Health/Psychiatric Impairments - mental health and psychiatric disorders that affect daily living.

- ☐ Hearing Impairments - make it difficult or impossible to hear lecturers, access multimedia materials, and participate in discussions.

- ☐ Blindness - refers to the disability of students who cannot read printed text, even when enlarged.

- ☐ Low Vision - refers to students who have some usable vision, but cannot read standard-size text, have field deficits (for example, cannot see peripherally or centrally but can see well in other ranges), or other visual impairments.

- ☐ Attention Deficit Disorder (ADD) - is a biologically based condition causing a persistent pattern of difficulties resulting in one or more of the following behaviours: inattention, hyperactivity, impulsivity.

Other (please explain) Your Use of Technology

4. Do you use technology in your course?

   ☐ Yes - continue with the next question # 5.

   ☐ No - Please go to question # 11.

5. What technologies do you use in your course(s)?

   ☐ Use PowerPoint overheads or slides in class

   ☐ Show videos

   ☐ Use e-mail to communicate with students

   ☐ Use computer-mediated conferencing for student discussion (e.g., FirstClass, Web CT).

   ☐ Use labs (e.g., language)

   ☐ Have a course web site (Please see question # 11).

   ☐ Provide PDF files for students to access or download

   ☐ Other (please specify)

6. If you have a course web page, what is on it?

   ☐ Does not apply

   ☐ Course outline /information about course

   ☐ Course notes such as PowerPoint

   ☐ Links to other web sites

   ☐ Video-clips of your lectures

   ☐ Audio-clips of your lectures

   ☐ Chat room or on-line discussion area

   ☐ List of supplementary reading material

   ☐ Exams

☐ Course grades

☐ Other (please specify)

7. Did you develop (design) your web page?

   ☐ Does not apply

   ☐ Yes - Please go to question # 9.

   ☐ No - Please continue with the next question.

8. If you did not develop (design) your web site, who developed (designed) it for you?

   ☐ Academic Technology

   ☐ IITS

   ☐ Staff member in your department/faculty

   ☐ Student

   ☐ Other (please specify)

9. To what extent do you feel all of your students are taking advantage of the technology you are providing in your course(s)?

   ☐ Very little

   ☐ Some

   ☐ A great deal

10.

a) Please briefly describe what added value technology is bringing to your students' learning experiences that they otherwise would not get?

b) Please briefly describe what added value technology is bringing to your students with a disability and their learning experiences that they otherwise would not get?

Your Knowledge of the Technologies and the Needs of Students with Disabilities

11. I am confident that my curriculum materials are accessible to all students with disabilities.

- ☐ Always
- ☐ Frequently
- ☐ Sometimes
- ☐ Rarely
- ☐ Never

12. When you were developing the technologies used in your course (e.g. web site, PowerPoint presentations, etc), how did you take into account the needs of students with disabilities?

13. Please describe a recent scenario where you needed to find a solution to a problem associated with the accessibility of e-learning materials for students with disabilities. Describe the scenario and how you went about finding a solution to the problem:

14. If you create accessible e-learning materials to meet the needs of students with disabilities, please indicate which of the following resources you frequently use for finding accessibility information.

- ☐ Does not apply
- ☐ Refer to websites from accessibility organisations (e.g. EASI, The Adaptive Technology Resource Centre .
- ☐ Refer to web sites that are technology/vendor specific (e.g. Macromedia, QuickTime, Adobe)
- ☐ Refer to the W3C's Web Content Accessibility Guidelines
- ☐ Refer to accessibility materials and tutorials found on the Internet

- ☐ Refer to learning materials provided by Concordia University
- ☐ Refer to discussion boards on the Internet
- ☐ Refer to books and other printed material on accessibility
- ☐ Refer to other colleagues at Concordia University
- ☐ Refer to external accessibility experts
- ☐ Refer to other resources

15. What is your current long-term goal for making the e-learning materials that you develop accessible to students with disabilities?

- ☐ No goal at this point
- ☐ Compliance with customised set of guidelines
- ☐ Compliance with W3C WCAG 1.0 Single-A Accessibility Requirements
- ☐ Compliance with W3C WCAG 1.0 Double-AA Accessibility Requirements
- ☐ Compliance with W3C WCAG 1.0 Triple-AAA Accessibility Requirements
- ☐ Other

16. How long do you think it will take to reach your accessibility goal?

- ☐ Less than 6 months
- ☐ 6 months to a year
- ☐ 1 to 2 years
- ☐ More than 2 years
- ☐ Not relevant

17. What, for you, is the most significant barrier to creating accessible e-learning materials for students with disabilities?

- ☐ Lack of knowledge of the needs of people with disabilities
- ☐ Lack of knowledge of using HTML and other technologies to create accessible resources
- ☐ Lack of support for authoring tools
- ☐ Too expensive
- ☐ Lack of time and personal resources for redesigning current resources to be more accessible
- ☐ Difficulty in developing a management plan or prioritising redesign of learning and teaching resources
- ☐ Lack of support network
- ☐ Lack of management commitment to accessible design standards and resources
- ☐ No problems, resources are already accessible
- ☐ Currently there is no demand for accessible resources
- ☐ Not relevant

18. Please describe the nature of any training you may have had in creating accessible e-learning materials for students with disabilities.

- ☐ No training at all
- ☐ I have attended training course(s) at Concordia University
- ☐ I have attended training course(s) outside of Concordia University
- ☐ I am self-taught

19. Do you validate HTML and/or other markup you create?

- ☐ Yes
- ☐ No
- ☐ Sometimes
- ☐ Don't know

20. If you answered: Sometimes, please indicate as best you can the circumstances when you do validate HTML.

21. Are the e-learning materials you create tested for their accessibility to meet the special needs of students with disabilities?

- ☐ Yes
- ☐ No
- ☐ Sometimes
- ☐ Don't know

22. If you answered: Sometimes, please indicate as best you can the circumstances when you do carry out accessibility testing of your e-learning resources.

23. If you answered: Yes, which of the following methods do you use for accessibility testing and checking? (Please indicate all that apply from the list I'll read to you)

- ☐ Accessibility Validation tools (e.g. Bobby, A-Prompt, Ask Alice, Lift Online)
- ☐ Mark-up Validation tools (e.g. W3C Markup Validation Service)
- ☐ Evaluation with disabled users
- ☐ Check against Web Content Accessibility Guidelines
- ☐ Testing using assistive technologies (e.g. screen readers, alternative input devices)

- ☐ Human Judgment
- ☐ Other

24. What authoring tools do you use to create e-learning materials? (Please indicate all that apply from the list I'll read to you)

- ☐ Does not apply
- ☐ Site Generator
- ☐ Netscape Composer
- ☐ Microsoft Front Page
- ☐ Macromedia Dreamweaver
- ☐ Macromedia Flash
- ☐ Macromedia Director
- ☐ Microsoft Office (Word, Powerpoint etc)
- ☐ Adobe Acrobat
- ☐ Adobe Go Live
- ☐ Virtual Learning Environment (e.g. WebCT, BlackBoard)
- ☐ BBEdit
- ☐ Courseware (e.g. Question mark Perception)
- ☐ Text Editor (.e.g. Notepad)
- ☐ Captioning Software (e.g. MAGPie)
- ☐ Other, please name the other authoring tools you use.

25. Which of the following technologies do you use in the creation of e-learning materials to meet the needs of students with disabilities?

- ➢ Please describe all that apply from the list I'll read to you, and
- ➢ Please describe how confident you are in making the technology accessible to students with a range of disabilities by indicating one of the four choices - e.g.

  Very confident - Confident - Not very confident - Not at all confident

☐ Does not apply

☐ HTML

Very confident - Confident - Not very confident - Not at all confident

☐ Cascading Style Sheets

Very confident - Confident - Not very confident - Not at all confident

☐ Macromedia Flash

Very confident - Confident - Not very confident - Not at all confident

☐ Macromedia Shockwave

Very confident - Confident - Not very confident - Not at all confident

☐ Portable Document Format (PDF)

Very confident - Confident - Not very confident - Not at all confident

☐ Microsoft Power Point

Very confident - Confident - Not very confident - Not at all confident

☐ Microsoft Word

Very confident - Confident - Not very confident - Not at all confident

☐ Microsoft Excel

Very confident - Confident - Not very confident - Not at all confident

☐ Javascript

Very confident - Confident - Not very confident - Not at all confident

☐ Active Server Pages (ASP)

Very confident - Confident - Not very confident - Not at all confident

☐ PHP

Very confident - Confident - Not very confident - Not at all confident

☐ Java Server Pages (JSP)

Very confident - Confident - Not very confident - Not at all confident

☐ Java Servlets

Very confident - Confident - Not very confident - Not at all confident

☐ Java Applets

Very confident - Confident - Not very confident - Not at all confident

☐ Active-X Controls

Very confident - Confident - Not very confident - Not at all confident

☐ Database technologies

Very confident - Confident - Not very confident - Not at all confident

☐ XML-generated content

Very confident - Confident - Not very confident - Not at all confident

☐ Real Video or Audio

Very confident - Confident - Not very confident - Not at all confident

☐ Avid Media Composer

Very confident - Confident - Not very confident - Not at all confident

☐ Adobe Premiere

Very confident - Confident - Not very confident - Not at all confident

☐ Quicktime Video or Audio

Very confident - Confident - Not very confident - Not at all confident

☐ Quicktime VR

Very confident - Confident - Not very confident - Not at all confident

☐ 3D Studio Max

Very confident - Confident - Not very confident - Not at all confident

☐ Microsoft (Windows Media) Video or Audio

Very confident - Confident - Not very confident - Not at all confident

- ☐ MPEG Video or Audio

  Very confident - Confident - Not very confident - Not at all confident

- ☐ Synchronised Multimedia Integration Language (SMIL)

  Very confident - Confident - Not very confident - Not at all confident

- ☐ Scalable Vector Graphics (SVG)

  Very confident - Confident - Not very confident - Not at all confident

- ☐ MAGpie

  Very confident - Confident - Not very confident - Not at all confident

- ☐ Other technologies - Please describe other technologies you use, and your level of confidence in using them to create content that is accessible to students with a range of disabilities.

  Very confident - Confident - Not very confident - Not at all confident

26. Please indicate whether you test the e-learning material you create for its compatibility with the following browsers to meet the needs of students with disabilities? (Please describe all that apply from the list I'll read to you)

- ☐ Does not apply
- ☐ Internet Explorer on Windows
- ☐ Internet Explore on Macintosh
- ☐ Netscape Navigator, version 6 or above
- ☐ Netscape Navigator, version 4 or below
- ☐ Mozilla
- ☐ Opera
- ☐ Konqueror
- ☐ Safari
- ☐ PDA or mobile phone browser
- ☐ I design to follow standards rather than specific browsers
- ☐ Other

Future Training Needs

27. One of the long-term goals of this dissertation research is to work toward the development of a high-quality interactive training resource on how to create accessible multimedia for e-learning materials to meet the special needs of students with disabilities. Which of the following formats would you find most useful for this type of resource?

- ☐ An instructional guide that provides you with a well structured step-by-step route through each topic.
- ☐ A reference that allows you to look up specific topics as required.
- ☐ A resource that offers a combination of the above approaches.
- ☐ Other - Please describe your preferred format.

28. What would be your preferred medium for this type of training resource?

- ☐ CD-ROM
- ☐ DVD
- ☐ Web site
- ☐ Virtual Learning Environment
- ☐ Printed Material (books, booklets, instruction manual)
- ☐ Video
- ☐ Combination of the above
- ☐ Other medium - Please give details of your preferred medium.

29. Which of the following do you consider important when learning how to create accessible learning and teaching resources to meet the specific needs of students with disabilities? (Please check all that apply)

- ☐ Better knowledge of the problems that students with disabilities face when accessing e-learning materials.
- ☐ Better knowledge of accessible design techniques.
- ☐ Better knowledge of different assistive technologies that disabled students may use.
- ☐ Better knowledge of disability discrimination legislation.
- ☐ More knowledge about why accessibility is important.
- ☐ Other - Please provide more details of what you consider important.

30. Which of the following accessibility topics would you like to see addressed in a guide to creating accessible e-learning materials to meet the specific needs of students with disabilities? (Please check all that apply)

- ☐ Assistive technology and accessibility
- ☐ Browsers and accessibility
- ☐ Accessible design principles
- ☐ Accessible curricula design principles
- ☐ Accessible on-line assessment
- ☐ Accessible navigation
- ☐ Accessible HTML (tables, forms, page structure)
- ☐ Accessible images and graphics
- ☐ Accessibility and colour
- ☐ Accessibility and typography
- ☐ Accessibility and audio content
- ☐ Accessibility and video content

- ☐ JavaScript and accessibility
- ☐ Accessibility and Flash
- ☐ Accessibility and Director/Shockwave
- ☐ Accessibility and PowerPoint
- ☐ Accessibility and XML technologies (including SVG and SMIL)
- ☐ Accessibility and Java applets
- ☐ Testing and validation
- ☐ Web development tools and accessibility
- ☐ Other - Please provide more details of what you would additionally like to see addressed by the resource.

Many thanks for taking time to speak with me and to participate in my study.

Do you have any final comments?

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APPENDIX D

FREQUENCY TABLES

List of Tables 12 to 117

Years Taught at Concordia University, Chapter IV: pg. 77, Questionnaire # 2

Table 12. Case Processing Summary, Years Taught

N	Valid	118
	Missing	0
Mean		12,69

Table 13. Years Taught

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	,8	,8	,8
	2	8	6,8	6,8	7,6
	3	12	10,2	10,2	17,8
	4	14	11,9	11,9	29,7
	5	7	5,9	5,9	35,6
	6	5	4,2	4,2	39,8
	7	4	3,4	3,4	43,2
	8	3	2,5	2,5	45,8
	9	4	3,4	3,4	49,2
	10	2	1,7	1,7	50,8
	11	5	4,2	4,2	55,1
	12	5	4,2	4,2	59,3
	13	2	1,7	1,7	61,0
	14	1	,8	,8	61,9
	15	8	6,8	6,8	68,6
	17	1	,8	,8	69,5
	18	4	3,4	3,4	72,9
	20	3	2,5	2,5	75,4
	21	1	,8	,8	76,3
	22	5	4,2	4,2	80,5
	23	2	1,7	1,7	82,2
	25	6	5,1	5,1	87,3
	27	2	1,7	1,7	89,0
	28	2	1,7	1,7	90,7
	30	5	4,2	4,2	94,9
	31	1	,8	,8	95,8
	32	1	,8	,8	96,6
	34	1	,8	,8	97,5
	35	2	1,7	1,7	99,2
	38	1	,8	,8	100,0
	Total	118	100,0	100,0	

(Years Taught at Concordia University, Chapter IV: pg. 77, Questionnaire # 2, cont'd)

Table 14 Interval Years Taught for Full-time Faculty

		Full-time Faculty		Total
		No	Yes	
Interval Years Taught	1-5 yrs	37	5	42
	5-16 yrs	13	26	39
	16-27 yrs	8	16	24
	27-38 yrs	1	12	13
Total		59	59	118

Table 15. Interval Years Taught for Part-time Faculty

		Part-time Faculty		Total
		no	Yes	
Interval Years Taught	1-5 yrs	15	27	42
	5-16 yrs	29	10	39
	16-27 yrs	18	6	24
	27-38 yrs	13	0	13
Total		75	43	118

Breakdown by Teaching Status, Chapter IV: pg. 77, Questionnaire #4

Table 16 Full-time Faculty

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	59	50,0	50,0	50,0
	yes	59	50,0	50,0	100,0
	Total	118	100,0	100,0	

Table 17. Part-time Faculty

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	75	63,6	63,6	63,6
	yes	43	36,4	36,4	100,0
	Total	118	100,0	100,0	

(Breakdown by Teaching Status, Chapter IV: pg. 77, Questionnaire #4, cont'd)

Table 18. Full-time Faculty by Gender

		Gender		Total
		male	female	
Full-time Faculty	No	30	29	59
	Yes	43	16	59
Total		73	45	118

Table 19. Part-time Faculty by Gender

		Gender		Total
		male	female	
Part-time Faculty	No	50	25	75
	Yes	23	20	43
Total		73	45	118

Prior Experience with Students Having Disabilities, Chapter IV: pg. 79, Questionnaire #7

Table 20 Case Processing Summary for Prior Experience with Students w Disabilities

N	Valid	117
	Missing	1
Mean		2,11

(Prior Experience with Students having Disabilities, Chapter IV: pg. 79, Questionnaire #7, cont'd)

Table 21. Prior Experience with Students having Disabilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	55	46,6	47,0	47,0
	1	3	2,5	2,6	49,6
	2	11	9,3	9,4	59,0
	3	5	4,2	4,3	63,2
	4	8	6,8	6,8	70,1
	5	35	29,7	29,9	100,0
	Total	117	99,2	100,0	
Missing	999	1	,8		
Total		118	100,0		

Table 22. Case Processing Summary for Prior Experience by Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Full-time Faculty * Prior Experience with Students having Disabilities	118	100,0%	0	,0%	118	100,0%

Table 23. Full-Time Faculty * Prior Experience with Students having Disabilities Crosstabulation

		Prior Experience with Students having Disabilities							Total
		0	1	2	3	4	5	blank	
Full-time Faculty	no	34	1	4	2	5	12	1	59
	yes	21	2	7	3	3	23	0	59
Total		55	3	11	5	8	35	1	118

(Prior Experience with Students having Disabilities, Chapter IV: pg. 87, Questionnaire #7, cont'd)

Table 24. Case Processing Summary for Prior Experience by Part-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Part-time Faculty * Prior Experience with Students having Disabilities	118	100,0%	0	,0%	118	100,0%

Table 25. Part-time Faculty * Prior Experience with Students having Disabilities Crosstabulation

		Prior Experience with Students having Disabilities							Total
		0	1	2	3	4	5	blank	
Part-time Faculty	no	28	2	7	4	4	29	1	75
	yes	27	1	4	1	4	6	0	43
Total		55	3	11	5	8	35	1	118

Prior Accessibility Training, Chapter IV: pg. 81, Questionnaire #26

Table 26. Case Processing Summary for Prior Accessibility Training

		No training at all	I have attended training courses at Concordia University	I have attended training courses outside Concordia University	I am self-taught	I have attended training courses outside Concordia University
N	Valid	34	34	34	34	34
	Missing	84	84	84	84	84

(Prior Accessibility Training, Chapter IV: pg. 81, Questionnaire #26, cont'd)

Table 27. No training at all

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	15	12,7	44,1	44,1
	Yes	19	16,1	55,9	100,0
	Total	34	28,8	100,0	
Missing	999	84	71,2		
Total		118	100,0		

Table 28. I have attended training courses at Concordia University

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	22	18,6	64,7	64,7
	yes	12	10,2	35,3	100,0
	Total	34	28,8	100,0	
Missing	999	84	71,2		
Total		118	100,0		

Table 29. I am self-taught

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	25	21,2	73,5	73,5
	yes	9	7,6	26,5	100,0
	Total	34	28,8	100,0	
Missing	999	84	71,2		
Total		118	100,0		

