

# CAN HANDICAPPED STUDENTS ACCESS YOUR CLASS WEB SITE?

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## ABSTRACT

*While most ABSEL members have developed web sites for the classes that they teach, many may not be aware that recent legislation regarding access for the handicapped require that these sites be accessible to all. This paper provides a brief review of the laws pertaining to making web sites available to the handicapped. It also reviews guidelines made by two organizations regarding how to implement the law. Finally, the paper examines how major software developers are addressing these issues and reviews various Internet sites that ABSEL members can turn to for further information and free testing of existing materials.*

## INTRODUCTION

Most ABSEL members now make use of web sites for their courses. They post course notes, syllabi, power point slides, recommended readings, etc. on their sites so that students can access them on the Internet. Most create their sites without much thought given to any legal issues that might apply. Recent legislation, however, now poses new burdens on all faculty and their universities.

It is now estimated that there are 54 million Americans with disabilities [Tillett, 2001]. Of these, over 20.9 million Americans aged 15 and over have work-related disabilities. Approximately 24% have computers at home, while less than half of this group, 2.4 million people, have access to the Internet via their home computer. Although over 2.1 million people with disabilities make use of the Internet either at home or on some other computer, they are less than half as likely as their nondisabled counterparts to have access to a computer at home and three times less likely to have the ability to connect to the Internet at home [Kaye, 2000].

Recent litigation over Internet accessibility points to an increasing legal burden on educators to be in compliance with recent legislation. On November 4, 1999, the National Federation of the Blind filed suit against America Online in the Federal District Court under the Americans with Disabilities Act (ADA) [Wingfield, 1999]. The Federation, a

nonprofit organization of 50,000 members nationwide, took the position that America Online and the Internet must provide public accommodation for persons with disabilities. This was the first legal action taken against an Internet content provider.

Advocates argue that just as wheelchair ramps and lowered curbs ease physical access, designing Web materials that support software that translates text to speech, allowing the blind to read, can ease access to the virtual world of the Internet [Gibson, 2001]. The suit was settled on July 26, 2000 when the Federation and America Online reached an agreement to work closely together to ensure continued progress on accessibility. In addition, America Online reinforced this commitment to accessibility by posting an accessibility policy on its Web site.

This litigation serves as a cautionary note for all Internet and web site developers. Lawsuits over the inaccessibility of their Web sites, software, or both have been filed against Bank of America, H&R Block, Intuit, and Wells Fargo [Bonner, 2002]. Educators must become familiar with issues of accessibility and strive to support compliance with standards that promote universal access to online materials.

In this paper, we will first provide a brief review of the laws pertaining to the use of web sites. We will then review suggestions by two organizations regarding how individuals can meet legal requirements. We will conclude with how major software developers are addressing these issues and will review various Internet sites that ABSEL members can turn to for further information and free testing of existing materials.

## LEGAL REQUIREMENTS FOR INTERNET ACCESSIBILITY

Internet accessibility is covered by two major pieces of legislation. First, the Americans with Disabilities Act (P.L. 101-336) (ADA) provides that institutions that are subject to the act must furnish appropriate aids and services to ensure effective communication with individuals with disabilities, unless doing so would result in a fundamental alteration to or in an undue burden on a program or service [28 C.F. R. Section 36.303; 28 C.F.R. Section 35.160]. Examples of aids

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include audiotapes of texts, Braille materials, large print materials, and captioning and text readers. On September 9, 1996, the U.S. Department of Justice issued a policy ruling extended ADA requirements to include communication through the Internet.

Two years later, the Workforce Investment Act of 1998 [Public Law 105-220, 1998 HR 1385], based on the ADA, significantly fortified the technology access requirements of Section 508 of the Rehabilitation Act of 1973 (Section 508). Effective August 7, 2000, Section 508 requires that when Federal agencies use electronic and information technology, they must ensure access to people with disabilities, unless it would pose an undue burden to do so. The level of access must be comparable to the same available to non-disabled Federal employees and members of the public. States receiving Federal funding under the Assistive Technology Act of 1998 are also subject to Section 508 provisions. The Federal government does not currently require the private sector to comply with Section 508. However, the government is using the influence of its buying power. Federal agencies spend more than \$30 billion per year on information technology products and services [Tillett, 2001]. These purchases must comply with Section 508. [See Waddell & Urban (2000) for an in-depth discussion and links to government publications related to this legislation.]. [Also See *Section 508-- Web Accessibility* of the Workforce Investment Act of 1998 (PL 105-220, 1998 HR 1385), and implementation strategies, including the Priority 1 Web Content Accessibility checkpoints (<http://www.w3.org/TR/WAI-WEBCONTENT/full-checklist.html>) and Microsoft's Web Guidelines (<http://www.microsoft.com/enable/guides/default.htm>)]

