WEB DESIGN AND ACCESSIBILITY THROUGH A TRAINER'S EYES

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He has spent countless hours training patrons with disabilities how to use specialized software or hardware to access the World Wide Web to share in the technological advances of this century. He has helped assure patrons that they too can become cyber-savvy. In doing so, he has witnessed their frustrations when they have encountered barriers and shared their joy when they surmounted them.

Information access is more than hardware and software

Libraries may provide patrons with the latest hardware and software to access the Internet, and find that patrons still are unable to retrieve the information they need. The problem inherently lies with poorly designed Web sites, which continue to be one of the biggest obstacles that impede people with disabilities from effectively navigating the World Wide Web. The real tragedy underlying inaccessible Web design is that the Internet interests of people with disabilities are no different than those of people without disabilities. Nevertheless, the World Wide Web is so largely tailored to appeal to people visually, it neglects and often overlooks those who cannot perceive visual formats.

According to some experts on disabilities and the Internet, nearly 95% of Web sites available are not accessible to people with disabilities.

Defining accessibility

The first step toward publishing an accessible Web page is to know what defines a page as accessible. Essentially, a Web page that is accessible gives people with disabilities the ability to independently access and use information that is comparable with the way people without a disability access and use information. Therefore, all the features, information, and options available on a Web site must be accessible for people with and without disabilities.

Although the task of creating a Web site that's accessible to a cross-section of society that has various disabilities seems impossible, start by looking at the population as the World Wide Web Consortium and the Access Board responsible for Section 508 0f the Rehabilitation Act did. Both of these groups have published detailed Web design guidelines based on the following concepts:

- People with disabilities gain access to the Internet using a variety of adaptive hardware and software.

- Some people may not have the ability to hear, move, see, speak, or effectively comprehend or process information or text.
- Some people may not have the means to operate a keyboard or pointing device.

World Wide Web Consortium: www.w3.org/WAI.

Section 508 Self Evaluation: www.usdoj.gov/crt/508/web.htm.

These concepts are a reality check for Web designers who may assume all site visitors can use their eyes to see all the prompts, read the scrolling neon, and manipulate their mouse on cue. If Web designs require the user to perform tasks using standard interface access, the design is not accessible to everyone.

Why are Web designers ignoring accessibility guidelines?

Web designers are being spared lawsuits only because people with disabilities are not taking them to court. Patrons realize that those cases being brought to court against corporations mean the spending a lot of time and money. Readers may remember the National Federation of the Blind's lawsuit against AOL was eventually settled out of court, with AOL admitting Web site barriers existed and developing an action plan to resolve the issues. Consumers, using the ADA as their ammunition, have pending lawsuits against several sites.

Effective last year because of Section 508 of the Rehabilitation Act, Web sites receiving federal funding are required to meet all the higher priority accessibility recommendations furnished by Section 508 in compliance with the Americans with Disabilities Act of 1990. Organizations and corporations that receive federal funding are required to meet accessibility guidelines. Compliance deadlines have been continuously extended, so no one can say if this law will start a trickle-down effect.

While training patrons in the use of adaptive technology to access the Internet, many sites were found that were virtually impossible to navigate without vision. After NFB sent more than 100 e-mails that commented on how inaccessible various sites were to Web masters, only seven sites responded. Of the seven responses, five mentioned that costs prohibited them from providing an accessible site and that people with disabilities were too small of a percentage to warrant developing an accessible site. The other two Web masters said they would look into increasing the accessibility of the site. Despite the poor responses from Web designers of commercial sites, information facilitators should alert Web designers to access problems.

A growing trend among Internet sites is to offer accessibility, in particular public agencies and services, as well as businesses that cater to people with disabilities. Many of these agencies and organizations take the time and make the corrections necessary to display one of the validation symbols provided by the World Wide Web Consortium, Bobby, or WGBH. Not enough Web sites are displaying access symbols, especially in learning environments such as schools and libraries.

Policing and sensitivity training are needed

Since no executive body enforces the guidelines set forth by the Section 508 Access Board or the World Wide Web Consortium and no one is certifying that Web sites claiming to be accessible actually are accessible, Web designers tend to skip over some checkpoints. But one

of the biggest reasons people give for not making their Web site accessible is "people with disabilities do not visit my site," or "the demographics of disabilities is too small to warrant the time and expense." Librarians and other information professionals can strive to change this myopic way of viewing the world.