Table 30. I have attended training courses outside Concordia University

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	33	28,0	97,1	97,1
	yes	1	,8	2,9	100,0
	Total	34	28,8	100,0	
Missing	999	84	71,2		
Total		118	100,0		

Use Technology in Class, Chapter IV: pg. 83, Questionnaire # 9

Table 31. Case Processing Summary, Use Technology in Class

N	Valid	117
	Missing	1

Table 32. Use Technology in Class

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	46	39,0	39,3	39,3
	yes	71	60,2	60,7	100,0
	Total	117	99,2	100,0	
Missing	999	1	,8		
Total		118	100,0		

Table 33. Case Processing Summary, Use of Technology by Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Full-time Faculty * Use Technology in Class	117	99,2%	1	,8%	118	100,0%

Table 34. Full-time Faculty * Use Technology in Class Crosstabulation

		Use Technology in Class		
		no	yes	Total
Full-time Faculty	No	28	30	58
	Yes	18	41	59
Total		46	71	117

(Use Technology in Class, Chapter IV: pg. 83, Questionnaire # 9, cont'd)

Table 35. Case Processing Summary, Use of Technology by Part-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Part-time Faculty * Use Technology in Class	117	99,2%	1	,8%	118	100,0%

Table 36. Part-time Faculty * Use Technology in Class Crosstabulation

		Use Technology in Class		
		no	yes	Total
Part-time Faculty	No	25	49	74
	Yes	21	22	43
Total		46	71	117

Table 37. Case Processing Summary for Use of Technology by Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Use Technology in Class	117	99,2%	1	,8%	118	100,0%

Table 38. Gender * Use Technology in Class Crosstabulation

		Use Technology in Class		
		no	yes	Total
Gender	male	20	52	72
	female	26	19	45
Total		46	71	117

Technologies Used in Courses, Chapter IV: pg. 84, Questionnaire #10

Table 39. Case Processing Summary for Specific Technology Used in Class

		Power-point overheads or slides in class	Show videos	Email commun-ications with students	Cpu-mediated conferenc-ing for student discussion	Use labs	A course web site	Provide PDF files for students to access or download
N	Valid	70	70	70	70	70	70	70
	Missin g	48	48	48	48	48	48	48

Table 40. Email communications with students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	17	14,4	24,3	24,3
	yes	53	44,9	75,7	100,0
	Total	70	59,3	100,0	
Missing	999	48	40,7		
Total		118	100,0		

Table 41. Powerpoint overheads or slides in class

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	23	19,5	32,9	32,9
	yes	47	39,8	67,1	100,0
	Total	70	59,3	100,0	
Missing	999	48	40,7		
Total		118	100,0		

Table 42. A course website

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	34	28,8	48,6	48,6
	yes	36	30,5	51,4	100,0
	Total	70	59,3	100,0	
Missing	999	48	40,7		
Total		118	100,0		

(Technologies Used in Courses, Chapter IV: pg. 84, Questionnaire #10, cont'd)

Table 43. Provide PDF files for students to access or download

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	37	31,4	52,9	52,9
	yes	33	28,0	47,1	100,0
	Total	70	59,3	100,0	
Missing	999	48	40,7		
Total		118	100,0		

Table 44. Show videos

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	50	42,4	71,4	71,4
	yes	20	16,9	28,6	100,0
	Total	70	59,3	100,0	
Missing	999	48	40,7		
Total		118	100,0		

Table 45. Use labs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	53	44,9	75,7	75,7
	yes	17	14,4	24,3	100,0
	Total	70	59,3	100,0	
Missing	999	48	40,7		
Total		118	100,0		

Table 46. Computer-mediated conferencing for student discussion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	65	55,1	92,9	92,9
	yes	5	4,2	7,1	100,0
	Total	70	59,3	100,0	
Missing	999	48	40,7		
Total		118	100,0		

Web Site Features on Course Web Page, Chapter IV: pg. 86, Questionnaire #11

Table 47. Case Processing Summary for Web Site Features

Web Feature Statistic	Valid	Missing
Course web page content-does not apply	41	77
Course outline/information about course	41	77
Course notes such as PowerPoint	41	77
Links to other web sites	41	77
Video clips of your lectures	41	77
Audio clips of your lectures	41	77
Chat room or on-line discussion area	41	77
List of supp. reading material	41	77
Exams	41	77
Course grades	40	78

Table 48. Course outline/information about course

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	2	1,7	4,9	4,9
	yes	31	26,3	75,6	80,5
	DNA	8	6,8	19,5	100,0
	Total	41	34,7	100,0	
Missing	999	77	65,3		
Total		118	100,0		

Table 49. Course notes such as PowerPoint

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	7	5,9	17,1	17,1
	yes	26	22,0	63,4	80,5
	DNA	8	6,8	19,5	100,0
	Total	41	34,7	100,0	
Missing	999	77	65,3		
Total		118	100,0		

(Web Site Features on Course Web Page, Chapter IV: pg. 86, Questionnaire #11, cont'd)

Table 50. List of supp. reading material

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	9	7,6	22,0	22,0
	yes	24	20,3	58,5	80,5
	DNA	8	6,8	19,5	100,0
	Total	41	34,7	100,0	
Missing	999	77	65,3		
Total		118	100,0		

Table 51. Links to other web sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	12	10,2	29,3	29,3
	yes	21	17,8	51,2	80,5
	DNA	8	6,8	19,5	100,0
	Total	41	34,7	100,0	
Missing	999	77	65,3		
Total		118	100,0		

Table 52. Course grades

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	10	8,5	25,0	25,0
	yes	22	18,6	55,0	80,0
	DNA	8	6,8	20,0	100,0
	Total	40	33,9	100,0	
Missing	999	78	66,1		
Total		118	100,0		

(Web Site Features on Course Web Page, Chapter IV: pg. 86, Questionnaire #11, cont'd)

Table 53. Course web page content-does not apply

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	33	28,0	80,5	80,5
	yes	8	6,8	19,5	100,0
	Total	41	34,7	100,0	
Missing	999	77	65,3		
Total		118	100,0		

Table 54. Exams

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	25	21,2	61,0	61,0
	yes	8	6,8	19,5	80,5
	DNA	8	6,8	19,5	100,0
	Total	41	34,7	100,0	
Missing	999	77	65,3		
Total		118	100,0		

Table 55. Video clips of your lectures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	28	23,7	68,3	68,3
	yes	5	4,2	12,2	80,5
	DNA	8	6,8	19,5	100,0
	Total	41	34,7	100,0	
Missing	999	77	65,3		
Total		118	100,0		

(Web Site Features on Course Web Page, Chapter IV: pg. 86, Questionnaire #11, cont'd)

Table 56. Chat room or on-line discussion area

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	28	23,7	68,3	68,3
	yes	5	4,2	12,2	80,5
	DNA	8	6,8	19,5	100,0
	Total	41	34,7	100,0	
Missing	999	77	65,3		
Total		118	100,0		

Table 57. Audio clips of your lectures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	32	27,1	78,0	78,0
	Yes	1	,8	2,4	80,5
	DNA	8	6,8	19,5	100,0
	Total	41	34,7	100,0	
Missing	999	77	65,3		
Total		118	100,0		

E-learning Testing for Special Needs, Chapter IV: pg 88, Questionnaire # 32

Table 58. Case Processing Summary, E-learning Testing for Special Needs

N	Valid	113
	Missing	5

(E-learning Testing for Special Needs, Chapter IV: pg 88, Questionnaire # 32, cont'd)

Table 59. E-learning Testing for Special Needs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	105	89,0	92,9	92,9
	don't know	6	5,1	5,3	98,2
	sometimes	2	1,7	1,8	100,0
	Total	113	95,8	100,0	
Missing	999	5	4,2		
Total		118	100,0		

Perceived Technology Benefits to Students, Chapter IV: pg. 89, Questionnaire #14

Table 60. Case Processing Summary, Perceived Technology Benefits to Students

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Use Technology in Class * Perceived Technology Benefits to Students	70	59,3%	48	40,7%	118	100,0%

Table 61. Use Technology in Class * Perceived Technology Benefits to Students Crosstabulation

		Perceived Technology Benefits to Students				Total
		very little	some	a great deal	Missing	
Use Technology in Class	no	1	2	4	39	46
	yes	1	9	53	8	71
Total		2	11	57	47	117

Consideration Taken for Students with Disabilities when Developing Technology, Chapter IV: pg. 92, Questionnaire #17

Table 62. Case Processing Summary, Consideration of Students with Disabilities when Developing Technology

N	Valid	101
	Missing	17

Table 63. Consideration of Students with Disabilities when Developing Technology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all	81	68,6	80,2	80,2
	Partially	12	10,2	11,9	92,1
	Definately	8	6,8	7,9	100,0
	Total	101	85,6	100,0	
Missing	999	17	14,4		
Total		118	100,0		

Confidence in Material Accessibility, Chapter IV: pg. 97, Questionnaire #16

Table 64. Case Processing Summary for Confidence in Material Accessibility

N	Valid	117
	Missing	1

(Confidence in Material Accessibility, Chapter IV: pg. 97, Questionnaire #16, cont'd)

Table 65. Confidence in Material Accessibility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	5	4,2	4,3	4,3
	sometimes	88	74,6	75,2	79,5
	frequently	12	10,2	10,3	89,7
	always	12	10,2	10,3	100,0
	Total	117	99,2	100,0	
Missing	999	1	,8		
Total		118	100,0		

Knowledge of Needs of Students w Disabilities, Chapter IV: pg. 100, Questionnaire #18

Table 66. Case Processing Summary for Knowledge of Needs

N	Valid	118
	Missing	0

Table 67. Current Knowledge of Needs of Students with Disabilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Little or no understanding	84	71,2	71,2	71,2
	Some knowledge	18	15,3	15,3	86,4
	Broad knowledge	16	13,6	13,6	100,0
	Total	118	100,0	100,0	

Barriers to Creating Accessible E-learning Materials for Students w Disabilities,

Chapter IV: pg. 103, Questionnaire #25

Table 68. Case Processing Summary for Barriers to creating e-learning

Statistics		N Valid	Missing
	Lack knowledge of needs	116	2
	Lack knowledge of HTML/other tech. to create accessible resources	116	2
	Lack support of authoring tools	116	2
	Too expensive	116	2
	Lack time and personal resources for redesigning current resources	116	2
	Difficulty in devel. mngt plan or priortizing redesign of learn/teaching	116	2
	Lack support network	116	2
	Lack of mngt commitment to access design standards/resources	116	2
	No problems, resources already accessible	116	2
	Sig. barriers- currently there is no demand for accessible resources	116	2
	Sig. barriers-not relevant	116	2

Table 69. Lack knowledge of needs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	64	54,2	55,2	55,2
	yes	13	11,0	11,2	66,4
	Not Relevant	39	33,1	33,6	100,0
	Total	116	98,3	100,0	
Missing	999	2	1,7		
Total		118	100,0		

(Barriers to Creating Accessible E-learning Materials for Students w Disabilities, Chapter IV: pg. 103, Questionnaire #25, cont'd)

Table 70. Lack knowledge of HTML and other tech. to create accessible resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	24	20,3	20,7	20,7
	yes	53	44,9	45,7	66,4
	Not Relevant	39	33,1	33,6	100,0
	Total	116	98,3	100,0	
Missing	999	2	1,7		
Total		118	100,0		

Table 71. Lack support of authoring tools

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	25	21,2	21,6	21,6
	yes	52	44,1	44,8	66,4
	Not Relevant	39	33,1	33,6	100,0
	Total	116	98,3	100,0	
Missing	999	2	1,7		
Total		118	100,0		

Table 72. Too expensive

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	74	62,7	63,8	63,8
	yes	3	2,5	2,6	66,4
	Not Relevant	39	33,1	33,6	100,0
	Total	116	98,3	100,0	
Missing	999	2	1,7		
Total		118	100,0		

(Barriers to Creating Accessible E-learning Materials for Students w Disabilities, Chapter IV: pg. 103, Questionnaire #25)

Table 73. Lack time and personal resources for redesigning current resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	14	11,9	12,1	12,1
	yes	63	53,4	54,3	66,4
	Not Relevant	39	33,1	33,6	100,0
	Total	116	98,3	100,0	
Missing	999	2	1,7		
Total		118	100,0		

Table 74. Difficulty in developing a management plan or priortizing redesign of learn/teaching resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	23	19,5	19,8	19,8
	yes	54	45,8	46,6	66,4
	Not Relevant	39	33,1	33,6	100,0
	Total	116	98,3	100,0	
Missing	999	2	1,7		
Total		118	100,0		

Table 75. Lack support network

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	31	26,3	26,7	26,7
	yes	46	39,0	39,7	66,4
	Not Relevant	39	33,1	33,6	100,0
	Total	116	98,3	100,0	
Missing	999	2	1,7		
Total		118	100,0		

(Barriers to Creating Accessible E-learning Materials for Students w Disabilities, Chapter IV: pg. 103, Questionnaire #25)

Table 76. Lack of management commitment to access design standards/resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	28	23,7	24,1	24,1
	yes	49	41,5	42,2	66,4
	Not Relevant	39	33,1	33,6	100,0
	Total	116	98,3	100,0	
Missing	999	2	1,7		
Total		118	100,0		

Table 77. No problems, resources already accessible

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	75	63,6	64,7	64,7
	yes	2	1,7	1,7	66,4
	Not Relevant	39	33,1	33,6	100,0
	Total	116	98,3	100,0	
Missing	999	2	1,7		
Total		118	100,0		

Compliance Goal for Accessibility, Chapter IV: pg. 104, Questionnaire # 22

Table 78. Compliance Goal for Accessibility

N	Valid	118
	Missing	0

(Compliance Goal for Accessibility, Chapter IV: pg. 104, Questionnaire # 22, cont'd)

Table 79. Compliance goal for accessibility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no goal	101	85,6	85,6	85,6
	comply customized guidelines	1	,8	,8	86,4
	comply W3C WCAG 1.0 double-AA	10	8,5	8,5	94,9
	comply W3C WCAG 1.0 triple-AAA	3	2,5	2,5	97,5
	other	3	2,5	2,5	100,0
	Total	118	100,0	100,0	

Time to Reach Compliance Goal, Chapter IV: pg. 110, Questionnaire # 24

Table 80. Time to Goal

N	Valid	108
	Missing	10

Table 81. Time to Goal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 6 months	1	,8	,9	,9
	6 months to a year	6	5,1	5,6	6,5
	1 to 2 years	5	4,2	4,6	11,1
	more than 2 years	82	69,5	75,9	87,0
	not relevant	14	11,9	13,0	100,0
	Total	108	91,5	100,0	
Missing	999	10	8,5		
Total		118	100,0		

Preferred Medium for Interactive Training, Chapter IV: pg. 112, Questionnaire # 41

Table 82. Case Processing Summary for Medium Preferred for Interactive Training

	CD-ROM	DVD	Web site	Virtual learning Environ-ment	Printed Material	Video	Combin-ation of Above	other medium
N Valid	114	114	114	114	114	114	114	114
Missing	4	4	4	4	4	4	4	4

Table 83. CD-ROM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	21	17,8	18,4	18,4
	Yes	93	78,8	81,6	100,0
	Total	114	96,6	100,0	
Missing	999	4	3,4		
Total		118	100,0		

Table 84. DVD

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	111	94,1	97,4	97,4
	yes	3	2,5	2,6	100,0
	Total	114	96,6	100,0	
Missing	999	4	3,4		
Total		118	100,0		

Table 85. Web site

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	16	13,6	14,0	14,0
	yes	98	83,1	86,0	100,0
	Total	114	96,6	100,0	
Missing	999	4	3,4		
Total		118	100,0		

(Preferred Medium for Interactive Training, Chapter IV: pg. 112, Questionnaire # 41, cont'd)

Table 86. Virtual learning Environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	112	94,9	98,2	98,2
	yes	2	1,7	1,8	100,0
	Total	114	96,6	100,0	
Missing	999	4	3,4		
Total		118	100,0		

Table 87. Printed Material

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	20	16,9	17,5	17,5
	yes	94	79,7	82,5	100,0
	Total	114	96,6	100,0	
Missing	999	4	3,4		
Total		118	100,0		

Table 88. Video

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	113	95,8	99,1	99,1
	yes	1	,8	,9	100,0
	Total	114	96,6	100,0	
Missing	999	4	3,4		
Total		118	100,0		

Table 89. Combination of Above

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	23	19,5	20,2	20,2
	yes	91	77,1	79,8	100,0
	Total	114	96,6	100,0	
Missing	999	4	3,4		
Total		118	100,0		

(Preferred Medium for Interactive Training, Chapter IV: pg. 112, Questionnaire # 41, cont'd)

Table 90. other medium

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	99	83,9	86,8	86,8
	yes	15	12,7	13,2	100,0
	Total	114	96,6	100,0	
Missing	999	4	3,4		
Total		118	100,0		

New Knowledge Areas Desired, Chapter IV: pg. 114, Questionnaire #42

Table 91. New Knowledge Areas

		Better knowledge of problems students w disabilities face	Better knowledge of accessible design techniques	Better knowledge of dif. assist technologies dis students use	Better knowledge of disability discrimination legislation	Better knowledge about why access. is important
N	Valid	115	115	115	115	115
	Missing	3	3	3	3	3

Table 92. Better knowledge of problems students w disabilities face

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	7	5,9	6,1	6,1
	yes	108	91,5	93,9	100,0
	Total	115	97,5	100,0	
Missing	999	3	2,5		
Total		118	100,0		

(New Knowledge Areas Desired, Chapter IV: pg. 114, Questionnaire #42, cont'd)

Table 93. Better knowledge of accessible design techniques

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	8	6,8	7,0	7,0
	yes	107	90,7	93,0	100,0
	Total	115	97,5	100,0	
Missing	999	3	2,5		
Total		118	100,0		

Table 94. Better knowledge of dif. Assist. technologies used by students with disabilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	10	8,5	8,7	8,7
	yes	105	89,0	91,3	100,0
	Total	115	97,5	100,0	
Missing	999	3	2,5		
Total		118	100,0		

Table 95. Better knowledge of disability discrimination legislation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	22	18,6	19,1	19,1
	yes	93	78,8	80,9	100,0
	Total	115	97,5	100,0	
Missing	999	3	2,5		
Total		118	100,0		

Table 96. Better knowledge about why access. is important

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	22	18,6	19,1	19,1
	yes	93	78,8	80,9	100,0
	Total	115	97,5	100,0	
Missing	999	3	2,5		
Total		118	100,0		

