OPENING NEW WORLDS OF INFORMATION: LIBRARY TECHNOLOGY AND INTERNET ACCESS FOR PATRONS WITH DISABILITIES

Courtney Deines-Jones
East Baton Rouge Parish Library
Baton Rouge, LA 70802 USA

Abstract

As more libraries offer patron access to the Internet and other on-line services, they must consider the needs of patrons with disabilities who will be using their Internet links either from the library or from remote sites. In planning and implementing technological improvements to optimize access for all patrons, librarians and information specialists must take into account questions of both physical and intellectual access to electronic information. This paper addresses these issues from a pragmatic perspective, reviewing available options and suggesting strategies for improving access for people with various disabilities.

The Internet Explosion

More libraries are gaining access to the Internet for their patrons. In the United States, an estimated 21% of public libraries have some type of Internet connection, with libraries in urban areas (having a patron base over one million) connected at a rate of 75%. These libraries are taking different approaches to providing Internet and on-line services to their patrons. Some have connections from terminals located inside the library; others allow dial-in access from patrons' offices or homes. Patron terminals are evolving beyond amber-screened terminals with numbered menus. Many new computers sport a full-color mouse-driven Graphic User Interface (GUI) which allow multimedia access to CD-ROM products, on-line services, and World Wide Web sites.

The Internet can truly open a world of information to people who have disabilities. E-mail, chat groups, and listservs allow people to make friends and talk to others even if they have severe communications disabilities. And the Internet can provide people who have rare disabilities with a link to information and support
they might otherwise never even know of. But although most people with
disabilities welcome library access to the Internet, many have difficulty using a
standard interface. For others, multimedia innovations represent potentially
insurmountable barricades to full Internet access. When designing user
interfaces or library work stations, information specialists must take potential
barriers to patrons with disabilities into account if they are to provide truly open
access to information.

Physical Access Problems

Physical access problems are usually obvious and can be addressed by
information professionals from many disciplines, from programmers who develop
new intrinsic work-arounds to a GUI to librarians who offer to describe images a
patron would otherwise be unable to understand. Careful planning and a
commitment to excellent service should ensure that every patron has basic
physical access to the Internet.

The standard computer interface consists of a keyboard, mouse and screen.
Many people with disabilities find this interface cumbersome or impossible to
use. Physical interface problems have been addressed by many companies, and
work-arounds exist for most potential problems. Some of the most commonly
implemented interface solutions are described below. Not every solution is
appropriate for every library. While ideally, adaptive technology would be
purchased and implemented solely on the basis of patron needs, cost and space
are often big factors in a library's choice among options.

Screen Magnifiers

One inexpensive and readily available adaptive tool is screen magnification
software. These programs allow patrons to view the computer screen at various
levels of magnification. They may also permit the patron to manipulate color or
intensity to help people who have trouble distinguishing certain color
combinations. Screen magnifiers are usually mounted on a PC or MAC platform,
rather than on a dumb terminal. There are several features which improve the
utility of a screen magnifier.
• Patrons should be able to magnify as much of the screen as they like; either a line, a word, an icon, or the entire screen.

• Because patrons have varying print size preferences, most prefer adjustable magnification to a normal/big toggle. This is especially true for graphical interfaces, where type sizes and detail levels vary.

• Programs operating with color monitors should allow the patron to change display colors and intensity. Magnifiers for single-color monitors should allow the patron to reverse the image (changing green-on-black to black-on-green, for example) within the magnified window.

Voice Interfaces

For patrons who cannot read the monitor at all, voice interfaces are the most common adaptive programs. They are used not only by the many blind and visually impaired people who do not read Braille but also by patrons with learning disabilities which may make print comprehension difficult, and by people whose limited mobility makes keyboard or mouse use impossible. Non-disabled users are also using voice interfaces in greater numbers, and these programs are becoming more sophisticated. Some voice interfaces are one-way only, reading information that appears on the screen. Others work both ways, allowing the user to dictate material which the computer can translate into commands or even into written text. There are features and caveats librarians should keep in mind when evaluating voice interfaces.