DOS and the print disabled

Among a majority of older computer and Internet users with disabilities, one of the greatest setbacks was the transition from the DOS operating environment to the highly visual world of Windows. For all intents and purposes, DOS File Transfer Protocol (FTP) utilities, such as Archie, Gopher, and Veronica, and browsers such as Lynx, are all extremely accessible and usable for nearly anyone who has the capacity to store the multitude of DOS text-based commands. Furthermore, they are all compatible with Braille displays and speech synthesizers thanks to their simple ASCII text format and presentation. Web sites consist of no images, no multimedia, and plain monochrome-colored displays that are accessible to people with or without disabilities. Looking back, accessibility really became an issue following this evolution from a textual to visual interface.

Recouping DOS' strengths

Rather than being so concerned about whether Web sites are accessible, Web developers should look back to the practicality behind DOS and apply it to Web design. The basic principle being to produce a Web site that can be used by people with or without disabilities. Ironically, an accessible Web page benefits people with and without disabilities. According to the World Wide Web Consortium, many users without disabilities benefit from the requirements suggested to aid users with disabilities based on the following theories:

- They may have a text-only screen, a small screen, or a slow Internet connection (for example, via a mobile phone browser). These users are likely to benefit from the same features that provide access to people with low vision or blindness.
- They may be in a situation where their eyes, ears, or hands are busy or interfered with (for example, driving to work, working in a noisy environment, and so on). These users are likely to benefit from the same features that provide access to people who cannot use a mouse or keyboard due to a visual, hearing, or physical disability.
- They may not understand fluently the natural language of spoken content. These users are likely to benefit from the same visual rendering of text equivalents that make spoken language accessible to people with a hearing disability.

Accessible does not mean boring

Making a Web site accessible does not necessarily mean making it boring or plain. Attracting visitors to a Web site should be an important goal for Web developers, but what good is it if all visitors cannot use the

site to access the information they want? Alienating patrons is not prudent policy for libraries. Visitors often return to Web sites because they have had success in finding the information they were seeking.

How do people with disabilities feel about Web access?

Examine the impressions of people with disabilities who use the Internet. For this article, four questions were asked of Internet users who are blind, possess low vision, or have a physical or learning disability. Those who responded represent a broad profile of ages, computer knowledge, disabilities, and skill levels in using the Internet. The questions were constructed to be open-ended and inclusive. Furthermore, the responses to these open-ended questions provide libraries with a better idea of the diverse interests and impressions of people with disabilities in general. They offer a useful benchmark for comparing how the library's Web site stacks up against the general public's interest.

Question 1: What types of Web sites do you usually visit?

For the most part, many of the Web sites mentioned addressed a range of daily living needs and recreational interests, including:

- Banking, shopping, professional wrestling (a young-adult favorite), psychology, and poetry.
- Updates on sports, music, and weather reports.
- Guide dog owners often expressed how convenient and valuable the World Wide Web could be when shopping for their dogs.

Users also expressed interest in educational Web sites that provide them with information beyond a recreational interest. For example, sites posting information on:

- Health issues, news and current events, history, and research materials for articles or publications they are in the process of writing.
- Online public library catalogs.

Libraries that provide a page dedicated to listing accessible databases or Web sites could save people with print disabilities and those using adaptive technologies time and frustration.

Question 2: What are the characteristics of well-designed Web site?

Users shared many of the same answers for this question, despite the rather broad skill levels each possessed at navigating the World Wide Web. Nearly every user expressed that they:

- Like Web pages that bring them to the information they want right away without a lot of navigation.
- Want information to be as accurate and thorough as possible.
- Appreciate sites that direct users to what they want with brief and precise instructions that are easy to follow and understand, especially when the user is relying on hearing rather than sight.

- Appreciate consumer and informational sites that allow users to e-mail orders and queries, rather than trying to plow through a myriad of product descriptions and combo and drop-down boxes.