Accessibility Topics, Chapter IV: pg. 119, Questionnaire # 43

Table 97. Accessibility Topics

Accessibility Topic	Valid	Missing
Assistive technology & accessibility	106	12
Browsers and accessibility	106	12
Accessible design principles	106	12
Accessible curricula principles	106	12
Accessible online assessment	106	12
Accessible navigation	106	12
Accessible HTML	106	12
Accessible images and graphics	106	12
Accessibility and colour	106	12
Accessibility and typography	106	12
Accessibility and audio content	106	12
Accessibility and video content	106	12
JavaScript and accessibility	106	12
Accessibility and Flash	106	12
Accessibility and Director/Shockwave	106	12
Accessibility and PowerPoint	106	12
Accessibility and XML technologies	106	12
Accessibility and Java applets	106	12
Testing and Validatioin	106	12
Web development tools and accessibility	106	12

Table 98. Assistive technology and accessibility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	3	2,5	2,8	2,8
	yes	103	87,3	97,2	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

(Accessibility Topics, Chapter IV: pg. 119, Questionnaire # 43)

Table 99. Accessible curricula principles

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	6	5,1	5,7	5,7
	yes	100	84,7	94,3	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 100. Accessible design principles

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	7	5,9	6,6	6,6
	yes	99	83,9	93,4	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 101. Accessibility and PowerPoint

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	9	7,6	8,5	8,5
	yes	97	82,2	91,5	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 102. Accessible HTML

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	10	8,5	9,4	9,4
	yes	96	81,4	90,6	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

(Accessibility Topics, Chapter IV: pg. 119, Questionnaire # 43)

Table 103. Web development tools and accessibility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	10	8,5	9,4	9,4
	yes	96	81,4	90,6	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 104. Accessible online assessment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	11	9,3	10,4	10,4
	yes	95	80,5	89,6	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 105. Accessibility and audio content

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	11	9,3	10,4	10,4
	yes	95	80,5	89,6	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 106. Testing and Validation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	11	9,3	10,4	10,4
	yes	95	80,5	89,6	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

(Accessibility Topics, Chapter IV: pg. 119, Questionnaire # 43)

Table 107. Accessible navigation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	12	10,2	11,3	11,3
	yes	94	79,7	88,7	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 108. Accessible images and graphics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	12	10,2	11,3	11,3
	yes	94	79,7	88,7	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 109. Accessibility and colour

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	12	10,2	11,3	11,3
	yes	94	79,7	88,7	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

(Accessibility Topics, Chapter IV: pg. 119, Questionnaire # 43)

Table 110. Accessibility and typography

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	12	10,2	11,3	11,3
	yes	94	79,7	88,7	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 111. Browsers and accessibility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	99	83,9	93,4	93,4
	yes	7	5,9	6,6	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 112. Accessibility and video content

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	84,7	94,3	94,3
	yes	6	5,1	5,7	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 113. Accessibility and Flash

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	102	86,4	96,2	96,2
	yes	4	3,4	3,8	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

(Accessibility Topics, Chapter IV: pg. 119, Questionnaire # 43)

Table 114. Accessibility and XML technologies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	102	86,4	96,2	96,2
	yes	4	3,4	3,8	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 115. JavaScript and accessibility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	104	88,1	98,1	98,1
	yes	2	1,7	1,9	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 116. Accessibility and Director/Shockwave

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	104	88,1	98,1	98,1
	yes	2	1,7	1,9	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

Table 117. Accessibility and Java applets

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	104	88,1	98,1	98,1
	yes	2	1,7	1,9	100,0
	Total	106	89,8	100,0	
Missing	999	12	10,2		
Total		118	100,0		

APPENDIX E

SIGNIFICANT CROSSTABULATIONS

List of Tables 118 to 283

Table 118 Case Processing Summary, Use of Technology in Class by Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Full-time Faculty * Use Technology in Class	117	99,2%	1	,8%	118	100,0%

Table 119. Full-time Faculty * Use Technology in Class Crosstabulation

		Use Technology in Class		Total
		No	yes	
Full-time Faculty	no	28	30	58
	yes	18	41	59
Total		46	71	117

Table 120. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3,870(b)	1	,049		

a Computed only for a 2x2 table
b 0 cells (,0%) have expected count less than 5. The minimum expected count is 22,80.

Table 121. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Full-time Faculty Dependent	,033	,033		,050(c)
		Use Technology in Class Dependent	,033	,033		,050(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Use of Technology in Class, Chapter IV: pg. 83, Questionnaire #9, cont'd)

Table 122. Case Processing Summary, Use of Technology in class by Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Use Technology in Class	117	99,2%	1	,8%	118	100,0%

Table 123. Gender * Use Technology in Class Crosstabulation

		Use Technology in Class		
		no	yes	Total
Gender	male	20	52	72
	female	26	19	45
Total		46	71	117

Table 124. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10,446(b)	1	,001		

a Computed only for a 2x2 table
b 0 cells (,0%) have expected count less than 5. The minimum expected count is 17,69.

Table 125. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Gender Dependent	,089	,054		,001(c)
		Use Technology in Class Dependent	,089	,054		,001(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 126. Case Processing Summary, Use of Technology in Class and Extent Students Use Technology, by Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Use Technology in Class * Extent Students use Technology * Gender	70	59,3%	48	40,7%	118	100,0%

Table 127. Use Technology in Class * Extent Students use Technology * Gender Crosstabulation

Gender			Extent Students use Technology			Total
			very little	some	a great deal	
Male	Use Technology in Class	No	0	1	3	4
		yes	1	8	38	47
	Total		1	9	41	51
Female	Use Technology in Class	no	1	1	1	3
		yes	0	1	15	16
	Total		1	2	16	19

Table 128. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
Male	Pearson Chi-Square	,234(a)	2	,890
Female	Pearson Chi-Square	8,189(b)	2	,017

a 4 cells (66,7%) have expected count less than 5. The minimum expected count is ,08.
b 5 cells (83,3%) have expected count less than 5. The minimum expected count is ,16.

(Perceived Technology Benefits, Chapter IV: pg. 89, Questionnaire #14, cont'd)

Table 129. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Use Technology in Class Dependent	,005	,017		,892(c)
			Extent Students use Technology Dependent	,002	,014		,891(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Use Technology in Class Dependent	,431	,216		,021(c)
			Extent Students use Technology Dependent	,264	,213		,009(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 130. Adjusted Residuals, Use Technology in Class * Extent Students use Technology * Gender Crosstabulation

Gender				Extent Students use Technology			Total
				very little	some	a great deal	
Male	Use Technology in Class	No	Count	0	1	3	4
			Adjusted Residual	-,3	,4	-,3	
		Yes	Count	1	8	38	47
			Adjusted Residual	,3	-,4	,3	
	Total		Count	1	9	41	51
Female	Use Technology in Class	no	Count	1	1	1	3
			Adjusted Residual	2,4	1,4	-2,6	
		yes	Count	0	1	15	16
			Adjusted Residual	-2,4	-1,4	2,6	
	Total		Count	1	2	16	19

(Perceived Technology Benefits, Chapter IV: pg. 89, Questionnaire #14, cont'd)

Table 131 Case Processing Summary for Use of Technology in Class and Extent Students Use Technology, by Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Use Technology in Class * Extent Students use Technology * Full-time Faculty	70	59,3%	48	40,7%	118	100,0%

Table 132. Use Technology in Class * Extent Students use Technology * Full-time Faculty Crosstabulation

Full-time Faculty			Extent Students use Technology			Total
			very little	some	a great deal	
No	Use Technology in Class	No	0	1	2	3
		Yes	1	5	19	25
	Total		1	6	21	28
Yes	Use Technology in Class	No	1	1	2	4
		yes	0	4	34	38
	Total		1	5	36	42

Table 133. Chi-Square Tests

Full-time Faculty		Value	df	Asymp. Sig. (2-sided)
No	Pearson Chi-Square	,373(a)	2	,830
Yes	Pearson Chi-Square	10,795(b)	2	,005

a 4 cells (66,7%) have expected count less than 5. The minimum expected count is ,11.
b 5 cells (83,3%) have expected count less than 5. The minimum expected count is ,10.

(Perceived Technology Benefits, Chapter IV: pg. 89, Questionnaire #14, cont'd)

Table 134. Directional Measures

Full-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
no	Nominal by nominal	Goodman and Kruskal tau	Use Technology in Class Dependent	,013	,041		,835(c)
			Extent Students use Technology Dependent	,007	,031		,830(c)
Yes	Nominal by nominal	Goodman and Kruskal tau	Use Technology in Class Dependent	,257	,109		,005(c)
			Extent Students use Technology Dependent	,082	,099		,034(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 135. Adjusted Residuals, Use Technology in Class * Extent Students use Technology * Full- time Faculty Crosstabulation

Full-time Faculty				Extent Students use Technology			Total
				very little	some	a great deal	
No	Use Technology in Class	no	Count	0	1	2	3
			Adjusted Residual	-,4	,5	-,4	
		yes	Count	1	5	19	25
			Adjusted Residual	,4	-,5	,4	
	Total		Count	1	6	21	28
Yes	Use Technology in Class	no	Count	1	1	2	4
			Adjusted Residual	3,1	,9	-2,1	
		yes	Count	0	4	34	38
			Adjusted Residual	-3,1	-,9	2,1	
	Total		Count	1	5	36	42

Consideration of Student Needs when Developing Technology, Chapter IV: pg. 92, Questionnaire #17

Table 136. Case Processing Summary for Consideration of Student Needs

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Past Times w Disabled Students * Consideration of Student Needs	100	84,7%	18	15,3%	118	100,0%

Table 137. Past Times w Disabled Students * Consideration of Student Needs Crosstabulation

		Consideration of Student Needs			Total
		Not at all	Partially	Definitely	
Past Times w Disabled Students	0	45	1	1	47
	1	2	0	1	3
	2	8	1	0	9
	3	4	0	1	5
	4	4	1	1	6
	5	17	9	4	30
Total		80	12	8	100

Table 138. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24,462(a)	10	,006

a 14 cells (77,8%) have expected count less than 5. The minimum expected count is ,24.

(Consideration of Student Needs when Developing Technology, Chapter IV: pg. 92, Questionnaire #17 cont'd)

Table 139. Directional Measures

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,105	,038		,000(c)
	Consideration of Student Needs Dependent	,153	,056		,001(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 140. Case Processing Summary for Consideration of Students Needs by Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Past Times w Disabled Students * Consideration of Student Needs * Gender	100	84,7%	18	15,3%	118	100,0%

(Consideration of Student Needs when Developing Technology, Chapter IV: pg. 92, Questionnaire #17 cont'd)

Table 141. Past Times w Disabled Students * Consideration of Student Needs * Gender Crosstabulation

Gender			Consideration of Student Needs			Total
			Not at all	Partially	Definitely	
male	Past Times w Disabled Students	0	25	0	0	25
		1	2	0	0	2
		2	6	1	0	7
		3	3	0	1	4
		4	2	1	1	4
		5	14	5	4	23
	Total		52	7	6	65
female	Past Times w Disabled Students	0	20	1	1	22
		1	0	0	1	1
		2	2	0	0	2
		3	1	0	0	1
		4	2	0	0	2
		5	3	4	0	7
	Total		28	5	2	35

Table 142. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
male	Pearson Chi-Square	16,587(a)	10	,084
female	Pearson Chi-Square	30,198(b)	10	,001

a 15 cells (83,3%) have expected count less than 5. The minimum expected count is ,18.
b 16 cells (88,9%) have expected count less than 5. The minimum expected count is ,06.

(Consideration of Student Needs when Developing Technology, Chapter IV: pg. 92, Questionnaire #17 cont'd)

Table 143. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
male	Nominal by Nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,100	,033		,000(c)
			Consideration of Student Needs Dependent	,167	,049		,019(c)
female	Nominal by Nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,196	,108		,000(c)
			Consideration of Student Needs Dependent	,392	,157		,003(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Consideration of Student Needs when Developing Technology, Chapter IV: pg. 92, Questionnaire #17 cont'd)

Table 144. Adjusted Residuals Past Times w Disabled Students * Consideration of Student Needs * Gender Crosstabulation

Gender				Consideration of Student Needs			Total
				Not at all	Partially	Definitely	
male	Past Times w Disabled Students	0	Count	25	0	0	25
			Adjusted Residual	3,2	-2,2	-2,0	
		1	Count	2	0	0	2
			Adjusted Residual	,7	-,5	-,5	
		2	Count	6	1	0	7
			Adjusted Residual	,4	,3	-,9	
		3	Count	3	0	1	4
			Adjusted Residual	-,3	-,7	1,1	
		4	Count	2	1	1	4
			Adjusted Residual	-1,5	,9	1,1	
		5	Count	14	5	4	23
			Adjusted Residual	-2,9	2,1	1,7	
	Total		Count	52	7	6	65
female	Past Times w Disabled Students	0	Count	20	1	1	22
			Adjusted Residual	2,1	-2,1	-,4	
		1	Count	0	0	1	1
			Adjusted Residual	-2,0	-,4	4,1	
		2	Count	2	0	0	2
			Adjusted Residual	,7	-,6	-,4	
		3	Count	1	0	0	1
			Adjusted Residual	,5	-,4	-,2	
		4	Count	2	0	0	2
			Adjusted Residual	,7	-,6	-,4	
		5	Count	3	4	0	7
			Adjusted Residual	-2,7	3,6	-,7	
	Total		Count	28	5	2	35

a 15 cells (83,3%) have expected count less than 5. The minimum expected count is ,18.
b 16 cells (88,9%) have expected count less than 5. The minimum expected count is ,06.

(Consideration of Student Needs when Developing Technology, Chapter IV: pg. 92, Questionnaire #17 cont'd)

Table 145. Case Processing Summary for Consideration of Student Needs by Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Past Times w Disabled Students * Consideration of Student Needs * Full -time Faculty	100	84,7%	18	15,3%	118	100,0%

Table 146. Past Times w Disabled Students * Consideration of Student Needs * Full-time Faculty Crosstabulation

Full-time Faculty			Consideration of Student Needs			Total
			Not at all	Partially	Definitely	
no	Past Times w Disabled Students	0	28	1	1	30
		1	1	0	0	1
		2	2	1	0	3
		3	2	0	0	2
		4	2	1	0	3
		5	2	3	3	8
	Total		37	6	4	47
yes	Past Times w Disabled Students	0	17	0	0	17
		1	1	0	1	2
		2	6	0	0	6
		3	2	0	1	3
		4	2	0	1	3
		5	15	6	1	22
	Total		43	6	4	53

Table 147. Chi-Square Tests

Full-time Faculty		Value	df	Asymp. Sig. (2-sided)
No	Pearson Chi-Square	21,936(a)	10	,015
Yes	Pearson Chi-Square	22,373(b)	10	,013

a 16 cells (88,9%) have expected count less than 5. The minimum expected count is ,09.
b 16 cells (88,9%) have expected count less than 5. The minimum expected count is ,15.

(Consideration of Student Needs when Developing Technology, Chapter IV: pg. 92, Questionnaire #17, cont'd)

Table 148. Directional Measures

Full-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
no	Nominal by Nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,198	,092		,000(c)
			Consideration of Student Needs Dependent	,301	,113		,002(c)
yes	Nominal by Nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,116	,025		,001(c)
			Consideration of Student Needs Dependent	,197	,071		,025(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Consideration of Student Needs when Developing Technology, Chapter IV: pg. 92, Questionnaire #17, cont'd)

Table 149. Adjusted residuals, Past Times w Disabled Students * Consideration of Student Needs * Full-time Faculty

Full-time Faculty				Consideration of Student Needs			Total
				Not at all	Partially	Definitely	
No	Past Times w Disabled Students	0	Count	28	1	1	30
			Adjusted Residual	3,3	-2,6	-1,7	
		1	Count	1	0	0	1
			Adjusted Residual	,5	-,4	-,3	
		2	Count	2	1	0	3
			Adjusted Residual	-,5	1,1	-,5	
		3	Count	2	0	0	2
			Adjusted Residual	,8	-,6	-,4	
		4	Count	2	1	0	3
			Adjusted Residual	-,5	1,1	-,5	
		5	Count	2	3	3	8
			Adjusted Residual	-4,1	2,3	3,2	
	Total		Count	37	6	4	47
Yes	Past Times w Disabled Students	0	Count	17	0	0	17
			Adjusted Residual	2,4	-1,8	-1,4	
		1	Count	1	0	1	2
			Adjusted Residual	-1,1	-,5	2,3	
		2	Count	6	0	0	6
			Adjusted Residual	1,3	-,9	-,7	
		3	Count	2	0	1	3
			Adjusted Residual	-,7	-,6	1,7	
		4	Count	2	0	1	3
			Adjusted Residual	-,7	-,6	1,7	
		5	Count	15	6	1	22
			Adjusted Residual	-2,0	3,1	-,7	
	Total		Count	43	6	4	53

(Consideration of Student Needs when Developing Technology, Chapter IV: pg. 101, Questionnaire #17, cont'd)

Table 150. Case Processing Summary for Consideration of Student Needs by Part-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Past Times w Disabled Students * Consideration of Student Needs * Part-time Faculty	100	84,7%	18	15,3%	118	100,0%

Table 151. Past Times w Disabled Students * Consideration of Student Needs * Part-time Faculty Crosstabulation

Part-time Faculty			Consideration of Student Needs			Total
			Not at all	Partially	Definitely	
no	Past Times w Disabled Students	0	22	1	1	24
		1	1	0	1	2
		2	6	0	0	6
		3	3	0	1	4
		4	2	0	1	3
		5	16	8	3	27
	Total		50	9	7	66
yes	Past Times w Disabled Students	0	23	0	0	23
		1	1	0	0	1
		2	2	1	0	3
		3	1	0	0	1
		4	2	1	0	3
		5	1	1	1	3
	Total		30	3	1	34

(Consideration of Student Needs when Developing Technology, Chapter IV: pg.97, Questionnaire #17, cont'd)

Table 152. Chi-Square Tests

Part-time Faculty		Value	df	Asymp. Sig. (2-sided)
no	Pearson Chi-Square	17,884(a)	10	,057
yes	Pearson Chi-Square	20,400(b)	10	,026

a 16 cells (88,9%) have expected count less than 5. The minimum expected count is ,21.
b 17 cells (94,4%) have expected count less than 5. The minimum expected count is ,03.