• A voice interface should have a buffer which stores output so that patrons can replay information if they need to.

• Voice interfaces can identify some icons, buttons, and the like, but for the most part they cannot identify pictorial information. For this reason, they work better on textual applications than on multimedia products and web connections. Librarians using a voice interface to access web sites may prefer to go through a textual interface such as lynx.
• Volume controls on voice interfaces should be large and easy to operate, and should have Braille or tactile indicators for blind patrons.

• Headphones used with voice interfaces should have separate volume controls for left and right ear inputs. These controls should be easy to operate. If the headphones must be plugged in by the patron, the jack should be large and located at the front of the computer, within easy reach of the patron.

**Braille Displays**

Among some blind users, Braille displays may be the preferred interface. These displays use a special 8-dot readout (instead of the usual 6-dot Braille cell) to indicate items which are highlighted or otherwise enhanced. Computer keyboards which will be used by blind patrons can be enhanced with Braille stickers. Libraries can also purchase Braille input keyboards and software which will translate Braille input into standard text, a much faster interface for blind users who do not touch type on a standard keyboard. Braille interfaces are most appropriate for libraries which serve large numbers of blind patrons. Librarians who are thinking of installing Braille interfaces should keep some important points in mind.

• Most blind people do not read Braille. As an example, only 7% of the blind patrons registered with the Louisiana State Library's services for the Blind and Physically Handicapped use Braille material. This number may decrease further as more children are taught in integrated schools where Braille literacy is not stressed.

• Patrons who want to use text-based Internet services such as e-mail, telnet, ftp, and traditional gopher services will get the most benefit from a Braille display. Web users will have more difficulty, because Braille displays cannot interpret pictorial information. Some buttons and icons can be translated, but most visual information cannot be adequately represented.

• Libraries using Braille displays to access web sites should go through a textual interface which converts multimedia information into text captions.
• Braille embossing printers (and the software to support them) should be provided at all work stations with Braille displays. If the printer does not have Braille control keys, Braille overlays should be added.

**Alternative Keyboard Options**

While people with mobility impairments may be able to read the computer display without difficulty, they may have a hard time typing commands or moving a mouse. Sophisticated head pointing devices which use eye movements or other cues to interpret patron commands are still in their infancy and are not, for the present, viable alternatives for most libraries. There are, however, some options for librarians who want to provide access in the least restrictive way possible.

- Software solutions include work-arounds for multiple-key commands and mouse-clicks. Some will also configure the numeric keyboard to take the place of the mouse for easier cursor movement.

- Keyguards use templates to guide the user's hands, reducing typing errors.

- Expanded keyboards have larger keys and can be configured to eliminate the need for multiple-key combinations.

- Programmable adaptive keyboards allow librarians to program keys and adjust options to suit a variety of patron needs.

- A basic push switch mounted on a universal switch mount allows patrons who rely on head, foot, or other simple movements to activate the computer.

- Trackballs require less movement to operate than a standard mouse and can benefit some people who have limited arm mobility.

- Touch screens can help patrons who may have difficulty manipulating a mouse or trackball, but who can reach the screen.

**Work Station Access**

Of course, no computer interface will be accessible if the work space is inaccessible. Many libraries have one "accessible" workstation which
incorporates all the special adaptive interfaces on a computer which is placed on a wheelchair-accessible table or stand. But because many people who use wheelchairs have no trouble with a standard computer interface, "regular" stations should also be accessible to these patrons. Librarians designing Internet computer stations should try to follow guidelines which will maximize accessibility for all patrons.

- Paths to work stations should be 36" (91cm) wide whenever possible, and no more than 28" (71cm) wide at any point to accommodate people who use wheelchairs, walkers, crutches, and other mobility aids.