Libraries could serve as a valuable resource here as well, by posting and supporting links to Web sites that are credible sources for information. They can also post a message encouraging patrons who are unable to use drop box forms to e-mail questions to an assigned address at the library.

Question 3: What features really annoy you about Web pages?

Every patron shared that their biggest pet peeve with the Internet is when they know the information is available somewhere on a site, and they cannot find a way to access what they want. Additionally, some users were annoyed about:

- Too many navigational and site links that can often inhibit those who rely on screen readers, since they have to listen to the same series of links before getting the information they want. They may not even know where the pertinent information begins.
- The use of Java script or other scripting, such as Macromedia Flash, to present information, because it involves streaming animation that may become distorted for people using screen magnifiers, confusing or distracting for people with learning disabilities, and completely inaccessible for those using screen readers.
- Poorly organized pages. For example, pages that delay offering the mechanisms (that is, search boxes, categorical links, and so on) for users to begin conducting their searches with advertisements, site links and maps, and many other unnecessary distractions that people without disabilities can easily overlook.
- Failure to use language that leads users to the information they want and absence of any instructions as to how to conduct a search query.

Libraries could resist using some of the Web authoring tools that cause problems for those using assistive technology and still host an attractive Web site. The language used can be crafted and placed in a manner to lead users to the information they seek.

Question 4: How long do you work with a Web page before giving up?

For the most part, the responses to this question were indicative of the respondent's skill level at navigating the World Wide Web.

- High-end users have less tolerance than novices. Their tolerance time was no longer than five minutes because they can recognize a dead-end site. Higher-end users also know that more than one Web site covers the information they want, and they navigate to the more authoritative sites to help avoid wasting time on sites that perhaps are not as credible.
- Beginner-to-novice users responded that they usually give up after 15 to 30 minutes with a Web page. They tend to stick with more difficult pages longer than the higher-end users because they may be unaware of an alternative site with the same information.

Furthermore, beginners and novice users tend to rely more on search engines to seek information, rather than knowing or going directly to specific sites. Beginners and novices use any available help pages or even send feedback for instructions on how to navigate a page to find the information they need, which inherently contributes to how much time they spend on a page.

Libraries should develop Web pages that give all users the information and help screens they need so users can learn to navigate them quickly and efficiently. Library Web sites should be considered authoritative and user-friendly for all people.

Practical advice for good Web design

The rules established by the Section 508 Access Board and the World Wide Web Consortium provide a strong foundation that Web developers can consult to construct accessible Web pages. Both sets of guiding principles are lengthy and detailed. Yet, after interacting and working with Internet users who need adaptive technologies to effectively navigate the World Wide Web, a list of straightforward, practical suggestions have been compiled. This list represents what has been found to be most important to people with disabilities who use the Internet, and this set of criteria outlines the prescription for not only accessible Web design, but good Web design in general.

The following are some practical suggestions for accessible Web design.

1. Web designers should develop sites that allow for a variety of input and output devices.

Keep in mind that people with disabilities may access Web pages through many adaptive technologies, from alternative pointing devices and natural language technology to Braille displays, screen magnifiers, and text-to-speech readers. Make every mouse action also have a keystroke equivalent.

- One way Web designers can ensure access to their Web site for many adaptive devices is to create a page that enables users full navigation and operation through a standard keyboard. Most adaptive technologies support input through a modified or standardized keyboard, such as natural language technologies, switches, touch screens, and head wands.
- Another way of ensuring access by a diverse array of adaptive technologies is to provide a text-only equivalent for a Web site. Text-only pages provide a fully accessible counterpart to main pages that are not compatible with adaptive technologies. Some sites also offer "printer-friendly" versions of pages. A good rule of thumb is that if a page is printer friendly, more than likely it is also accessible to people using adaptive technologies.
- Web designers should also consider how a user's adaptive input device interacts with form fields, such as text boxes, combo boxes, drop-down boxes, radio buttons, and check boxes. All these items are easily accessible and highly effective for people using pointing devices, such as a mouse. However, managing these features can be difficult for those using keyboards with Braille displays and screen readers. Here, libraries

could design an electronic form, where patrons could submit reference questions, requests for materials, and comments about the library or Web site.