Table 153. Directional Measures

Part-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,091	,039		,001(c)
			Consideration of Student Needs Dependent	,144	,063		,045(c)
yes	Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,204	,061		,000(c)
			Consideration of Student Needs Dependent	,355	,133		,009(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Consideration of Student Needs when Developing Technology, Chapter IV: pg. 92, Questionnaire #17, cont'd)

Table 154. Adjusted residuals, Past Times w Disabled Students * Consideration of Student Needs * Part-time Faculty Crosstabulation

Part-time Faculty				Consideration of Student Needs			Total
				Not at all	Partially	Definitely	
no	Past Times w Disabled Students	0	Count	22	1	1	24
			Adjusted Residual	2,3	-1,7	-1,3	
		1	Count	1	0	1	2
			Adjusted Residual	-,9	-,6	1,8	
		2	Count	6	0	0	6
			Adjusted Residual	1,5	-1,0	-,9	
		3	Count	3	0	1	4
			Adjusted Residual	,0	-,8	1,0	
		4	Count	2	0	1	3
			Adjusted Residual	-,4	-,7	1,3	
		5	Count	16	8	3	27
			Adjusted Residual	-2,6	3,2	,1	
	Total		Count	50	9	7	66
yes	Past Times w Disabled Students	0	Count	23	0	0	23
			Adjusted Residual	3,1	-2,6	-1,5	
		1	Count	1	0	0	1
			Adjusted Residual	,4	-,3	-,2	
		2	Count	2	1	0	3
			Adjusted Residual	-1,2	1,6	-,3	
		3	Count	1	0	0	1
			Adjusted Residual	,4	-,3	-,2	
		4	Count	2	1	0	3
			Adjusted Residual	-1,2	1,6	-,3	
		5	Count	1	1	1	3
			Adjusted Residual	-3,1	1,6	3,3	
	Total		Count	30	3	1	34

Confidence in Material Accessibility, Chapter IV: pg. 97, Questionnaire #16

Table 155. Case Processing Summary for Confidence in Material Accessibility

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Past Times w Disabled Students * Confidence in material accessibility	116	98,3%	2	1,7%	118	100,0%

Table 156. Past Times w Disabled Students * Confidence in material accessibility Crosstabulation

		Confidence in material accessibility				Total
		never	sometimes	frequently	always	
Past Times w Disabled Students	0	3	48	2	2	55
	1	0	2	1	0	3
	2	0	9	1	1	11
	3	1	2	0	2	5
	4	0	6	1	1	8
	5	1	20	7	6	34
Total		5	87	12	12	116

Table 157. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24,025(a)	15	,065

a 18 cells (75,0%) have expected count less than 5. The minimum expected count is ,13.

(Confidence in Material Accessibility, Chapter IV: pg. 97, Questionnaire #16, cont'd)

Table 158. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,068	,030		,001(c)
		Confidence in material accessibility Dependent	,090	,042		,009(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 159. Case Processing Summary for Confidence in Material Accessibility by Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Past Times w Disabled Students * Confidence in material accessibility * Gender	116	98,3%	2	1,7%	118	100,0%

(Confidence in Material Accessibility, Chapter IV: pg. 97, Questionnaire #16, cont'd)

Table 160. Past Times w Disabled Students * Confidence in material accessibility * Gender Crosstabulation

Gender			Confidence in material accessibility				Total
			never	sometimes	frequently	always	
male	Past Times w Disabled Students	0	2	23	1	2	28
		1	0	2	0	0	2
		2	0	7	1	1	9
		3	1	2	0	1	4
		4	0	3	1	1	5
		5	1	14	2	6	23
	Total		4	51	5	11	71
female	Past Times w Disabled Students	0	1	25	1	0	27
		1	0	0	1	0	1
		2	0	2	0	0	2
		3	0	0	0	1	1
		4	0	3	0	0	3
		5	0	6	5	0	11
	Total		1	36	7	1	45

Table 161. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
male	Pearson Chi-Square	11,213(a)	15	,737
female	Pearson Chi-Square	62,220(b)	15	,000

a 21 cells (87,5%) have expected count less than 5. The minimum expected count is ,11.
b 22 cells (91,7%) have expected count less than 5. The minimum expected count is ,02.

(Confidence in Material Accessibility, Chapter IV: pg. 97, Questionnaire #16, cont'd)

Table 162. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,040	,028		,514(c)
			Confidence in material accessibility Dependent	,061	,041		,611(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,208	,079		,000(c)
			Confidence in material accessibility Dependent	,387	,106		,000(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Confidence in Material Accessibility, Chapter IV: pg. 97, Questionnaire #16, cont'd)

Table 163. Adjusted residuals, Past Times w Disabled Students * Confidence in material accessibility * Gender Crosstabulation

Gender				Confidence in material accessibility				Total
				never	sometimes	frequently	always	
male	Past Times w Disabled Students	0	Count	2	23	1	2	28
			Adjusted Residual	,4	1,6	-,9	-1,6	
		1	Count	0	2	0	0	2
			Adjusted Residual	-,4	,9	-,4	-,6	
		2	Count	0	7	1	1	9
			Adjusted Residual	-,8	,4	,5	-,4	
		3	Count	1	2	0	1	4
			Adjusted Residual	1,7	-1,0	-,6	,5	
		4	Count	0	3	1	1	5
			Adjusted Residual	-,6	-,6	1,2	,3	
		5	Count	1	14	2	6	23
			Adjusted Residual	-,3	-1,4	,4	1,7	
	Total		Count	4	51	5	11	71
Female	Past Times w Disabled Students	0	Count	1	25	1	0	27
			Adjusted Residual	,8	2,6	-2,7	-1,2	
		1	Count	0	0	1	0	1
			Adjusted Residual	-,2	-2,0	2,4	-,2	
		2	Count	0	2	0	0	2
			Adjusted Residual	-,2	,7	-,6	-,2	
		3	Count	0	0	0	1	1
			Adjusted Residual	-,2	-2,0	-,4	6,7	
		4	Count	0	3	0	0	3
			Adjusted Residual	-,3	,9	-,8	-,3	
		5	Count	0	6	5	0	11
			Adjusted Residual	-,6	-2,4	3,1	-,6	
	Total		Count	1	36	7	1	45

(Confidence in Material Accessibility, Chapter IV: pg. 97, Questionnaire #16, cont'd)

Table 164. Case Processing Summary for Confidence in Material Accessibility by Part-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Past Times w Disabled Students * Confidence in material accessibility * Part-time Faculty	116	98,3%	2	1,7%	118	100,0%

Table 165. Past Times w Disabled Students * Confidence in material accessibility * Part-time Faculty Crosstabulation

Part-time Faculty			Confidence in material accessibility				Total
			never	Sometimes	frequently	always	
no	Past Times w Disabled Students	0	2	23	1	2	28
		1	0	1	1	0	2
		2	0	6	1	0	7
		3	1	2	0	1	4
		4	0	3	0	1	4
		5	0	17	6	5	28
	Total		3	52	9	9	73
yes	Past Times w Disabled Students	0	1	25	1	0	27
		1	0	1	0	0	1
		2	0	3	0	1	4
		3	0	0	0	1	1
		4	0	3	1	0	4
		5	1	3	1	1	6
	Total		2	35	3	3	43

(Confidence in Material Accessibility, Chapter IV: pg. 106, Questionnaire #16, cont'd)

Table 166. Chi-Square Tests

Part-time Faculty		Value	df	Asymp. Sig. (2-sided)
No	Pearson Chi-Square	18,445(a)	15	,240
Yes	Pearson Chi-Square	25,227(b)	15	,047

a 22 cells (91,7%) have expected count less than 5. The minimum expected count is ,08.
b 23 cells (95,8%) have expected count less than 5. The minimum expected count is ,05.

Table 167. Directional Measures

Part-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,069	,031		,050(c)
			Confidence in material accessibility Dependent	,078	,044		,330(c)
Yes	Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,126	,055		,034(c)
			Confidence in material accessibility Dependent	,230	,075		,016(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Confidence in Material Accessibility, Chapter IV: pg. 106, Questionnaire #16, cont'd)

Table 168. Adjusted Residuals, Past Times w Disabled Students * Confidence in material accessibility * Part-time Faculty Crosstabulation

Part-time Faculty				Confidence in material accessibility				Total
				never	sometimes	frequently	always	
No	Past Times w Disabled Students	0	Count	2	23	1	2	28
			Adjusted Residual	1,0	1,6	-1,8	-1,1	
		1	Count	0	1	1	0	2
			Adjusted Residual	-,3	-,7	1,6	-,5	
		2	Count	0	6	1	0	7
			Adjusted Residual	-,6	,9	,2	-1,0	
		3	Count	1	2	0	1	4
			Adjusted Residual	2,2	-1,0	-,8	,8	
		4	Count	0	3	0	1	4
			Adjusted Residual	-,4	,2	-,8	,8	
		5	Count	0	17	6	5	28
			Adjusted Residual	-1,4	-1,6	1,9	1,1	
	Total		Count	3	52	9	9	73
yes	Past Times w Disabled Students	0	Count	1	25	1	0	27
			Adjusted Residual	-,4	2,5	-1,1	-2,3	
		1	Count	0	1	0	0	1
			Adjusted Residual	-,2	,5	-,3	-,3	
		2	Count	0	3	0	1	4
			Adjusted Residual	-,5	-,3	-,6	1,5	
		3	Count	0	0	0	1	1
			Adjusted Residual	-,2	-2,1	-,3	3,7	
		4	Count	0	3	1	0	4
			Adjusted Residual	-,5	-,3	1,5	-,6	
		5	Count	1	3	1	1	6
			Adjusted Residual	1,5	-2,1	1,0	1,0	
	Total		Count	2	35	3	3	43

Current Knowledge of Needs for Students with Disabilities, Chapter IV: pg. 109, Questionnaire #18

Table 169. Case Processing Summary for Current Knowledge of Needs for Students with Disabilities

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Past Times w Disabled Students * Current knowledge of needs for students with disabilities	117	99,2%	1	,8%	118	100,0%

Table 170. Past Times w Disabled Students * Current Knowledge of Needs for Students with Disabilities Crosstabulation

		Current knowledge of needs for students with disabilities			Total
		Little or no understand-ing	Some knowledge	Broad knowledge	
Past Times w Disabled Students	0	48	3	4	55
	1	0	1	2	3
	2	9	2	0	11
	3	4	0	1	5
	4	5	1	2	8
	5	17	11	7	35
Total		83	18	16	117

Table 171. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29,098(a)	10	,001

a 11 cells (61,1%) have expected count less than 5. The minimum expected count is ,41.

(Current Knowledge of Needs for Students with Disabilities, Chapter IV: pg. 109, Questionnaire #18, cont'd)

Table 172. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,085	,035		,000(c)
		Current knowledge of needs for students with disabilities Dependent	,154	,045		,000(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 173. Past Times w Disabled Students * Current Knowledge of Needs for Students with Disabilities * Gender Crosstabulation

Gender			Current knowledge of needs for students with disabilities			Total
			Little or no understand-ing	Some knowledge	Broad knowledge	
Male	Past Times w Disabled Students	0	23	3	2	28
		1	0	0	2	2
		2	7	2	0	9
		3	4	0	0	4
		4	2	1	2	5
		5	12	7	5	24
	Total		48	13	11	72
Female	Past Times w Disabled Students	0	25	0	2	27
		1	0	1	0	1
		2	2	0	0	2
		3	0	0	1	1
		4	3	0	0	3
		5	5	4	2	11
	Total		35	5	5	45

(Current Knowledge of Needs for Students with Disabilities, Chapter IV: pg. 109, Questionnaire #18, cont'd)

Table 174. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
Male	Pearson Chi-Square	23,444(a)	10	,009
Female	Pearson Chi-Square	29,810(b)	10	,001

a 14 cells (77,8%) have expected count less than 5. The minimum expected count is ,31.
b 16 cells (88,9%) have expected count less than 5. The minimum expected count is ,11.

Table 175. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,059	,033		,022(c)
			Current knowledge of needs for students with disabilities Dependent	,170	,050		,007(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,191	,064		,000(c)
			Current knowledge of needs for students with disabilities Dependent	,363	,092		,000(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Current Knowledge of Needs for Students with Disabilities, Chapter IV: pg. 109, Questionnaire #18, cont'd)

Table 176. Adjusted residuals, Past Times w Disabled Students * Current Knowledge of Needs for Students with Disabilities * Gender Crosstabulation

Gender				Current knowledge of needs for students with disabilities: Little or no understand-ing	Some knowledge	Broad knowledge	Total
male	Past Times w Disabled Students	0	Count	23	3	2	28
			Adjusted Residual	2,2	-1,3	-1,5	
		1	Count	0	0	2	2
			Adjusted Residual	-2,0	-,7	3,4	
		2	Count	7	2	0	9
			Adjusted Residual	,8	,3	-1,4	
		3	Count	4	0	0	4
			Adjusted Residual	1,5	-1,0	-,9	
		4	Count	2	1	2	5
			Adjusted Residual	-1,3	,1	1,6	
		5	Count	12	7	5	24
			Adjusted Residual	-2,1	1,7	,9	
	Total		Count	48	13	11	72
female	Past Times w Disabled Students	0	Count	25	0	2	27
			Adjusted Residual	2,9	-2,9	-1,0	
		1	Count	0	1	0	1
			Adjusted Residual	-1,9	2,9	-,4	
		2	Count	2	0	0	2
			Adjusted Residual	,8	-,5	-,5	
		3	Count	0	0	1	1
			Adjusted Residual	-1,9	-,4	2,9	
		4	Count	3	0	0	3
			Adjusted Residual	1,0	-,6	-,6	
		5	Count	5	4	2	11
			Adjusted Residual	-3,0	3,1	,9	
	Total		Count	35	5	5	45

(Current Knowledge of Needs for Students with Disabilities, Chapter IV: pg. 109, Questionnaire #18, cont'd)

Table 177. Case Processing Summary for Current Knowledge of Needs for Students with Disabilities by Part-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Past Times w Disabled Students * Current knowledge of needs for students with disabilities * Part-time Faculty	117	99,2%	1	,8%	118	100,0%

Table 178. Past Times w Disabled Students * Current Knowledge of Needs for Students with Disabilities * Part-time Faculty Crosstabulation

Part-time Faculty			Current knowledge of needs for students with disabilities			Total
			Little or no understand-ing	Some knowledge	Broad knowledge	
no	Past Times w Disabled Students	0	22	2	4	28
		1	0	1	1	2
		2	5	2	0	7
		3	4	0	0	4
		4	3	0	1	4
		5	13	10	6	29
	Total		47	15	12	74
yes	Past Times w Disabled Students	0	26	1	0	27
		1	0	0	1	1
		2	4	0	0	4
		3	0	0	1	1
		4	2	1	1	4
		5	4	1	1	6
	Total		36	3	4	43

(Current Knowledge of Needs for Students with Disabilities, Chapter IV: pg. 109, Questionnaire #18, cont'd)

Table 179 . Chi-Square Tests

Part-time Faculty		Value	df	Asymp. Sig. (2-sided)
no	Pearson Chi-Square	16,661(a)	10	,082
yes	Pearson Chi-Square	28,545(b)	10	,001

a 14 cells (77,8%) have expected count less than 5. The minimum expected count is ,32.
b 16 cells (88,9%) have expected count less than 5. The minimum expected count is ,07.

Table 180. Directional Measures

Part-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,071	,038		,004(c)
			Current knowledge of needs for students with disabilities Dependent	,136	,045		,031(c)
Yes	Nominal by nominal	Goodman and Kruskal tau	Past Times w Disabled Students Dependent	,131	,049		,002(c)
			Current knowledge of needs for students with disabilities Dependent	,395	,082		,000(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Current Knowledge of Needs for Students with Disabilities, Chapter IV: pg. 109, Questionnaire #18, cont'd)

Table 181. Adjusted residuals, Past Times w Disabled Students * Current Knowledge of Needs for Students with Disabilities * Part-time Faculty Crosstabulation

Part-time Faculty				Current knowledge of needs for students with disabilities			Total
				Little or no understand-ing	Some knowledge	Broad knowledge	
no	Past Times w Disabled Students	0	Count	22	2	4	28
			Adjusted Residual	2,1	-2,2	-,4	
		1	Count	0	1	1	2
			Adjusted Residual	-1,9	1,1	1,3	
		2	Count	5	2	0	7
			Adjusted Residual	,5	,6	-1,2	
		3	Count	4	0	0	4
			Adjusted Residual	1,6	-1,0	-,9	
		4	Count	3	0	1	4
			Adjusted Residual	,5	-1,0	,5	
		5	Count	13	10	6	29
			Adjusted Residual	-2,7	2,4	,8	
	Total		Count	47	15	12	74
yes	Past Times w Disabled Students	0	Count	26	1	0	27
			Adjusted Residual	2,9	-1,1	-2,7	
		1	Count	0	0	1	1
			Adjusted Residual	-2,3	-,3	3,2	
		2	Count	4	0	0	4
			Adjusted Residual	,9	-,6	-,7	
		3	Count	0	0	1	1
			Adjusted Residual	-2,3	-,3	3,2	
		4	Count	2	1	1	4
			Adjusted Residual	-1,9	1,5	1,1	
		5	Count	4	1	1	6
			Adjusted Residual	-1,2	1,0	,7	
	Total		Count	36	3	4	43

Table 182. Case Processing Summary, Compliance Goal for Accessibility and Time to Reach Goal

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Compliance goal for accessibility * Time to goal	108	91,5%	10	8,5%	118	100,0%

Table 183. Compliance goal for accessibility * Time to goal Crosstabulation

		Time to goal					Total
		less than 6 months	6 months to a year	1 to 2 years	more than 2 years	not relevant	
Compliance goal for accessibility	no goal	0	2	0	77	12	91
	comply customized guidelines	1	0	0	0	0	1
	comply W3C WCAG 1.0 double-AA	0	3	3	4	0	10
	comply W3C WCAG 1.0 triple-AAA	0	0	2	1	0	3
	other	0	1	0	0	2	3
Total		1	6	5	82	14	108

Table 184. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	182,083(a)	16	,000

a 21 cells (84,0%) have expected count less than 5. The minimum expected count is ,01.

(Compliance Goals, Chapter IV: pg. 112, Questionnaire #22)

Table 185. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Compliance goal for accessibility Dependent	,372	,079		,000(c)
		Time to goal Dependent	,228	,060		,000(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 186. Case Processing Summary, Compliance Goal and Time to Reach Goal by Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Compliance goal for accessibility * Time to goal * Gender	108	91,5%	10	8,5%	118	100,0%

(Compliance Goals, Chapter IV: pg. 112, Questionnaire #22, cont'd)

Table 187. Compliance goal for accessibility * Time to goal * Gender Crosstabulation

Gender			Time to goal					Total
			less than 6 months	6 months to a year	1 to 2 years	more than 2 years	not relevant	
male	Compliance goal for accessibility	no goal	0	2	0	42	7	51
		comply customized guidelines	1	0	0	0	0	1
		comply W3C WCAG 1.0 double-AA	0	3	3	3	0	9
		comply W3C WCAG 1.0 triple-AAA	0	0	0	1	0	1
		other	0	1	0	0	1	2
	Total		1	6	3	46	8	64
female	Compliance goal for accessibility	no goal			0	35	5	40
		comply W3C WCAG 1.0 double-AA			0	1	0	1
		comply W3C WCAG 1.0 triple-AAA			2	0	0	2
		other			0	0	1	1
	Total				2	36	6	44

(Compliance Goals, Chapter IV: pg. 112, Questionnaire #22, cont'd)

Table 188. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
male	Pearson Chi-Square	100,762(a)	16	,000
female	Pearson Chi-Square	50,569(b)	6	,000

a 22 cells (88,0%) have expected count less than 5. The minimum expected count is ,02.
b 10 cells (83,3%) have expected count less than 5. The minimum expected count is ,05.