- If there are multiple work stations available, one should be designed to be used while standing. This is a benefit to people who have a hard time getting up and down as well as those who cannot sit for long periods.

- Ideally, all seated work stations should have 28" (71cm) vertical floor clearance extending at least 20" (50cm) under the station to allow ample leg room for wheelchair users.

- Keyboard shelves should be adjustable, and monitors should swivel and tilt.

- Stations designated specifically for wheelchair access should never be blocked by chairs.

Remote Access

Some people cannot come to the library at all. Remote dial-in access can bring the library to them. Using familiar interfaces, patrons can access library information without worrying about transportation. The convenience of dial-in access is such that some patrons who can get to the library will prefer remote connections. The advantages of dial-in access are quite compelling, especially for academic and special libraries, but there are also concerns associated with relying too heavily on remote access for patrons with disabilities.

- Library patrons who use home or office computers to dial in do so on a level footing with any other remote user.
• Professors, students, or employees who have adapted work stations in their labs, dorms, or offices can use these same interfaces for Internet access.

• If the patron may download files, information can be translated by the patron's computer into spoken word or Braille formats, or otherwise manipulated at will by the patron.

• Librarians must remember that dial-in access is not an option for patrons with disabilities who cannot afford their own adaptive computer equipment.

• Librarians must develop alternative ways to provide full library services, including assisting the patron's search efforts, to patrons with disabilities who rely on remote access.

• Librarians must ensure that remote access is not used to discourage patrons with disabilities from coming to the library.

**Patron Concerns**

The importance of incorporating physical access options into the new multimedia interfaces is becoming more accepted among programmers. The Mosaic Access Project, with funding from the U.S. National Science Foundation, is devoted to identifying and eliminating barriers to physical access by people with disabilities. Their web site includes a "wish list" compiled from requests by Internet users who have disabilities. Recent "wish list" items demonstrate the concern people with hearing and visual impairments have about the problems of negotiating a multimedia GUI and suggest areas in which further work is needed. (Footnote: This list is taken from the Mosaic Wish List compiled on the Mosaic Access Project's web site as of April 15, 1995. The Mosaic Access Project web address is http://bucky.aa.uic.edu.)

• Visually impaired patrons want audio- and text-captioned image viewers, and Deaf Mosaic users would like captioned or visually enhanced audio clips.

• Many patrons would appreciate on-line help accessible in both text and audio formats.
• Visually impaired patrons would benefit from a one-button toggle to set all fonts to a standard default font.

• People who use screen readers would like standards requiring icons to be detectable by screen readers and also requiring that all icons and command buttons have textual labels.

• An auto-fetch for alternative document formats would help people who wish to use adaptive formats without having to execute complex or fussy commands.

• Numbering of all anchors in a document with a display of the count and numbering in-line images would help people keep track of their relative location in a web document.

Intellectual Access

Once the computer has been made physically accessible, librarians and information specialists must consider the intellectual accessibility of their services. With research into on-line retrieval strategies a relatively new field, not much work has addressed differing strategies among people with disabilities. Research has suggested, however, that cognitive processes differ among people with disabilities as well as among those who speak different languages. In its most obvious implications, this means that while patrons who have learning disabilities which impair print comprehension may benefit from a GUI, other people with learning disabilities can read print and type without difficulty, but have trouble understanding icons. Developmental specialists are working with software developers to create programs which will help people with specific cognitive disabilities learn to use the computer. But in order to fully realize the potential of A GUI, information scientists must also consider whether a graphical search engine implies more than simple replacement of pictures for words. If GUI platforms like Mosaic do represent a new, visual way of thinking about searches and information retrieval, what are the implications for people with visual and cognitive impairments which effect visual processing and understanding? And if search strategies vary among
cultures and language, will Deaf patrons who use sign language approach information searches and retrieval in a unique way? These are questions and areas of inquiry which are not likely to be closed quickly. For the working librarian who must help someone with a cognitive disability use an Internet interface, there are a few rules which will help patrons get the most benefit from the library's system, both with physical and mental access.