In case of an input or output conflict, the library can use the Web site to provide people with disabilities with a way to request the information in an alternate format. For example, many libraries are using automatic phone messaging or e-mail messaging to alert patrons that requested books are available. Patrons should always be able to choose the method they wish, as patrons with hearing disabilities may prefer e-mail notification, rather than a phone message.

2. Web designers should provide a text equivalent for any nontext element.

One of the biggest problems facing people with disabilities who use screen readers and text-to-speech browsers to navigate the World Wide Web is nontext elements, such as images, multimedia, streaming Java script, and applets.

- Significant text descriptions should accompany any nontext elements so people using adaptive technology can differentiate important content from merely decorative images.
- Most adaptive technologies cannot identify or describe these elements without an explanatory text label, commonly in the form of an 'alt tag.' Alt tags can be assigned to images (<IMG> tag), Java applets (<APPLET> tag), or other nontext elements (<OBJECT> tag).

Web designers can also include long descriptions or a caption for each nontext element. For example, a caption underneath the image of a library can read: "Above is a picture of the Public Library, and surrounding landscape." By the same token, make text description meaningful. Granted, text descriptions need not be lengthy narratives, but they should convey enough information to give users who need them an idea of what is being displayed.

3. Web designers should allow users to modify rendering of page content and override the designer's specified control settings.

One of the easiest approaches Web designers can take to ensure users can gain access to their site is to allow them to manipulate and modify how a page is displayed. Libraries should look into providing users with the ability to adjust the text sizing, background, and font colors, or choose an already constructed print-friendly format.

- Be mindful that low vision users may require text sizes larger than the settings prescribed by the Web designer, or users with learning disabilities or color sensitivities may not be able to comprehend certain colors, which may distract them from the page's content.
- Another frequent problem occurs when Web designers choose text colors that blend with background colors, making the text body indistinguishable.

Offering users the chance to change the color of the display is useful, and avoids heated discussions at staff meetings. Some site designers, for instance, like using the color contrast of yellow or white text on blue, which is fine for most people. However, if the shade of blue veers to the purple-blue, older adults may not be able to see the text.

4. If Web designers need to use multimedia tools they should.

For examples of sites that allow the user to change the display, see American Federation of the Blind:
www.afb.org/appearance.asp

New York Institute for Special Education, Blindness Resource Center:
www.nyise.org/blind.htm/

They simply need to allow users to adjust or disable any rendering of multimedia content, such as audio or video clips, that may interfere with the presentation of other content and potentially disorient a person.

Libraries should not be discouraged from using Java or similar scripting with their pages, especially if they are beneficial, such as local, historical photographs, famous speeches from history, or even video highlights from a library program. They should also provide transcripts for the content of these nontext elements.

- Web designers should also allow end users to control the speed and volume, as well as other master controls such as playing, stopping, pausing, fast-forwarding, and rewinding of audio and video clips. This allows users with cognitive disabilities to adjust the display rate to one they can assimilate.
- More importantly, Web designers must alert users that these multimedia features are present on a page.

Looking back at the responses from people with disabilities, remember that those who use the Internet said one of the more exasperating features about the World Wide Web was the inclusion of some type of multimedia application, such as Java scripting or Macromedia Flash. These features tend to interfere with and even obstruct important text that people using screen readers need—and cannot access—since the focus remains on downloading and running the multimedia content. These features may be distracting or incomprehensible to those with learning disabilities and, in rare instances, may trigger seizures in people who have photosensitive epilepsy.

5. Web designers should title frames with meaningful text that allows users to effectively identify and navigate through each frame.

Frames are often used to separate relative areas of information on a Web page, but pages that lack meaningful titles identifying the contents of a frame can easily lead people with screen readers into a continuous series of dead ends.

- One of the more common uses of frames is to divide navigational links from the main body of the Web page. Nevertheless, meaningful frame titles allow people with disabilities to orient themselves with the information housed within a frame and its relationship to other frames on the page.

Some libraries may choose to use frames to divide their online public access catalog from navigational links and news about the library. In this example, providing frame titles would help direct the user to the library catalog and keep them from wastefully searching for a book title in the wrong area.