Table 189. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Compliance goal for accessibility Dependent	,416	,100		,000(c)
			Time to goal Dependent	,234	,067		,000(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Compliance goal for accessibility Dependent	,519	,148		,000(c)
			Time to goal Dependent	,358	,096		,000(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Compliance Goals, Chapter IV: pg. 112, Questionnaire #22, cont'd)

Table 190. Adjusted residuals, Compliance goal for accessibility * Time to goal * Gender Crosstabulation

Gender				Time to goal					Total
				less than 6 months	6 months to a year	1 to 2 years	more than 2 years	not relevant	
Male	Compliance goal for accessibility	no goal	Count	0	2	0	42	7	51
			Adjusted Residual	-2,0	-3,0	-3,5	3,7	,6	
		comply customized guidelines	Count	1	0	0	0	0	1
			Adjusted Residual	8,0	-,3	-,2	-1,6	-,4	
		comply W3C WCAG 1.0 double-AA	Count	0	3	3	3	0	9
			Adjusted Residual	-,4	2,7	4,4	-2,8	-1,2	
		comply W3C WCAG 1.0 triple-AAA	Count	0	0	0	1	0	1
			Adjusted Residual	-,1	-,3	-,2	,6	-,4	
		other	Count	0	1	0	0	1	2
			Adjusted Residual	-,2	2,0	-,3	-2,3	1,6	
	Total		Count	1	6	3	46	8	64
Female	Compliance goal for accessibility	no goal	Count			0	35	5	40
			Adjusted Residual			-4,6	3,1	-,7	
		comply W3C WCAG 1.0 double-AA	Count			0	1	0	1
			Adjusted Residual			-,2	,5	-,4	
		comply W3C WCAG 1.0 triple-AAA	Count			2	0	0	2
			Adjusted Residual			6,6	-3,1	-,6	
		other	Count			0	0	1	1
			Adjusted Residual			-,2	-2,1	2,5	
	Total		Count			2	36	6	44

Table 191. Case Processing Summary, Compliance Goal and Time to Reach Goal by Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Compliance goal for accessibility * Time to goal * Full-time Faculty	108	91,5%	10	8,5%	118	100,0%

Table 192. Compliance goal for accessibility * Time to goal * Full-time Faculty Crosstabulation

Full-time Faculty			Time to goal					Total
			less than 6 months	6 months to a year	1 to 2 years	more than 2 years	not relevant	
no	Compliance goal for accessibility	no goal	0	2	0	40	6	48
		comply customized guidelines	1	0	0	0	0	1
		comply W3C WCAG 1.0 double-AA	0	2	0	1	0	3
		comply W3C WCAG 1.0 triple-AAA	0	0	1	1	0	2
		other	0	0	0	0	1	1
	Total		1	4	1	42	7	55
yes	Compliance goal for accessibility	no goal		0	0	37	6	43
		comply W3C WCAG 1.0 double-AA		1	3	3	0	7
		comply W3C WCAG 1.0 triple-AAA		0	1	0	0	1
		other		1	0	0	1	2
	Total			2	4	40	7	53

(Compliance Goals, Chapter IV: pg. 112, Questionnaire #22, cont'd)

Table 193. Chi-Square Tests

Full-time Faculty		Value	df	Asymp. Sig. (2-sided)
No	Pearson Chi-Square	105,471(a)	16	,000
yes	Pearson Chi-Square	48,334(b)	9	,000

a 23 cells (92,0%) have expected count less than 5. The minimum expected count is ,02.
b 13 cells (81,3%) have expected count less than 5. The minimum expected count is ,04.

Table 194. Directional Measures

Full-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Compliance goal for accessibility Dependent	,410	,125		,000(c)
			Time to goal Dependent	,255	,094		,000(c)
Yes	Nominal by nominal	Goodman and Kruskal tau	Compliance goal for accessibility Dependent	,429	,105		,000(c)
			Time to goal Dependent	,274	,080		,000(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Compliance Goals, Chapter IV: pg. 112, Questionnaire #22, cont'd)

Table 195. Adjusted residuals, Compliance goal for accessibility * Time to goal * Full-time Faculty Crosstabulation

Full-Time Faculty				Time to goal					Total
				less than 6 months	6 months to a year	1 to 2 years	more than 2 years	not relevant	
no	Compliance goal for accessibility	no goal	Count	0	2	0	40	6	48
			Adjusted Residual	-2,6	-2,3	-2,6	3,2	-,1	
		comply customized guidelines	Count	1	0	0	0	0	1
			Adjusted Residual	7,4	-,3	-,1	-1,8	-,4	
		comply W3C WCAG 1.0 double-AA	Count	0	2	0	1	0	3
			Adjusted Residual	-,2	4,1	-,2	-1,8	-,7	
		comply W3C WCAG 1.0 triple-AAA	Count	0	0	1	1	0	2
			Adjusted Residual	-,2	-,4	5,2	-,9	-,6	
		other	Count	0	0	0	0	1	1
			Adjusted Residual	-,1	-,3	-,1	-1,8	2,6	
	Total		Count	1	4	1	42	7	55
yes	Compliance goal for accessibility	no goal	Count		0	0	37	6	43
			Adjusted Residual		-3,0	-4,3	3,7	,3	
		comply W3C WCAG 1.0 double-AA	Count		1	3	3	0	7
			Adjusted Residual		1,6	3,8	-2,2	-1,1	
		comply W3C WCAG 1.0 triple-AAA	Count		0	1	0	0	1
			Adjusted Residual		-,2	3,5	-1,8	-,4	
		other	Count		1	0	0	1	2
			Adjusted Residual		3,5	-,4	-2,5	1,6	
	Total		Count		2	4	40	7	53

(Compliance Goals, Chapter IV: pg. 112, Questionnaire #22, cont'd)

Table 196. Case Processing Summary for Compliance Goal and Time to Reach Goal by Part-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Compliance goal for accessibility * Time to goal * Part-time Faculty	108	91,5%	10	8,5%	118	100,0%

Table 197. Compliance goal for accessibility * Time to goal * Part-time Faculty Crosstabulation

Part-time Faculty			Time to goal					Total
			less than 6 months	6 months to a year	1 to 2 years	more than 2 years	not relevant	
no	Compliance goal for accessibility	no goal	0	1	0	45	8	54
		Comply customized guidelines	1	0	0	0	0	1
		comply W3C WCAG 1.0 double-AA	0	2	3	3	0	8
		comply W3C WCAG 1.0 triple-AAA	0	0	2	1	0	3
		Other	0	1	0	0	2	3
	Total		1	4	5	49	10	69
Yes	Compliance goal for accessibility	no goal		1		32	4	37
		comply W3C WCAG 1.0 double-AA		1		1	0	2
	Total			2		33	4	39

(Compliance Goals, Chapter IV: pg. 112, Questionnaire #22, cont'd)

Table 198. Chi-Square Tests

Part-time Faculty		Value	df	Asymp. Sig. (2-sided)
No	Pearson Chi-Square	120,857(a)	16	,000
Yes	Pearson Chi-Square	8,792(b)	2	,012

a 22 cells (88,0%) have expected count less than 5. The minimum expected count is ,01.
b 5 cells (83,3%) have expected count less than 5. The minimum expected count is ,10.
Table 202. Directional Measures

Table 199. Directional Measures

Part-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Compliance goal for accessibility Dependent	,390	,082		,000(c)
			Time to goal Dependent	,278	,074		,000(c)
Yes	Nominal by nominal	Goodman and Kruskal tau	Compliance goal for accessibility Dependent	,225	,288		,014(c)
			Time to goal Dependent	,066	,103		,081(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Compliance Goals, Chapter IV: pg. 112, Questionnaire #22, cont'd)

Table 200. Adjusted residuals, Compliance goal for accessibility * Time to goal * Part-time Faculty Crosstabulation

Part-time Faculty				Time to goal					Total
				less than 6 months	6 months to a year	1 to 2 years	more than 2 years	not relevant	
no	Compliance goal for accessibility	no goal	Count	0	1	0	45	8	54
			Adjusted Residual	-1,9	-2,7	-4,4	4,3	,1	
		comply customized guidelines	Count	1	0	0	0	0	1
			Adjusted Residual	8,3	-,2	-,3	-1,6	-,4	
		comply W3C WCAG 1.0 double-AA	Count	0	2	3	3	0	8
			Adjusted Residual	-,4	2,5	3,5	-2,2	-1,2	
		comply W3C WCAG 1.0 triple-AAA	Count	0	0	2	1	0	3
			Adjusted Residual	-,2	-,4	4,1	-1,5	-,7	
		other	Count	0	1	0	0	2	3
			Adjusted Residual	-,2	2,1	-,5	-2,8	2,6	
	Total		Count	1	4	5	49	10	69
yes	Compliance goal for accessibility	no goal	Count		1		32	4	37
			Adjusted Residual		-3,0		1,4	,5	
		comply W3C WCAG 1.0 double-AA	Count		1		1	0	2
			Adjusted Residual		3,0		-1,4	-,5	
	Total		Count		2		33	4	39

Confidence Using Microsoft Technologies, Chapter IV pg. 117, Questionnaire #37

Table 201. Case Processing Summary, Confidence Using Microsoft Technologies by Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Full-time Faculty * Microsoft word	96	81,4%	22*	18,6%	118	100,0%
Full-time Faculty * Microsoft PowerPoint	94	79,7%	24**	20,3%	118	100,0%
Full-time Faculty * Microsoft Excel	69	58,5%	49***	41,5%	118	100,0%

Respondents both indicated 'does not apply' for use of Microsoft products to create e-learning and rated their confidence for the applications as follows: * 7 blank, 42 does not apply, ** 8 blank, 42 does not apply, ***9 blank, 42 does not

Table 202. Full-Time Faculty * Microsoft Excel Crosstabulation

		Microsoft Excel				Total
		not at all confident	not very confident	confident	very confident	
Full-time Faculty	no	15	2	9	3	29
	yes	33	0	3	4	40
Total		48	2	12	7	69

Table 203. Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10,404(a)	3	,015

a 4 cells (50,0%) have expected count less than 5. The minimum expected count is ,84.

(Confidence Using Microsoft Technologies, Capter IV pg. 117, Questionnaire #37, cont'd)

Table 204. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
	Goodman and Kruskal tau	Full-time Faculty Dependent	,151	,073		,017(c)
		Microsoft Excel Dependent	,079	,052		,001(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 205. Full-time Faculty * Microsoft Excel * Gender Crosstabulation

Gender			Microsoft Excel				Total
			not at all confident	not very confident	confident	very confident	
Male	Full-time Faculty	No	7	1	6	3	17
		Yes	23	0	2	4	29
	Total		30	1	8	7	46
female	Full-time Faculty	No	8	1	3		12
		Yes	10	0	1		11
	Total		18	1	4		23

Table 206. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
male	Pearson Chi-Square	9,170(a)	3	,027
female	Pearson Chi-Square	2,183(b)	2	,336

a 5 cells (62,5%) have expected count less than 5. The minimum expected count is ,37.
b 4 cells (66,7%) have expected count less than 5. The minimum expected count is ,48.

(Confidence Using Microsoft Technologies, Capter IV pg. 117, Questionnaire #37, cont'd)

Table 207. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Full-time Faculty Dependent	,199	,107		,030(c)
			Microsoft Excel Dependent	,103	,071		,003(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Full-time Faculty Dependent	,095	,089		,352(c)
			Microsoft Excel Dependent	,064	,082		,245(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 208. Adjusted residuals, Full-Time Faculty * Q37ixa_MicroSoft_Excel * Gender Crosstabulation

Gender				Q37ixa_Micro_Ecel				Total
				not at all confident	not very confident	confident	very confident	
male	Full-time Faculty	No	Count	7	1	6	3	17
			Adjusted Residual	-2,6	1,3	2,5	,4	
		Yes	Count	23	0	2	4	29
			Adjusted Residual	2,6	-1,3	-2,5	-,4	
	Total		Count	30	1	8	7	46
female	Full-time Faculty	No	Count	8	1	3		12
			Adjusted Residual	-1,4	1,0	1,0		
		Yes	Count	10	0	1		11
			Adjusted Residual	1,4	-1,0	-1,0		
	Total		Count	18	1	4		23

Table 209. Case Processing Summary for Preferred Medium

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Web site	114	96,6%	4	3,4%	118	100,0%
Gender * Printed Material	114	96,6%	4	3,4%	118	100,0%
Gender * CD-ROM	114	96,6%	4	3,4%	118	100,0%
Gender * Combination of Above	114	96,6%	4	3,4%	118	100,0%

Table 210. Gender * Combination of Above Crosstabulation

		Combination of Above		Total
		no	Yes	
Gender	male	20	50	70
	female	3	41	44
Total		23	91	114

Table 211. Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7,938(b)	1	,005		

a Computed only for a 2x2 table
b 0 cells (,0%) have expected count less than 5. The minimum expected count is 8,88.

Table 212. Directional Measures

		Value	Asymp. Std. Error(a)	Approx. T	Approx. Sig.
Goodman and Kruskal tau	Gender Dependent	,070	,037		,005(b)
	Combination of Above Dependent	,070	,038		,005(b)

a Not assuming the null hypothesis.
b Based on chi-square approximation

(Preferred Medium, Chapter IV: pg. 122, Questionnaire #41, cont'd)

Table 213. Case Processing Summary for Preferred Medium of Part-time Faculty, by Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Part-time Faculty * CD-ROM * Gender	114	96,6%	4	3,4%	118	100,0%
Part-time Faculty * Web site * Gender	114	96,6%	4	3,4%	118	100,0%
Part-time Faculty * Printed Material * Gender	114	96,6%	4	3,4%	118	100,0%

Table 214. Part-time Faculty * CD-ROM * Gender Crosstabulation

Gender			CD-ROM		Total
			no	yes	
male	Part-time Faculty	No	10	37	47
		Yes	5	18	23
	Total		15	55	70
female	Part-time Faculty	No	6	18	24
		Yes	0	20	20
	Total		6	38	44

Table 215. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
male	Pearson Chi-Square	,002(a)	1	,965		
female	Pearson Chi-Square	5,789(b)	1	,016		

a 1 cells (25,0%) have expected count less than 5. The minimum expected count is 4,93.
b 2 cells (50,0%) have expected count less than 5. The minimum expected count is 2,73.

(Preferred Medium, Chapter IV: pg. 122, Questionnaire #41, cont'd)

Table 216. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Part-time Faculty Dependent	,000	,001		,965(c)
			CD-ROM Dependent	,000	,001		,965(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Part-time Faculty Dependent	,132	,037		,017(c)
			CD-ROM Dependent	,132	,054		,017(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 217. Adjusted residuals, Part-time Faculty * CD-ROM * Gender Crosstabulation

Gender				CD-ROM		Total
				no	yes	
male	Part-time Faculty	no	Count	10	37	47
			Adjusted Residual	,0	,0	
		yes	Count	5	18	23
			Adjusted Residual	,0	,0	
	Total		Count	15	55	70
female	Part-time Faculty	no	Count	6	18	24
			Adjusted Residual	2,4	-2,4	
		yes	Count	0	20	20
			Adjusted Residual	-2,4	2,4	
	Total		Count	6	38	44

Table 218. Case Processing Summary for New Knowledge Areas

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Current Knowledge* Better knowledge of problems students w disabilities face	115	97,5%	3	2,5%	118	100,0%
Current Knowledge * Better knowledge of accessible design techniques	115	97,5%	3	2,5%	118	100,0%
Current Knowledge * Better knowledge of dif. assist technologies disabled students use	115	97,5%	3	2,5%	118	100,0%
Current Knowledge * Better knowledge of disability discrimination legislation	115	97,5%	3	2,5%	118	100,0%
Current Knowledge * Better knowledge about why access. is important	115	97,5%	3	2,5%	118	100,0%

Table 219. Current knowledge of needs for students with disabilities * Better knowledge of problems students w disabilities face Crosstabulation

		Better knowledge of problems students w disabilities face		Total
		no	yes	
Current knowledge of needs for students with disabilities	Little or no understanding	2	81	83
	Some knowledge	1	16	17
	Broad knowledge	4	11	15
Total		7	108	115

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 220. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13,078(a)	2	,001

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is ,91.

Table 221. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,057	,041		,002(c)
		Better knowledge of problems students w disabilities face Dependent	,114	,090		,002(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 222. Current knowledge of needs for students with disabilities * Better knowledge of accessible design techniques Crosstabulation

		Better knowledge of accessible design techniques		
		no	yes	Total
Current knowledge of needs for students with disabilities	Little or no understanding	3	80	83
	Some knowledge	2	15	17
	Broad knowledge	3	12	15
Total		8	107	115

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 223. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5,982(a)	2	,050

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is 1,04.

Table 224. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,032	,030		,025(b)
		Better knowledge of accessible design techniques Dependent	,052	,053		,052(b)

a Not assuming the null hypothesis.
b Based on chi-square approximation

Table 225. Current knowledge of needs for students with disabilities * Better knowledge of disability discrimination legislation Crosstabulation

		Better knowledge of disability discrimination legislation		Total
		no	yes	
Current knowledge of needs for students with disabilities	Little or no understanding	10	73	83
	Some knowledge	8	9	17
	Broad knowledge	4	11	15
Total		22	93	115

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 226. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11,813(a)	2	,003

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is 2,87.

Table 227. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,065	,043		,001(b)
		Better knowledge of disability discrimination legislation Dependent	,103	,067		,003(b)

a Not assuming the null hypothesis.
b Based on chi-square approximation

Table 228. Current knowledge of needs for students with disabilities * Better knowledge about why accessibility is important Crosstabulation

		Better knowledge about why access. is important		Total
		no	yes	
Current knowledge of needs for students with disabilities	Little or no understanding	9	74	83
	Some knowledge	8	9	17
	Broad knowledge	5	10	15
Total		22	93	115

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 229. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14,211(a)	2	,001

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is 2,87.