Determining the best course of action
The best course of action involves balancing current patron needs while anticipating the needs of potential users. The following steps can serve as a general guide to making computer information accessible to the broadest possible constituency. The goal should be to provide information access; not, necessarily, to purchase every available adaptive aid.

- Install free and inexpensive material right away. Some programs are available free of charge from vendors or associations which promote computer access for people with disabilities. (Footnote: The University of Wisconsin Trace Center, for example, offers free adaptive equipment through their gopher site. These programs and information on adaptive technology may be accessed via gopher at trace.wisc.edu.)

- Examine the demographics of the library's patron base. Special libraries, school libraries, and private academic libraries may be able to get information about patron disabilities from their personnel, admissions, and student affair offices. Having this information ensures that any adaptive technology purchased or installed will meet the needs of actual users. Public libraries have a more difficult job. It may be possible to get some demographic information from government and census information or from disabilities advocacy organizations.

- Ask your patron base to identify its needs. If surveys are conducted, they should extend beyond current patrons, since many people with disabilities who would like to use the library may not be aware of adaptive interfaces in place, or may be unable to use present library services for some reason.
• If the library offers dial-in access or adaptive interfaces, advertise these services in venues likely to be seen by patrons with disabilities. For example, radio and television notices will reach more visually impaired patrons than will print advertisements, but radio advertisements will not reach most of the Deaf community.

• Ask patrons whether they prefer a text-based or graphical interface. Remember to phrase the question in a way that does not depend on too much jargon. If a patron cannot understand one interface, try another.

• Model the first few searches for the new user, using the same technique. Introduce short cuts" or alternative paths only after the patron has mastered the basic techniques for navigating the system.

• Make patron crib sheets for all basic Internet functions. Be sure the instructions are clear and concise and as free from jargon as is possible.

• Adopt work-arounds to help patrons for whom the library does not have an appropriate interface. If, for example, there is no interface usable by a patron, have a staff member sit with the patron and type information from the patron's dictation.

• Be willing to help. People with disabilities may need more time or assistance when they are using the system. If there are certain times of day that are quieter than others, let the patron know that at those times you will be able to give them more one-on-one instruction.

• Provide training both in using adaptive equipment and in navigating the Internet. A connection is useless if the patron does not know the types of information and services available on the Internet. Be sure that staff members attend this training as well.

• Keep statistics on library use by patrons with disabilities. Include both people who use adaptive aids and those who require staff assistance to access computerized information. If you notice a trend in patron demographics, consider
purchasing additional equipment or shifting resources to help meet those patrons' interface needs.

- Stay abreast of new developments in adaptive equipment and strategies. Sign on to AXSLIB-L and ADAPT-L (Footnote: AXSLIB-L is a site for discussion of library access to patrons with disabilities. Address: AXSLIB-L@american.edu. Subscription requests follow the standard listserv format. ADAPT-L focuses on adaptive technology solutions to library access problems. Address: ADAPT-L@sjuvm.stjohns.edu.) and regularly visit gopher and web sites to keep up with new developments in this rapidly evolving area.

Conclusion
Libraries will continue to expand on-line and Internet services. But these services will only be universally available if librarians make the effort to design adaptive work stations taking patrons' special access strategies into account. Physical access methods are improving as adaptive equipment becomes more sophisticated and widespread and as Internet developers become more aware of the need to design access methods into their interfaces. Many questions about intellectual access remain, however, representing an area in which more research is needed by information scientists. By basing adaptive equipment purchases on actual patron needs, developing work-arounds when adaptive equipment is not available, and keeping abreast of new developments in access strategies, librarians can ensure that they are offering the best Internet access possible to all their patrons. By doing so, librarians can truly open a world of information to patrons with disabilities.

References
McClure, Charles. "Public access to the information superhighway through the nation's libraries." Public libraries 34(2), Mar/Apr 1995 p. 80-84.