6. Web designers should identify row and column headers for data tables.

Some library Web designers may choose to use tables to present statistical information, such as library holdings. Yet people using screen readers or Braille displays may have difficulty comprehending how the data in a table cell relates to the overall theme of the given table.

- Screen readers and Braille displays usually report information from a Web page from left to right, line by line, moving from the top to the bottom of the page, and they can often mix data or important identifying information from different cells all in the same text line.

- Web designers can use "id" and "header" HTML attributes to delineate table rows and headers within a given cell to help Braille displays and screen readers identify such tables.
- Web developers can also include a <TABLE> tag within the HTML source code to help screen readers announce the presence of a table.

For libraries to post statistical reports that are in table format on the Web site is acceptable. But staff must be sure patrons using screen readers receive a good reading of the data. For instance, if the system's monthly activity report is posted as a chart, and circulation counts are posted alongside the gate counts and Internet hits, and are listed by branch, will the reader be able to determine how many Internet hits were made at his or her branch?

7. Web designers should allow users to skip repetitive navigational links.

One of the more common complaints people using adaptive technologies had about the World Wide Web was that they had to bear trudging through a host of standard navigational links before finding what they want.

People without disabilities can visually sift through these navigational links. Accommodations also need to be made for people using Braille displays, screen readers, or other types of adaptive technologies to easily bypass these redundant links.

- One of the easiest ways library Web managers and Web designers in general can help people with disabilities avoid these recurring navigational links is to place them toward the bottom of the page, furnishing users with what users want first.

Exceptions exist. Place important navigational links, such as those alerting users to text versions on the Web site, as near the top of the page as possible.

8. Web designers should provide a text equivalent for image map links or other graphical text.

Image map links and graphical text can be excellent ways of presenting a clean, crisp look to a page; unfortunately, unless presented correctly, they can be troublesome for people using adaptive technologies, especially screen readers and Braille displays.

- Web developers need to use <ALT> tags when necessary to help identify these graphics for people using adaptive technologies.
- Alternative text links should be included for any links assigned to an image map or graphical link.
- Keep in mind that screen readers have a difficult time reading graphical text. Web developers should either try to avoid using this type of presentation, or, if they choose to do so, provide a text-only equivalent for those pages.

9. Web designers should provide clues to help users be aware of their location, progress, and status with a Web page.

People using Braille displays and screen readers are often left in limbo, wondering after 20 seconds of not hearing or receiving any output whether their page has finally downloaded. Yet people without disabilities can view a progress bar that lets them know what percentage of the requested page

has downloaded.

Another common annoyance with the World Wide Web is when another browser window opens with an advertisement or special offer, and users wonder why the page they had chosen to retrieve is not what they received.

- Such scenarios can be easily resolved by providing clues that inform users how much of a page has downloaded and when the page has finished downloading, the title of the current page or frame, and when users have left or been carried away from their current field of focus.

Library Web masters should provide as many descriptive clues as possible as to what is happening to help prevent people with disabilities from becoming disoriented. For example, providing separate page titles for different pages throughout the site, such as "Public Library Catalog" and "Public Library News and Events," saves a lot of patience and time for people using screen readers and other adaptive output devices.

10. Web designers should provide online help and instructions, and use language that makes using the site easy.

Maneuvering through a Web page may be easy for people without disabilities, but for those using adaptive technologies, it may be rather difficult to grasp what they should do next.

- Web developers can never provide too much help. Help pages are beneficial to first-time visitors to a Web site, whether or not they have a disability.
- Web developers should provide examples of the best ways to work their site and provide e-mail support to assist users who may be having trouble using their site.
- Web site designers should compose language that leads a person to the next step, whether the task is browsing through a categorical index or entering keywords to conduct a search.
- Web designers should avoid using "Click Here" links as well. Not only is the use of this phrase insensitive to those unable to use point-and-click devices, but for those browsing links with Braille displays, screen readers, and text-to-speech browsers, the language doesn't define what they are linking to.

When all else fails, people actually do read the instructions and help screens. Providing meaningful and useful information helps all Web site visitors and keeps frustration levels lower.

Staff can also consider developing a FAQ (frequently asked questions) page for accessing the Web site with adaptive technology.