Table 230. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,083	,047		,000(b)
		Better knowledge about why access. is important Dependent	,124	,071		,001(b)

a Not assuming the null hypothesis.
b Based on chi-square approximation

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 231. Case Processing Summary, Current Knowledge of Needs and New Knowledge Areas, by Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Current knowledge of needs for students with disabilities * Better knowledge of problems students w disabilities face * Gender	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge of accessible design techniques * Gender	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge of dif. assist technologies dis students use * Gender	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge of disability discrimination legislation * Gender	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge about why access. is important * Gender	115	97,5%	3	2,5%	118	100,0%

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 232. Current knowledge of needs for students with disabilities * Better knowledge of problems students w disabilities face * Gender Crosstabulation

Gender			Better knowledge of problems students w disabilities face		Total
			no	yes	
male	Current knowledge of needs for students with disabilities	Little or no understanding	2	46	48
		Some knowledge	1	11	12
		Broad knowledge	2	8	10
	Total		5	65	70
female	Current knowledge of needs for students with disabilities	Little or no understanding	0	35	35
		Some knowledge	0	5	5
		Broad knowledge	2	3	5
	Total		2	43	45

Table 233. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
male	Pearson Chi-Square	3,159(a)	2	,206
female	Pearson Chi-Square	16,744(b)	2	,000

a 3 cells (50,0%) have expected count less than 5. The minimum expected count is ,71.
b 5 cells (83,3%) have expected count less than 5. The minimum expected count is ,22.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 234. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,024	,033		,193(c)
			Better knowledge of problems students w disabilities face Dependent	,045	,066		,211(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,177	,051		,000(c)
			Better knowledge of problems students w disabilities face Dependent	,372	,213		,000(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 235. Adjusted residuals, Current Knowledge of Needs and Better Knowledge of Problems that Students with Disabilities Face, by Gender

Gender				Better knowledge of problems students w disabilities face: no	yes	Total
Male	Current knowledge of needs for students with disabilities	Little or no understanding	Count	2	46	48
			Adjusted Residual	-1,4	1,4	
		Some knowledge	Count	1	11	12
			Adjusted Residual	,2	-,2	
		Broad knowledge	Count	2	8	10
			Adjusted Residual	1,7	-1,7	
	Total		Count	5	65	70
female	Current knowledge of needs for students with disabilities	Little or no understanding	Count	0	35	35
			Adjusted Residual	-2,7	2,7	
		Some knowledge	Count	0	5	5
			Adjusted Residual	-,5	,5	
		Broad knowledge	Count	2	3	5
			Adjusted Residual	4,1	-4,1	
	Total		Count	2	43	45

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 236. Current knowledge of needs for students with disabilities * Better knowledge of accessible design techniques * Gender Crosstabulation

Gender			Better knowledge of accessible design techniques		Total
			no	yes	
male	Current knowledge of needs for students with disabilities	Little or no understanding	3	45	48
		Some knowledge	1	11	12
		Broad knowledge	2	8	10
	Total		6	64	70
female	Current knowledge of needs for students with disabilities	Little or no understanding	0	35	35
		Some knowledge	1	4	5
		Broad knowledge	1	4	5
	Total		2	43	45

Table 237. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
male	Pearson Chi-Square	1,998(a)	2	,368
female	Pearson Chi-Square	7,326(b)	2	,026

a 3 cells (50,0%) have expected count less than 5. The minimum expected count is ,86.
b 5 cells (83,3%) have expected count less than 5. The minimum expected count is ,22.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 238. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,014	,025		,385(c)
			Better knowledge of accessible design techniques Dependent	,029	,052		,374(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,114	,040		,007(c)
			Better knowledge of accessible design techniques Dependent	,163	,108		,028(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 239. Adjusted residuals, Current Knowledge of Needs And Knowledge of Accessible Design Techniques, by Gender

Gender				Better knowledge of accessible design techniques		Total
				no	yes	
Male	Current knowledge of needs for students with disabilities	Little or no understanding	Count	3	45	48
			Adjusted Residual	-1,0	1,0	
		Some knowledge	Count	1	11	12
			Adjusted Residual	,0	,0	
		Broad knowledge	Count	2	8	10
			Adjusted Residual	1,4	-1,4	
	Total		Count	6	64	70
female	Current knowledge of needs for students with disabilities	Little or no understanding	Count	0	35	35
			Adjusted Residual	-2,7	2,7	
		Some knowledge	Count	1	4	5
			Adjusted Residual	1,8	-1,8	
		Broad knowledge	Count	1	4	5
			Adjusted Residual	1,8	-1,8	
	Total		Count	2	43	45

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 240. Current knowledge of needs for students with disabilities * Better knowledge of dif. assist technologies students with disabilities use * Gender Crosstabulation

Gender			Better knowledge of dif. assist technologies dis students use		
			no	yes	Total
male	Current knowledge of needs for students with disabilities	Little or no understanding	5	43	48
		Some knowledge	3	9	12
		Broad knowledge	2	8	10
	Total		10	60	70
female	Current knowledge of needs for students with disabilities	Little or no understanding		35	35
		Some knowledge		5	5
		Broad knowledge		5	5
	Total			45	45

Table 241. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
male	Pearson Chi-Square	1,978(a)	2	,372
female	Pearson Chi-Square	.(b)		

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is 1,43.
b No statistics are computed because Better knowledge of dif. assist technologies dis students use is a constant.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 242. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T	Approx. Sig.
male	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,019	,029		,272(b)
			Better knowledge of dif. assist technologies dis students use Dependent	,028	,044		,377(b)
female	Nominal by Nominal	Lambda	Symmetric	.(c)			

a Not assuming the null hypothesis.
b Based on chi-square approximation
c No statistics are computed because Better knowledge of dif. assist technologies dis students use is a constant.

Table 243. Adjusted residuals, Current Knowledge of Needs and Better Knowledge of Different Assist. Technologies Disabled Students Use, by Gender

Gender				Better knowledge of dif. assist technologies dis students use		Total
				no	yes	
male	Current knowledge of needs for students with disabilities	Little or no understanding	Count	5	43	48
			Adjusted Residual	-1,4	1,4	
		Some knowledge	Count	3	9	12
			Adjusted Residual	1,2	-1,2	
		Broad knowledge	Count	2	8	10
			Adjusted Residual	,6	-,6	
	Total		Count	10	60	70
female	Current knowledge of needs for students with disabilities	Little or no understanding	Count		35	35
			Adjusted Residual		.	
		Some knowledge	Count		5	5
			Adjusted Residual		.	
		Broad knowledge	Count		5	5
			Adjusted Residual		.	
	Total		Count		45	45

Table 244. Current knowledge of needs for students with disabilities * Better knowledge of disability discrimination legislation * Gender Crosstabulation

Gender			Better knowledge of disability discrimination legislation		Total
			no	yes	
Male	Current knowledge of needs for students with disabilities	Little or no understanding	9	39	48
		Some knowledge	6	6	12
		Broad knowledge	3	7	10
	Total		18	52	70
female	Current knowledge of needs for students with disabilities	Little or no understanding	1	34	35
		Some knowledge	2	3	5
		Broad knowledge	1	4	5
	Total		4	41	45

Table 245. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
male	Pearson Chi-Square	5,020(a)	2	,081
female	Pearson Chi-Square	8,310(b)	2	,016

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is 2,57.
b 5 cells (83,3%) have expected count less than 5. The minimum expected count is ,44.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 246. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,044	,043		,047(c)
			Better knowledge of disability discrimination legislation Dependent	,072	,068		,084(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,118	,094		,005(c)
			Better knowledge of disability discrimination legislation Dependent	,185	,160		,017(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 247. Adjusted residuals, Current Knowledge of Needs and Better Knowledge of Disability Discrimination Legislation, by Gender

Gender				Better knowledge of disability discrimination legislation		Total
				no	yes	
male	Current knowledge of needs for students with disabilities	Little or no understanding	Count	9	39	48
			Adjusted Residual	-2,0	2,0	
		Some knowledge	Count	6	6	12
			Adjusted Residual	2,1	-2,1	
		Broad knowledge	Count	3	7	10
			Adjusted Residual	,3	-,3	
	Total		Count	18	52	70
female	Current knowledge of needs for students with disabilities	Little or no understanding	Count	1	34	35
			Adjusted Residual	-2,7	2,7	
		Some knowledge	Count	2	3	5
			Adjusted Residual	2,6	-2,6	
		Broad knowledge	Count	1	4	5
			Adjusted Residual	,9	-,9	
	Total		Count	4	41	45

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 248. Current knowledge of needs for students with disabilities * Better knowledge about why access. is important * Gender Crosstabulation

Gender			Better knowledge about why access. is important		Total
			no	yes	
male	Current knowledge of needs for students with disabilities	Little or no understanding	9	39	48
		Some knowledge	6	6	12
		Broad knowledge	3	7	10
	Total		18	52	70
female	Current knowledge of needs for students with disabilities	Little or no understanding	0	35	35
		Some knowledge	2	3	5
		Broad knowledge	2	3	5
	Total		4	41	45

Table 249. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)
male	Pearson Chi-Square	5,020(a)	2	,081
female	Pearson Chi-Square	15,366(b)	2	,000

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is 2,57.
b 5 cells (83,3%) have expected count less than 5. The minimum expected count is ,44.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 250. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,044	,043		,047(c)
			Better knowledge about why access. is important Dependent	,072	,068		,084(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,239	,074		,000(c)
			Better knowledge about why access. is important Dependent	,341	,145		,001(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 251. Adjusted residuals, Current Knowledge of Needs and Better Knowledge about Why Access is Important, by Gender

Gender				Better knowledge about why access. is important		Total
				no	yes	
male	Current knowledge of needs for students with disabilities	Little or no understanding	Count	9	39	48
			Adjusted Residual	-2,0	2,0	
		Some knowledge	Count	6	6	12
			Adjusted Residual	2,1	-2,1	
		Broad knowledge	Count	3	7	10
			Adjusted Residual	,3	-,3	
	Total		Count	18	52	70
female	Current knowledge of needs for students with disabilities	Little or no understanding	Count	0	35	35
			Adjusted Residual	-3,9	3,9	
		Some knowledge	Count	2	3	5
			Adjusted Residual	2,6	-2,6	
		Broad knowledge	Count	2	3	5
			Adjusted Residual	2,6	-2,6	
	Total		Count	4	41	45

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 252. Case Processing Summary, Better Knowledge of Needs of Students and New Knowledge Areas, by Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Current knowledge of needs for students with disabilities * Better knowledge of problems students w disabilities face * Full-time Faculty	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge of accessible design techniques * Full-time Faculty	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge of dif. assist technologies dis students use * Full-time Faculty	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge of disability discrimination legislation * Full-time Faculty	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge about why access. is important * Full-time Faculty	115	97,5%	3	2,5%	118	100,0%

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 253. Current knowledge of needs for students with disabilities * Better knowledge about why access. is important * Full-time Faculty Crosstabulation

Full-time Faculty			Better knowledge about why access. is important		Total
			no	yes	
no	Current knowledge of needs for students with disabilities	Little or no understanding	5	40	45
		Some knowledge	3	3	6
		Broad knowledge	3	3	6
	Total		11	46	57
yes	Current knowledge of needs for students with disabilities	Little or no understanding	4	34	38
		Some knowledge	5	6	11
		Broad knowledge	2	7	9
	Total		11	47	58

Table 254. Chi-Square Tests

Full-time Faculty		Value	df	Asymp. Sig. (2-sided)
no	Pearson Chi-Square	9,200(a)	2	,010
yes	Pearson Chi-Square	6,845(b)	2	,033

a 4 cells (66,7%) have expected count less than 5. The minimum expected count is 1,16.
b 2 cells (33,3%) have expected count less than 5. The minimum expected count is 1,71.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 255. Directional Measures

Full-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,113	,083		,002(c)
			Better knowledge about why access. is important Dependent	,161	,118		,011(c)
Yes	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,071	,060		,017(c)
			Better knowledge about why access. is important Dependent	,118	,099		,035(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 256. Adjusted residuals, Current Knowledge of Needs and Better Knowledge About Why Access is important, by Full-time Faculty

Full-time Faculty				Better knowledge about why access. is important		
				no	yes	Total
no	Current knowledge of needs for students with disabilities	Little or no understanding	Count	5	40	45
			Adjusted Residual	-3,0	3,0	
		Some knowledge	Count	3	3	6
			Adjusted Residual	2,0	-2,0	
		Broad knowledge	Count	3	3	6
			Adjusted Residual	2,0	-2,0	
	Total		Count	11	46	57
yes	Current knowledge of needs for students with disabilities	Little or no understanding	Count	4	34	38
			Adjusted Residual	-2,3	2,3	
		Some knowledge	Count	5	6	11
			Adjusted Residual	2,5	-2,5	
		Broad knowledge	Count	2	7	9
			Adjusted Residual	,3	-,3	
	Total		Count	11	47	58

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 257. Case Processing Summary, Current Knowledge of Needs and New Knowledge Areas, by Part-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Current knowledge of needs for students with disabilities * Better knowledge of problems students w disabilities face * Part-time Faculty	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge of accessible design techniques * Part-time Faculty	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge of dif. assist technologies dis students use * Part-time Faculty	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge of disability discrimination legislation * Part-time Faculty	115	97,5%	3	2,5%	118	100,0%
Current knowledge of needs for students with disabilities * Better knowledge about why access. is important * Part-time Faculty	115	97,5%	3	2,5%	118	100,0%

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 258. Current knowledge of needs for students with disabilities * Better knowledge of problems students w disabilities face * Part-time Faculty Crosstabulation

Part-time Faculty			Better knowledge of problems students w disabilities face		Total
			no	yes	
no	Current knowledge of needs for students with disabilities	Little or no understanding	1	46	47
		Some knowledge	0	14	14
		Broad knowledge	2	10	12
	Total		3	70	73
yes	Current knowledge of needs for students with disabilities	Little or no understanding	1	35	36
		Some knowledge	1	2	3
		Broad knowledge	2	1	3
	Total		4	38	42

Table 259. Chi-Square Tests

Part-time Faculty		Value	df	Asymp. Sig. (2-sided)
no	Pearson Chi-Square	5,870(a)	2	,053
yes	Pearson Chi-Square	15,243(b)	2	,000

a 3 cells (50,0%) have expected count less than 5. The minimum expected count is ,49.
b 5 cells (83,3%) have expected count less than 5. The minimum expected count is ,29.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 260. Directional Measures

Part-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,032	,035		,102(c)
			Better knowledge of problems students w disabilities face Dependent	,080	,089		,055(c)
Yes	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,241	,156		,000(c)
			Better knowledge of problems students w disabilities face Dependent	,363	,228		,001(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 261. Adjusted residuals, Current Knowledge of Needs and Better Knowledge of Problems Students w Disabilities Face

Part-time Faculty				Better knowledge of problems students w disabilities face		
				no	yes	Total
no	Current knowledge of needs for students with disabilities	Little or no understanding	Count	1	46	47
			Adjusted Residual	-1,1	1,1	
		Some knowledge	Count	0	14	14
			Adjusted Residual	-,9	,9	
		Broad knowledge	Count	2	10	12
			Adjusted Residual	2,4	-2,4	
	Total		Count	3	70	73
yes	Current knowledge of needs for students with disabilities	Little or no understanding	Count	1	35	36
			Adjusted Residual	-3,6	3,6	
		Some knowledge	Count	1	2	3
			Adjusted Residual	1,5	-1,5	
		Broad knowledge	Count	2	1	3
			Adjusted Residual	3,5	-3,5	
	Total		Count	4	38	42

Table 262. Current knowledge of needs for students with disabilities * Better knowledge of accessible design techniques * Part-time Faculty Crosstabulation

Part-time Faculty			Better knowledge of accessible design techniques		Total
			no	yes	
no	Current knowledge of needs for students with disabilities	Little or no understanding	2	45	47
		Some knowledge	2	12	14
		Broad knowledge	1	11	12
	Total		5	68	73
yes	Current knowledge of needs for students with disabilities	Little or no understanding	1	35	36
		Some knowledge	0	3	3
		Broad knowledge	2	1	3
	Total		3	39	42

Table 263. Chi-Square Tests

Part-time Faculty		Value	df	Asymp. Sig. (2-sided)
no	Pearson Chi-Square	1,751(a)	2	,417
yes	Pearson Chi-Square	17,291(b)	2	,000

a 3 cells (50,0%) have expected count less than 5. The minimum expected count is ,82.
b 5 cells (83,3%) have expected count less than 5. The minimum expected count is ,21.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 264. Directional Measures

Part-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,015	,025		,348(c)
			Better knowledge of accessible design techniques Dependent	,024	,042		,422(c)
Yes	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,191	,164		,000(c)
			Better knowledge of accessible design techniques Dependent	,412	,291		,000(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 265. Adjusted residuals, Current Knowledge of Needs and Better Knowledge of Accessible Design Techniques, by Part-time Faculty

Part-time Faculty				Better knowledge of accessible design techniques: no	Better knowledge of accessible design techniques: yes	Total
no	Current knowledge of needs for students with disabilities	Little or no understanding	Count	2	45	47
			Adjusted Residual	-1,2	1,2	
		Some knowledge	Count	2	12	14
			Adjusted Residual	1,2	-1,2	
		Broad knowledge	Count	1	11	12
			Adjusted Residual	,2	-,2	
	Total		Count	5	68	73
yes	Current knowledge of needs for students with disabilities	Little or no understanding	Count	1	35	36
			Adjusted Residual	-2,7	2,7	
		Some knowledge	Count	0	3	3
			Adjusted Residual	-,5	,5	
		Broad knowledge	Count	2	1	3
			Adjusted Residual	4,2	-4,2	
	Total		Count	3	39	42

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 266. Current knowledge of needs for students with disabilities * Better knowledge of dif. assist technologies dis students use * Part-time Faculty Crosstabulation

Part-time Faculty			Better knowledge of dif. assist technologies dis students use		Total
			no	yes	
no	Current knowledge of needs for students with disabilities	Little or no understanding	4	43	47
		Some knowledge	2	12	14
		Broad knowledge	1	11	12
	Total		7	66	73
yes	Current knowledge of needs for students with disabilities	Little or no understanding	1	35	36
		Some knowledge	1	2	3
		Broad knowledge	1	2	3
	Total		3	39	42

Table 267. Chi-Square Tests

Part-time Faculty		Value	df	Asymp. Sig. (2-sided)
no	Pearson Chi-Square	,441(a)	2	,802
yes	Pearson Chi-Square	7,239(b)	2	,027

a 3 cells (50,0%) have expected count less than 5. The minimum expected count is 1,15.
b 5 cells (83,3%) have expected count less than 5. The minimum expected count is ,21.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 268. Directional Measures

Part-time Faculty				Value	Asymp. Std. Error(a)	Approx. T	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,003	,010		,808(b)
			Better knowledge of dif. assist technologies dis students use Dependent	,006	,021		,805(b)
Yes	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,124	,119		,006(b)
			Better knowledge of dif. assist technologies dis students use Dependent	,172	,177		,029(b)

a Not assuming the null hypothesis.
b Based on chi-square approximation

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 269. Adjusted residuals, Current Knowledge of Needs and Better Knowledge of Different Assist. Technologies Students Use, by Part-time Faculty

Part-time Faculty				Better knowledge of dif. assist technologies dis students use		
				no	yes	Total
no	Current knowledge of needs for students with disabilities	Little or no understanding	Count	4	43	47
			Adjusted Residual	-,4	,4	
		Some knowledge	Count	2	12	14
			Adjusted Residual	,7	-,7	
		Broad knowledge	Count	1	11	12
			Adjusted Residual	-,2	,2	
	Total		Count	7	66	73
yes	Current knowledge of needs for students with disabilities	Little or no understanding	Count	1	35	36
			Adjusted Residual	-2,7	2,7	
		Some knowledge	Count	1	2	3
			Adjusted Residual	1,8	-1,8	
		Broad knowledge	Count	1	2	3
			Adjusted Residual	1,8	-1,8	
	Total		Count	3	39	42

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 270. Current knowledge of needs for students with disabilities * Better knowledge of disability discrimination legislation * Part-time Faculty Crosstabulation

Part-time Faculty			Better knowledge of disability discrimination legislation		Total
			No	yes	
no	Current knowledge of needs for students with disabilities	Little or no understanding	6	41	47
		Some knowledge	7	7	14
		Broad knowledge	2	10	12
	Total		15	58	73
yes	Current knowledge of needs for students with disabilities	Little or no understanding	4	32	36
		Some knowledge	1	2	3
		Broad knowledge	2	1	3
	Total		7	35	42

Table 271. Chi-Square Tests

Part-time Faculty		Value	df	Asymp. Sig. (2-sided)
no	Pearson Chi-Square	9,293(a)	2	,010
yes	Pearson Chi-Square	6,800(b)	2	,033

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is 2,47.
b 4 cells (66,7%) have expected count less than 5. The minimum expected count is ,50.