The importance of language to accessibility

Some Web visitors may have a disability that prevents them from easily assimilating information. They must have information presented clearly to follow directions. For the most part Web sites generally fall under two styles with respect to how they present their content to a user. Both take about the same amount of time to design and mount, yet they are not equally as accessible.

Here is how

The first style is a descriptive approach. Language and text on the page actually lead the user through a page or site. For example, consider a library that offers access to its online public access catalog through its Web site. By adding a phrase, such as "Type the author, title, subject, or any keywords in the text box provided below, then hit Enter on the keyboard or click on the Search button to begin your search," the library has given visitors all the information they need to conduct a search.

Here it is!

The second style could be called the "Here it is" approach. Everything a site has to offer is posted on the home page, and the user has to browse through links or search the site for the information they want. Web sites such as Yahoo and others who categorically index their information are prime examples of the "Here it is" style. Unfortunately, people using screen readers have the hardest time with these types of sites because a multitude of links begin to ramble at them once they download a page, and they can easily become overwhelmed. Perhaps amidst the rambling is a search box or help page, but it really requires a strong attention span and patience level to browse the Internet using text-to-speech.

The "Here it is" type of presentation is best-suited for people who have the ability to point-and-click throughout a page and can visually sort through the content of a Web site. This style often frustrates people using screen readers, unless they have become so familiar with a particular site that they can immediately go to the pages they want. A Web site that is screen reader friendly can still be ambiguous, even to the point that it disorients or discourages a person using adaptive technologies from using the Internet. By using descriptive language and styles, Web developers can help prevent their easily accessible sites from becoming incomprehensible.

Walk the adaptive technology walk

The best way Web developers can understand the importance of providing accessible Web pages is to view Web pages, listen to them, read them, and try to operate them as someone using adaptive technologies would. They should consider the following points of view:

- What if you had to wait to hear the screen reader read the entire page to find the text-only link?
- What if you had to "click here" and could not find the "here"?
- How aggravating would it be to have an assortment of colors flashing and banners refreshing while trying to use screen magnification software?
- How distracting are altering background and text colors, multimedia, applets and Java scripting to people with attention disorders or learning disabilities?
- Would Web developers have the patience to browse through and hear 20, 30, or 50 links before finding what they wanted?

These conditions only represent the tip of the iceberg for people who are disabled and trying to use the Internet. People haven't really experienced the Internet from the point of view of a person with disabilities, until they have tried to navigate the Internet using adaptive technologies such as Braille displays, screen readers and magnifiers, learning-systems software for those with learning disabilities, natural language technologies, on-screen keyboards, switches, and wands. Essentially, people with disabilities have been given this wonderful and limitless resource and been told to find a way to use it themselves.

Thanks to organizations such as CAST, the World Wide Web Consortium, and the Section 508 Access Board, steps are being taken to ensure Web developers have the blueprints and knowledge for constructing accessible sites. Imagine if more Web sites adhered to the guidelines or went beyond them and offered audio output or ways of enlarging user's displays through their site rather than relying on text-to-speech engines or screen magnification software.

Libraries should lead the way

Culture has traditionally ascribed libraries to serve as a Mecca of information, knowledge, and resources, and people respect libraries based on their ideologies and purpose. Libraries can use their position in society to:

- Heighten disability awareness and stress the need for equality among all its members, and the general populace, by publishing an accessible Web site that serves as a model to other disseminators on how information should be rendered, regardless of disability.
- Support other Web sites that provide valuable information to people with and without disabilities by listing them along with others on their site as accessible.
- Provide navigational guides for valuable Web sites that may not be all that accessible for people with disabilities, but with a little help and orientation could prove useful.
- Wage the battle for accessibility by becoming familiar with those sites that are accessible for patrons using adaptive technologies. They can also send feedback to inaccessible sites, letting Web masters know that people with disabilities are having difficulties using their Web site, and provide them with addresses for Bobby, W3C, or Section 508.

Historians have labeled the present time the Age of Information. Libraries need to lead by example and continue to advocate the importance of information and knowledge that is accessible to everyone, using the most powerful, widespread information disseminator in its arsenal, namely the World Wide Web.