Table 272. Directional Measures

Part-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,067	,052		,008(c)
			Better knowledge of disability discrimination legislation Dependent	,127	,094		,010(c)
Yes	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,104	,106		,014(c)
			Better knowledge of disability discrimination legislation Dependent	,162	,147		,036(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 273. Current knowledge of needs for students with disabilities * Better knowledge of disability discrimination legislation * Part-time Faculty Crosstabulation

Part-time Faculty				Better knowledge of disability discrimination legislation		Total
				no	yes	
no	Current knowledge of needs for students with disabilities	Little or no understanding	Count	6	41	47
			Adjusted Residual	-2,2	2,2	
		Some knowledge	Count	7	7	14
			Adjusted Residual	3,0	-3,0	
		Broad knowledge	Count	2	10	12
			Adjusted Residual	-,4	,4	
	Total		Count	15	58	73
yes	Current knowledge of needs for students with disabilities	Little or no understanding	Count	4	32	36
			Adjusted Residual	-2,4	2,4	
		Some knowledge	Count	1	2	3
			Adjusted Residual	,8	-,8	
		Broad knowledge	Count	2	1	3
			Adjusted Residual	2,4	-2,4	
	Total		Count	7	35	42

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 274. Current knowledge of needs for students with disabilities * Better knowledge about why access. is important * Part-time Faculty Crosstabulation

Part-time Faculty			Better knowledge about why access. is important		Total
			no	yes	
No	Current knowledge of needs for students with disabilities	Little or no understanding	5	42	47
		Some knowledge	7	7	14
		Broad knowledge	3	9	12
	Total		15	58	73
yes	Current knowledge of needs for students with disabilities	Little or no understanding	4	32	36
		Some knowledge	1	2	3
		Broad knowledge	2	1	3
	Total		7	35	42

Table 275. Chi-Square Tests

Part-time Faculty		Value	df	Asymp. Sig. (2-sided)
no	Pearson Chi-Square	10,411(a)	2	,005
yes	Pearson Chi-Square	6,800(b)	2	,033

a 2 cells (33,3%) have expected count less than 5. The minimum expected count is 2,47.
b 4 cells (66,7%) have expected count less than 5. The minimum expected count is ,50.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 276. Directional Measures

Part-time Faculty				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
No	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,086	,057		,002(c)
			Better knowledge about why access. is important Dependent	,143	,094		,006(c)
Yes	Nominal by nominal	Goodman and Kruskal tau	Current knowledge of needs for students with disabilities Dependent	,104	,106		,014(c)
			Better knowledge about why access. is important Dependent	,162	,147		,036(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Cannot be computed because the asymptotic standard error equals zero.

(New Knowledge Areas, Chapter IV: pg. 125, Questionnaire #42, cont'd)

Table 277. Adjusted residuals, Current Knowledge of Needs and Better Knowledge About why Access. Is Important, by Part-time Faculty

Part-time Faculty				Better knowledge about why access. is important: no	Better knowledge about why access. is important: yes	Total
no	Current knowledge of needs for students with disabilities	Little or no understanding	Count	5	42	47
			Adjusted Residual	-2,8	2,8	
		Some knowledge	Count	7	7	14
			Adjusted Residual	3,0	-3,0	
		Broad knowledge	Count	3	9	12
			Adjusted Residual	,4	-,4	
	Total		Count	15	58	73
yes	Current knowledge of needs for students with disabilities	Little or no understanding	Count	4	32	36
			Adjusted Residual	-2,4	2,4	
		Some knowledge	Count	1	2	3
			Adjusted Residual	,8	-,8	
		Broad knowledge	Count	2	1	3
			Adjusted Residual	2,4	-2,4	
	Total		Count	7	35	42

Desired Accessibility Topics, Chapter IV: pg. 129, Questionnaire #43

Table 278. Full-time Faculty * Accessibility and Flash Crosstabulation

		Accessibility and Flash: No	Accessibility and Flash: yes	Total
Full-time Faculty	no	49	4	53
	yes	53	0	53
Total		102	4	106

Table 279. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4,157(b)	1	,041		

a Computed only for a 2x2 table
b 2 cells (50,0%) have expected count less than 5. The minimum expected count is 2,00.

Table 280. Directional Measures

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Goodman and Kruskal tau	Full-time Faculty Dependent	,039	,007		,042(c)
	Accessibility and Flash Dependent	,039	,020		,042(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 281. Full-time Faculty * Accessibility and XML technologies Crosstabulation

		Accessibility and XML technologies		Total
		No	yes	
Full-time Faculty	no	49	4	53
	yes	53	0	53
Total		102	4	106

Table 282. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4,157(b)	1	,041		

a Computed only for a 2x2 table
b 2 cells (50,0%) have expected count less than 5. The minimum expected count is 2,00.

(Desired Accessibility Topics, Chapter IV: pg. 129, Questionnaire #43, cont'd)

Table 283. Directional Measures

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Goodman and Kruskal tau	Full-time Faculty Dependent	,039	,007		,042(c)
	Accessibility and XML technologies Dependent	,039	,020		,042(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

APPENDIX F

TECHNOLOGY STATISTICS FOR GENDER AND TEACHING STATUS

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TECHNOLOGY STATISTICS FOR GENDER AND TEACHING STATUS

Appendix F presents gender and teaching status information for technology use and e-mail testing for which trends of the survey population as a whole were detailed in Chapter IV. The gender and teaching status breakdowns are described for: (1) the four most popular technology categories; (2) the top three web site features and; (3) e-learning testing practices. Corresponding gender and teaching status crosstabulation frequencies start on page 380 of this Appendix. Sparse significant results were found only for specific technology tests and full and part-time teaching status and are located directly following the crosstabulation frequencies for that section starting on page 390.

Specific Technologies, Chapter IV: pg. 92, Questionnaire # 10

Crosstabulations were performed for gender and teaching status regarding the use of various technologies in delivering course material. The results demonstrate that there was virtually no difference between males and females for the top four categories. Compared to non-users of these technologies, approximately three times the proportion of respondents of both sexes used e-mails communications, and double the proportion of both sexes used powerpoint overheads (for e-mails, 38 out of 50 males, and 15 out of 20 females; for powerpoint overheads 34 out of 50 males, 13 out of 20 females). Roughly 50% of male respondents claimed to have a course web site and provide PDF files; the same was true of female respondents (for course web site, 27 out of 50 males, and 9 out of 20 females, for PDF files, 24 out of 50 males, and 9 out of 20 females). None of the relationships proved significant.

Most relationships with Full-or Part-time status using these technologies were also insignificant. What can be noted however, is that the rate of usage by Full-time professors is generally higher than teachers who are not Full-time. For Full-time professors, only the relationship for providing PDF files was significant but small with Goodman and Kruskal tau of .13. Here, 25 out of 40 Full-time respondents or 62.5% provided PDF files, while 8 out of 30 or 26.7% of teachers who were not Full-time did likewise.

For the most popular categories, Part-time professors tended to use technology at a lesser rate than professors with other status'. Powerpoint slides were used by only 13 out of 22 (59.1%) Part-time professors, compared to 34 out of 48 others (70.8%). For the Part-time respondents, the relationship with providing PDF files was also significant but small with a Goodman Kruskal tau of .21. Here, 3 out of 22 part-time professors used PDF files (13.6%), while 30 out of 48 professors who were not Part-time provided PDF files (62.5%).

Adding a control variable of gender revealed significant relationships for full-time status and providing PDF files. Both male and female layers were statistically significant but small with the highest Goodman and Kruskal score of .24 for females providing PDF files. Statistics indicate that Full-time professors of both sexes tend to use PDF files at a higher rate than all other professors (males: others 5 out of 18 or 27%, Full-time males, 19 out of 32 or 59.4%; females: others 3 out of 12 or 25%, Full-time females 6 out of 8 or 75%). The findings for Part-time professors and providing PDF files by gender again echo previous findings. That is, both Part-time males and females were found to be providing them at a lessor rate than all others (males: others 21 out of 36 or 58.3%, Part-time 3 out of 14 or 21.4%; others 9 out of 12 or 75%, Part-time females 0 out of 8 or 0%). The relationships were statistically significant and small for males and moderate for females with a tau of .11 and .54 respectively.

Part-time females alone showed significant relationships with e-mail communications and overhead slides in the relationships with technolgy. Upon closer examination, however, it becomes clear that it is the occurance of Part-time females using these technologies at a lesser rate than females with other status' that is significant. For e-mail communications, users were 4 out of 8 Part-time females (50%) versus 11 out of 12 (91.6%) females with other status'. For overhead slides, users were 3 out of 8 Part-time females (37.5%) versus 10 out of 12 (83.3%) females with other status'. Both relationships were small, as the Goodman and Kruskal tau indicated at .22 for both of them.

Web site Features, Chapter IV: pg. 95, Questionnaire #11

Gender crosstabulations were performed for people who have web sites and the three web features most often employed according to the Chapter IV general findings. For these features, the male proportion was higher than the females for only course outlines, but this difference was actually due to only 1 responding female who failed to indicate that she provided course outlines. Here, 24 out of 24 males who had web sites indicated 100% of the time that they had course outlines, whereas 7 out of 8 females said they did (88%). 19 out of 24 males had course notes such as powerpoint (79.2%), while 7 out of 8 females did so(88%). For list of supplimentary materials, 17 males indicated that they had this (70.8%) while 7 females claimed they did (88%). Differential proportions were due in large part toso few women hosting course web sites (24 males, 8 females). For the remaining features, small male frequencies outweighed sometimes non-existant female frequencies in but one area, which was providing a chat room discussion area (males 2 out of 12 or 8.3%, females 3 out of 8 or 37.5%). The significance of all crosstabulations for gender and web site features could not be calculated because all people who did not have a course web site indicated 'does not apply'. This meant that all respondants in the crosstabulation did have web sites resulting in constants. Crosstabulation frequencies for these results are found on page 394 of this Appendix.

Crosstabulation frequencies for status show some interesting frequency scores. Comparing full time professors against all others for the most popular features, a higher proportion of full time professors have these features on their web sites: course outlines, 20 out of 20 full time professors (100%), 11 out of 12 all others (91.7%); course notes, 17 full time professors (85%), all others 9 out of 12 (75%); and a list of supplimentary readings, full time professors 16 (80%), all others 8 (66.7%).

On the other hand comparing part-time professors against all others shows the opposite trend for all but one of the features, that is lower proportions of part-time professors have the most popular web features on their course web sites. The numbers are as follows: course outline, part-time professors 6 out of 7 (85%) , all others 20 out of 20 (100%); a list of supplimentary readings 5 out of 7 part-time professors (71.4%), all others 19 (76%); and finally for the single feature where the Part-time professors score outweighed all others, course notes, 6 part-time professors (85.7%), all others 20 out of 25 (80%). Crosstabulation frequencies for web site features and status start on page 394 of this Appendix. Again, as in the case of gender, the significance of all crosstabulations for teaching status and web site features could not be calculated because all people who did not have a course web site indicated 'does not apply'. This meant that all respondants in the crosstabulation did have web sites and therefore constants were generated.

E-learning Testing, Chapter IV: pg. 96, Questionnaire #32

For the question relating to e-learning testing for special needs, a couple of males were alone in indicating that they sometimes tested (2 out of 69 or 2.9%), while proportionately more males than females were in the middle category of 'don't know' (5 males out of 69 or 7.2%, versus 1 female out of 44 or 2.3%). 62 males or 90% indicated they did not test e-learning for special needs, while 97.7% females indicated the same. Any differences may be random only because the relationship with gender is not significant.

Professors who were other than Full-time professors had a greater representation in the middle 'don't know' category (other 5 out of 57 or 8.8%, versus Full-time 1 out of 56 or 1.8%). The crosstabulation which compared Part-time professors and all others showed more Part-time professors were the middle category (Part-time 4 out of 41 or 9.8%, other 2 out of 72 or 2.8%), but that professors who did sometimes do e-learning testing were not Part-time professors (Part-time 0, other 2 or 2.8%). Neither Full-time nor Part-time relationship was significant, therefore any differences can be seen as random. Adding a control variable of gender did produce any significant results. All crosstabulation frequencies for gender and teaching status and e-mail testing can be located starting on page 406 of this Appendix.

Specific Technologies, Appendix F: pg. 376, Questionnaire #10

Table 284. Case Processing Summary, Specific Technologies for Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Powerpoint overheads or slides in class	70	59,3%	48	40,7%	118	100,0%
Gender * Show videos	70	59,3%	48	40,7%	118	100,0%
Gender * E-mail communications with students	70	59,3%	48	40,7%	118	100,0%
Gender * Cpu-mediated conferencing for student discussion	70	59,3%	48	40,7%	118	100,0%
Gender * Use labs	70	59,3%	48	40,7%	118	100,0%
Gender * A course web site	70	59,3%	48	40,7%	118	100,0%
Gender * Provide PDF files for students to access or download	70	59,3%	48	40,7%	118	100,0%

Table 285 Gender * Email communications with students Crosstabulation

		Email communications with students		
		no	yes	Total
Gender	male	12	38	50
	female	5	15	20
Total		17	53	70

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 286. Gender * Powerpoint overheads or slides in class Crosstabulation

		Powerpoint overheads or slides in class		
		no	yes	Total
Gender	male	16	34	50
	female	7	13	20
Total		23	47	70

Table 287. Gender * A course web site Crosstabulation

		A course web site		
		no	yes	Total
Gender	male	23	27	50
	female	11	9	20
Total		34	36	70

Table 288. Gender * Provide PDF files for students to access or download Crosstabulation

		Provide PDF files for students to access or download		
		no	yes	Total
Gender	male	26	24	50
	female	11	9	20
Total		37	33	70

Table 289. Gender * Show videos Crosstabulation

		Show videos		
		no	yes	Total
Gender	male	38	12	50
	female	12	8	20
Total		50	20	70

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 290. Gender * Use labs Crosstabulation

		Use labs		Total
		no	yes	
Gender	male	37	13	50
	female	16	4	20
Total		53	17	70

Table 291. Gender * Cpu-mediated conferencing for student discussion Crosstabulation

		Cpu-mediated conferencing for student discussion		Total
		no	yes	
Gender	male	48	2	50
	female	17	3	20
Total		65	5	70

Table 292. Case Processing Summary, Specific Technologies for Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Full-time Faculty * Powerpoint overheads or slides in class	70	59,3%	48	40,7%	118	100,0%
Full-time Faculty * Show videos	70	59,3%	48	40,7%	118	100,0%
Full-time Faculty * E-mail communications with students	70	59,3%	48	40,7%	118	100,0%
Full-time Faculty * Cpu-mediated conferencing for student discussion	70	59,3%	48	40,7%	118	100,0%
Full-time Faculty * Use labs	70	59,3%	48	40,7%	118	100,0%
Full-time Faculty * A course web site	70	59,3%	48	40,7%	118	100,0%
Full-time Faculty * Provide PDF files for students to access or download	70	59,3%	48	40,7%	118	100,0%

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 293. Full-time Faculty * E-mail communications with students Crosstabulation

		E-mail communications with students		Total
		no	yes	
Full-time Faculty	no	8	22	30
	yes	9	31	40
Total		17	53	70

Table 294. Full-time Faculty * Powerpoint overheads or slides in class Crosstabulation

		Powerpoint overheads or slides in class		Total
		no	yes	
Full-time Faculty	no	11	19	30
	yes	12	28	40
Total		23	47	70

Table 295. Full-time Faculty * A course web site Crosstabulation

		A course web site		Total
		no	Yes	
Full-Time Faculty	no	17	13	30
	yes	17	23	40
Total		34	36	70

Table 296. Full-time Faculty * Show videos Crosstabulation

		Show videos		Total
		no	yes	
Full-time Faculty	no	19	11	30
	yes	31	9	40
Total		50	20	70

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 297. Full-time Faculty * Use labs Crosstabulation

		Use labs		
		no	yes	Total
Full-time Faculty	no	25	5	30
	yes	28	12	40
Total		53	17	70

Table 298. Full-time Faculty * Cpu-mediated conferencing for student discussion Crosstabulation

		Cpu-mediated conferencing for student discussion		
		no	yes	Total
Full-time Faculty	no	26	4	30
	yes	39	1	40
Total		65	5	70

Table 299. Case Processing Summary, Specific Technologies for Part-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Part-time Faculty * Powerpoint overheads or slides in class	70	59,3%	48	40,7%	118	100,0%
Part-time Faculty * Show videos	70	59,3%	48	40,7%	118	100,0%
Part-time Faculty * E-mail communications with students	70	59,3%	48	40,7%	118	100,0%
Part-time Faculty * Cpu-mediated conferencing for student discussion	70	59,3%	48	40,7%	118	100,0%
Part-time Faculty * Use labs	70	59,3%	48	40,7%	118	100,0%
Part-time Faculty * A course web site	70	59,3%	48	40,7%	118	100,0%
Part-time Faculty * Provide PDF files for students to access or download	70	59,3%	48	40,7%	118	100,0%

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 300. Part-time Faculty * E-mail communications with students Crosstabulation

		E-mail communications with students		
		no	Yes	Total
Part-time Faculty	no	10	38	48
	yes	7	15	22
Total		17	53	70

Table 301. Part-time Faculty * Powerpoint overheads or slides in class Crosstabulation

		Powerpoint overheads or slides in class		
		no	Yes	Total
Part-time Faculty	no	14	34	48
	yes	9	13	22
Total		23	47	70

Table 302. Part-time Faculty * A course web site Crosstabulation

		A course web site		
		no	yes	Total
Part-time Faculty	no	20	28	48
	yes	14	8	22
Total		34	36	70

Table 303. Part-time Faculty * Show videos Crosstabulation

		Show videos		
		no	Yes	Total
Part-time Faculty	no	35	13	48
	yes	15	7	22
Total		50	20	70

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 304. Part-time Faculty * Use labs Crosstabulation

		Use labs		Total
		no	yes	
Part-time Faculty	no	34	14	48
	yes	19	3	22
Total		53	17	70

Table 305. Part-time Faculty * Cpu-mediated Conferencing for Student Discussion Crosstabulation

		Cpu-mediated conferencing for student discussion		Total
		no	yes	
Part-time Faculty	no	44	4	48
	yes	21	1	22
Total		65	5	70

Table 306. Case Processing Summary, Full-time Faculty and Providing PDF files for students to access or download

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Full-time Faculty * Provide PDF files for students to access or download	70	59,3%	48	40,7%	118	100,0%

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 307. Full-time Faculty * Provide PDF files for students to access or download Crosstabulation

		Provide PDF files for students to access or download		Total
		no	Yes	
Full-time Faculty	No	22	8	30
	Yes	15	25	40
Total		37	33	70

Table 308. Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8,834(b)	1	,003		

a Computed only for a 2x2 table
b 0 cells (,0%) have expected less than 5. The minimum expected is 14,14.

Table 309. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Full-time Faculty Dependent	,126	,078		,003(c)
		Provide PDF files for students to access or download Dependent	,126	,078		,003(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 310. Case Processing Summary, Part-time Faculty and Providing PDF files for students to access or download

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Part-time Faculty * Provide PDF files for students to access or download	70	59,3%	48	40,7%	118	100,0%

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 311. Part-time Faculty * Provide PDF files for students to access or download Crosstabulation

		Provide PDF files for students to access or download		Total
		no	yes	
Part-time Faculty	no	18	30	48
	yes	19	3	22
Total		37	33	70

Table 312. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	14,455(b)	1	,000		

a Computed only for a 2x2 table
b 0 cells (,0%) have expected less than 5. The minimum expected is 10,37.

Table 313. Directional Measures

			Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Nominal by nominal	Goodman and Kruskal tau	Part-time Faculty Dependent	,206	,087		,000(c)
		Provide PDF files for students to access or download Dependent	,206	,085		,000(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 314 Case Processing Summary, Full-time Faculty and Providing PDF files for students to access or download for Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Full-time Faculty * Provide PDF files for students to access or download * Gender	70	59,3%	48	40,7%	118	100,0%

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 315. Full-time Faculty * Provide PDF files for students to access or download * Gender Crosstabulation

Gender			Provide PDF files for students to access or download		Total
			No	yes	
Male	Full-time Faculty	no	13	5	18
		yes	13	19	32
	Total		26	24	50
Female	Full-time Faculty	no	9	3	12
		yes	2	6	8
	Total		11	9	20

Table 316. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Male	Pearson Chi-Square	4,608(b)	1	,032		
Female	Pearson Chi-Square	4,848(c)	1	,028		

a Computed only for a 2x2 table
b 0 cells (,0%) have expected less than 5. The minimum expected is 8,64.
c 2 cells (50,0%) have expected less than 5. The minimum expected is 3,60.
Table 636. Directional Measures

Table 317. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Full-time Faculty Dependent	,092	,080		,034(c)
			Provide PDF files for students to access or download Dependent	,092	,080		,034(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Full-time Faculty Dependent	,242	,193		,032(c)
			Provide PDF files for students to access or download Dependent	,242	,192		,032(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 318. Part-time Faculty * Provide PDF files for students to access or download * Gender Crosstabulation

Gender			Provide PDF files for students to access or download		Total
			no	yes	
Male	Part-time Faculty	No	15	21	36
		yes	11	3	14
	Total		26	24	50
Female	Part-time Faculty	No	3	9	12
		yes	8	0	8
	Total		11	9	20

Table 319. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Male	Pearson Chi-Square	5,500(b)	1	,019		
Female	Pearson Chi-Square	10,909(c)	1	,001		

a Computed only for a 2x2 table
b 0 cells (,0%) have expected less than 5. The minimum expected is 6,72.
c 2 cells (50,0%) have expected less than 5. The minimum expected is 3,60.

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 320. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Part-time Faculty Dependent	,110	,083		,020(c)
			Provide PDF files for students to access or download Dependent	,110	,082		,020(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Part-time Faculty Dependent	,545	,168		,001(c)
			Provide PDF files for students to access or download Dependent	,545	,165		,001(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

Table 321. Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Part-time Faculty * E-mail communications with students*Gender	70	59,3%	48	40,7%	118	100,0%
Part-time Faculty * Powerpoint overheads or slides in class * Gender	70	59,3%	48	40,7%	118	100,0%

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 322. Part-time Faculty * E-mail communications with students * Gender Crosstabulation

Gender			E-mail communications with students		Total
			no	yes	
Male	Part-time Faculty	no	9	27	36
		yes	3	11	14
	Total		12	38	50
Female	Part-time Faculty	no	1	11	12
		yes	4	4	8
	Total		5	15	20

Table 323. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Male	Pearson Chi-Square	,070(b)	1	,791		
Female	Pearson Chi-Square	4,444(c)	1	,035		

a Computed only for a 2x2 table
b 1 cells (25,0%) have expected less than 5. The minimum expected is 3,36.
c 2 cells (50,0%) have expected less than 5. The minimum expected is 2,00.

Table 324. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Part-time Faculty Dependent	,001	,010		,793(c)
			E-mail communications with students Dependent	,001	,010		,793(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Part-time Faculty Dependent	,222	,179		,040(c)
			E-mail communications with students Dependent	,222	,185		,040(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Based on chi-square approximation

(Specific Technologies, Appendix F: pg. 376, Questionnaire #10, cont'd)

Table 325. Part-time Faculty * Powerpoint overheads or slides in class * Gender Crosstabulation

Gender			Powerpoint overheads or slides in class		Total
			no	yes	
Male	Part-time Faculty	no	12	24	36
		yes	4	10	14
	Total		16	34	50
female	Part-time Faculty	no	2	10	12
		yes	5	3	8
	Total		7	13	20

Table 326. Chi-Square Tests

Gender		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Male	Pearson Chi-Square	,105(b)	1	,746		
Female	Pearson Chi-Square	4,432(c)	1	,035		

a Computed only for a 2x2 table
b 1 cells (25,0%) have expected less than 5. The minimum expected is 4,48.
c 2 cells (50,0%) have expected less than 5. The minimum expected is 2,80.

Table 327. Directional Measures

Gender				Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Male	Nominal by nominal	Goodman and Kruskal tau	Part-time Faculty Dependent	,002	,013		,748(c)
			Powerpoint overheads or slides in class Dependent	,002	,013		,748(c)
Female	Nominal by nominal	Goodman and Kruskal tau	Part-time Faculty Dependent	,222	,189		,040(c)
			Powerpoint overheads or slides in class Dependent	,222	,190		,040(c)

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.
c Cannot be computed because the asymptotic standard error equals zero.
d Based on chi-square approximation

Course Web site Features, Appendix F: pg. 378, Questionnaire #11

Table 328. Case Processing Summary, Course Web Site and Web Site Features for Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
A course web site * Course outline/information about course * Gender	32	27,1%	86	72,9%	118	100,0%
A course web site * Course notes such as PowerPoint * Gender	32	27,1%	86	72,9%	118	100,0%
A course web site * Links to other web sites * Gender	32	27,1%	86	72,9%	118	100,0%
A course web site * Video clips of your lectures * Gender	32	27,1%	86	72,9%	118	100,0%
A course web site * Audio clips of your lectures * Gender	32	27,1%	86	72,9%	118	100,0%
A course web site * Chat room or on-line discussion area * Gender	32	27,1%	86	72,9%	118	100,0%
A course web site * List of supp. reading material * Gender	32	27,1%	86	72,9%	118	100,0%
A course web site * Exams * Gender	32	27,1%	86	72,9%	118	100,0%
A course web site * Course grades * Gender	31	26,3%	87	73,7%	118	100,0%

Table 329. A course web site * Course outline/information about course * Gender Crosstabulation

Gender			Course outline/information about course		Total
			no	yes	
Male	A course web site	yes		24	24
	Total			24	24
Female	A course web site	yes	1	7	8
	Total		1	7	8

(Course Web site Features, Appendix F: pg. 378, Questionnaire #11, cont'd)

Table 330. A course web site * Course notes such as PowerPoint * Gender Crosstabulation

Gender			Course notes such as PowerPoint		Total
			no	yes	
Male	A course web site	yes	5	19	24
	Total		5	19	24
Female	A course web site	yes	1	7	8
	Total		1	7	8

Table 331. A course web site * List of Supplementary Reading Material* Gender Crosstabulation

Gender			List of supp. reading material		Total
			no	yes	
Male	A course web site	yes	7	17	24
	Total		7	17	24
Female	A course web site	yes	1	7	8
	Total		1	7	8

Table 332. A course web site * Links to other web sites * Gender Crosstabulation

Gender			Links to other web sites		Total
			no	yes	
Male	A course web site	yes	6	18	24
	Total		6	18	24
Female	A course web site	yes	5	3	8
	Total		5	3	8

(Course Web site Features, Appendix F: pg. 378, Questionnaire #11, cont'd)

Table 333. A course web site * Course grades * Gender Crosstabulation

Gender			Course grades		Total
			no	yes	
Male	A course web site	yes	8	16	24
	Total		8	16	24
Female	A course web site	yes	1	6	7
	Total		1	6	7

Table 334. A course web site * Exams * Gender Crosstabulation

Gender			Exams		Total
			no	yes	
Male	A course web site	yes	17	7	24
	Total		17	7	24
Female	A course web site	yes	7	1	8
	Total		7	1	8

Table 335. A course web site * Video clips of your lectures * Gender Crosstabulation

Gender			Video clips of your lectures		Total
			no	yes	
Male	A course web site	yes	19	5	24
	Total		19	5	24
Female	A course web site	yes	8		8
	Total		8		8

(Course Web site Features, Appendix F: pg. 378, Questionnaire #11, cont'd)

Table 336. A course web site * Chat room or on-line discussion area * Gender Crosstabulation

Gender			Chat room or on-line discussion area		Total
			no	yes	
Male	A course web site	yes	22	2	24
	Total		22	2	24
Female	A course web site	yes	5	3	8
	Total		5	3	8

Table 337. A course web site * Audio clips of your lectures * Gender Crosstabulation

Gender			Audio clips of your lectures		Total
			no	yes	
Male	A course web site	yes	23	1	24
	Total		23	1	24
Female	A course web site	yes	8		8
	Total		8		8

(Course Web site Features, Appendix F: pg. 378, Questionnaire #11, cont'd)

Table 338. Case Processing Summary, Course Web site and Web site features for Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
A course web site * Course outline/information about course * Full-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Course notes such as PowerPoint * Full-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Links to other web sites * Full-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Video clips of your lectures * Full-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Audio clips of your lectures * Full-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Chat room or on-line discussion area * Full-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * List of supp. reading material * Full-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Exams * Full-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Course grades * Full-time Faculty	31	26,3%	87	73,7%	118	100,0%

Table 339. A course web site * Course outline/information about course * Full-time Faculty Crosstabulation

Full-time Faculty			Course outline/information about course		
			no	yes	Total
no	A course web site	yes	1	11	12
	Total		1	11	12
yes	A course web site	yes		20	20
	Total			20	20

(Course Web site Features, Appendix F: pg.378, Questionnaire #11, cont'd)

Table 340. A course web site * Course notes such as PowerPoint * Full-time Faculty Crosstabulation

Full-time Faculty			Course notes such as PowerPoint		Total
			no	yes	
no	A course web site	yes	3	9	12
	Total		3	9	12
yes	A course web site	yes	3	17	20
	Total		3	17	20

Table 341. A course web site * List of supp. reading material * Full-time Faculty Crosstabulation

Full-time Faculty			List of supp. reading material		Total
			no	yes	
no	A course web site	yes	4	8	12
	Total		4	8	12
yes	A course web site	yes	4	16	20
	Total		4	16	20

Table 342. A course web site * Links to other web sites * Full-time Faculty Crosstabulation

Full-time Faculty			Links to other web sites		Total
			no	yes	
no	A course web site	yes	6	6	12
	Total		6	6	12
yes	A course web site	yes	5	15	20
	Total		5	15	20

(Course Web site Features, Appendix F: pg. 378, Questionnaire #11, cont'd)

Table 343. A course web site * Course grades * Full-time Faculty Crosstabulation

Full-time Faculty			Course grades		Total
			no	yes	
No	A course web site	Yes	5	6	11
	Total		5	6	11
yes	A course web site	Yes	4	16	20
	Total		4	16	20

Table 344. A course web site * Exams * Full-time Faculty Crosstabulation

Full-time Faculty			Exams		Total
			no	yes	
No	A course web site	yes	10	2	12
	Total		10	2	12
yes	A course web site	yes	14	6	20
	Total		14	6	20

Table 345. A course web site * Video clips of your lectures * Full-time Faculty Crosstabulation

Full-time Faculty			Video clips of your lectures		Total
			no	yes	
no	A course web site	yes	9	3	12
	Total		9	3	12
yes	A course web site	yes	18	2	20
	Total		18	2	20

(Course Web site Features, Appendix F: pg. 378, Questionnaire #11, cont'd)

Table 346. A course web site * Chat room or on-line discussion area * Full-time Faculty Crosstabulation

Full-time Faculty			Chat room or on-line discussion area		Total
			no	Yes	
No	A course web site	yes	8	4	12
	Total		8	4	12
yes	A course web site	yes	19	1	20
	Total		19	1	20

Table 347. A course web site * Audio clips of your lectures * Full-time Faculty Crosstabulation

Full-time Faculty			Audio clips of your lectures		Total
			no	yes	
no	A course web site	yes	11	1	12
	Total		11	1	12
yes	A course web site	yes	20		20
	Total		20		20

(Course Web site Features, Appendix F: pg. 378, Questionnaire #11, cont'd)

Table 348. Case Processing Summary, Course Web site and Web site Features for Part-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
A course web site * Course outline/information about course * Part-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Course notes such as PowerPoint * Part-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Links to other web sites * Part-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Video clips of your lectures * Part-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Audio clips of your lectures * Part-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Chat room or on-line discussion area * Part-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * List of supp. reading material * Part-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Exams * Part-time Faculty	32	27,1%	86	72,9%	118	100,0%
A course web site * Course grades * Part-time Faculty	31	26,3%	87	73,7%	118	100,0%

(Course Web site Features, Appendix F: pg. 378, Questionnaire #11, cont'd)

Table 349. A course web site * Course outline/information about course * Part-time Faculty Crosstabulation

Part-time Faculty			Course outline/information about course		Total
			no	yes	
No	A course web site	yes		25	25
	Total			25	25
Yes	A course web site	yes	1	6	7
	Total		1	6	7

Table 350. A course web site * Course notes such as PowerPoint * Part-time Faculty Crosstabulation

Part-time Faculty			Course notes such as PowerPoint		Total
			no	Yes	
No	A course web site	yes	5	20	25
	Total		5	20	25
Yes	A course web site	yes	1	6	7
	Total		1	6	7

Table 351. A course web site * List of supp. reading material * Part-time Faculty Crosstabulation

Part-time Faculty			List of supp. reading material		Total
			no	yes	
No	A course web site	yes	6	19	25
	Total		6	19	25
Yes	A course web site	yes	2	5	7
	Total		2	5	7

(Course Web site Features, Appendix F: pg. 378, Questionnaire #11, cont'd)

Table 352. A course web site * Links to other web sites * Part-time Faculty Crosstabulation

Part-time Faculty			Links to other web sites		Total
			no	yes	
no	A course web site	yes	7	18	25
	Total		7	18	25
yes	A course web site	yes	4	3	7
	Total		4	3	7

Table 353. A course web site * Course grades * Part-time Faculty Crosstabulation

Part-time Faculty			Course grades		Total
			no	yes	
No	A course web site	yes	6	19	25
	Total		6	19	25
Yes	A course web site	yes	3	3	6
	Total		3	3	6

Table 354. A course web site * Exams * Part-time Faculty Crosstabulation

Part-time Faculty			Exams		Total
			no	yes	
No	A course web site	yes	18	7	25
	Total		18	7	25
Yes	A course web site	yes	6	1	7
	Total		6	1	7

(Course Web site Features, Appendix F: pg. 378, Questionnaire #11, cont'd)

Table 355. A course web site * Video clips of your lectures * Part-time Faculty Crosstabulation

Part-time Faculty			Video clips of your lectures		Total
			no	yes	
No	A course web site	yes	21	4	25
	Total		21	4	25
yes	A course web site	yes	6	1	7
	Total		6	1	7

Table 356. A course web site * Chat room or on-line discussion area * Part-time Faculty Crosstabulation

Part-time Faculty			Chat room or on-line discussion area		Total
			no	yes	
No	A course web site	Yes	21	4	25
	Total		21	4	25
Yes	A course web site	Yes	6	1	7
	Total		6	1	7

Table 357. A course web site * Audio clips of your lectures * Part-time Faculty Crosstabulation

Part-time Faculty			Audio clips of your lectures		Total
			no	yes	
No	A course web site	yes	24	1	25
	Total		24	1	25
Yes	A course web site	yes	7		7
	Total		7		7

Table 358. Case Processing Summary, E-learning testing for Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * E learning testing for special needs	113	95,8%	5	4,2%	118	100,0%

Table 359. Gender * E-learning testing for special needs Crosstabulation

		E-learning testing for special needs			Total
		no	don't know	Sometimes	
Gender	male	62	5	2	69
	female	43	1	0	44
Total		105	6	2	113

Table 360. Case Processing Summary, E-learning testing for Full-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Full-time Faculty * E-learning testing for special needs	113	95,8%	5	4,2%	118	100,0%

Table 361. Full-time Faculty * E-learning testing of special needs Crosstabulation

		E-learning testing for special needs			Total
		no	don't know	Sometimes	
Full-time Faculty	no	51	5	1	57
	yes	54	1	1	56
Total		105	6	2	113

Table 362. Case Processing Summary for Part-time Faculty

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Part-time Faculty * E-learning testing for special needs	113	95,8%	5	4,2%	118	100,0%

(E-learning Testing, Appendix F: pg. 380, Questionnaire #32, cont'd)

Table 363. Part-time Faculty * E-learning testing for special needs Crosstabulation

		E-learning testing for special needs			Total
		no	don't know	sometimes	
Part-time Faculty	no	68	2	2	72
	yes	37	4	0	41
Total		105	6	2	113

Table 364. Case Processing Summary, E-learning testing for Full-time Faculty by Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Full-time Faculty * E-learning testing of special needs* Gender	113	95,8%	5	4,2%	118	100,0%

Table 365. Full-time Faculty * E-learning testing for special needs* Gender Crosstabulation

Gender			E-learning testing for special needs			Total
			No	don't know	sometimes	
Male	Full-time Faculty	no	23	4	1	28
		yes	39	1	1	41
	Total		62	5	2	69
Female	Full-time Faculty	no	28	1		29
		yes	15	0		15
	Total		43	1		44

Table 366. Case Processing Summary, E-learning testing for Part-time Faculty by Gender

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Part-time Faculty * E-learning testing of special needs* Gender	113	95,8%	5	4,2%	118	100,0%

(E-learning Testing, Appendix F: pg. 380, Questionnaire #32, cont'd)

Table 367. Part-time Faculty * E-learning testing for special needs* Gender Crosstabulation

Gender			E-learning testing for special needs			Total
			No	don't know	sometimes	
male	Part-time Faculty	no	44	2	2	48
		yes	18	3	0	21
	Total		62	5	2	69
Female	Part-time Faculty	no	24	0		24
		yes	19	1		20
	Total		43	1		44