This legislation places educators under a significantly increased burden not to produce, distribute, or support Internet materials that are in violation of the 1990 ADA. This act, which celebrated its twelfth anniversary July 2002, has prompted an enormous amount of litigation in schools and the workplace [Sager, 2000]. Some of the important accessibility issues pertaining to Web page design relate to the way in which individuals interact with computer technology and accessibility of the information itself. For instance, certain disabilities result in difficulty reading or comprehending text or may understanding the language of the document. Using a keyboard or mouse may be an impossibility. Some users may require appliances that have a text-only screen, a small screen, an older browser, or a slow Internet connection.

### IMPLEMENTATION STRATEGY FOR WEB CONTENT ACCESSIBILITY

Two organizations have developed recommendations for how ABSEL members and others can best comply with the laws. In 1999, The World Wide Web Consortium (W3C) established a useful set of priorities for implementing accessibility standards for a Web site. [The most recent version is available at <http://www.w3.org/TR/WAI-WEBCONTENT/>]. Web design elements to enhance

accessibility have been assigned to one of three priority levels. For each priority level, W3C has listed a number of checkpoints for individual design elements. These checkpoints can serve as a basis for evaluating the overall accessibility of Web content.

For items given *Priority 1* status, the guidelines require that all disability groups be able to access the information contained in a Web document. An example of a Priority 1 checkpoint is as follows:

“Provide a text equivalent for every non-text element (e.g., via "alt", "longdesc", or in element content). This includes: images, graphical representations of text (including symbols), image map regions, animations (e.g., animated GIFs), applets and programmatic objects, ASCII art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video” [World Wide Web Consortium at <http://www.w3.org/TR/WCAG/full-checklist.html>].

A Web content developer **should** comply with *Priority 2* guidelines to prevent disability groups from having difficulty in accessing information in the document. For example, *Priority 2* guidelines require that foreground and background color combinations provide sufficient contrast to be easily viewed by someone having color deficits and when displayed in black and white only. Further, the designer should clearly identify the target of each link.

*Priority 3* guidelines may or may not be addressed, but still can cause access difficulties for one or more disability groups. To comply at a *Priority 3* level, the content developer must specify the expansion of each abbreviation or acronym in a document where it first occurs, the primary natural language of a document must be identified, and a logical tab order through links, form controls, and objects should be defined. Organizations are encouraged to adopt the W3C guidelines and checklists as a means of improving web content accessibility.

A second group that has developed guidelines for internet access is the HTML Writers Guild. In 1999, this organization published a list of twelve design features that insure at least minimal accessibility for students with disabilities. This list was based on version 1.0 of the Web Content Accessibility Guidelines published by the World Wide Web Consortium [<http://www.w3.org/TR/WAI-WEBCONTENT/>]. References to the guidelines were included in the descriptions of list elements. The abbreviated HTML Writers Guild guidelines are as follows:

1. **“Provide text equivalents for non-text elements”** [WCAG 1.1, 1.3, 1.4] Images in HTML have an “ALT” attribute that displays text when the image fails to load or when, using browsers such as Internet Explorer, the cursor hovers over the mouse. HTML accessibility software will read this description of the image. Similarly, text equivalents should be provided for all multimedia files that describes their information

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- content. These alternative materials can take the form of transcripts or synchronized captions.
2. **“Don't rely solely upon color”** [WCAG 2.1] It is important to also provide additional HTML markup codes such as <STRONG> or <EM> that indicate the color changes for accessibility aids. In addition, high contrast alternatives support students with certain visual impairments.
  3. **“Identify language changes”** [WCAG 4.1] Screenreaders and other assistive technologies can adapt to most major languages used on the Internet. The language for an entire page can be set using the following meta tag. <META NAME="language" CONTENT="language">. In order for the technology to identify the correct language for specific text within a page, the phrase can be placed within the <SPAN LANG=" language "> ... </SPAN> element.
  4. **“Make sure pages are usable without style sheets”** [WCAG 6.1] Cascading Style Sheets are heavily used to facilitate the standardization of an entire Web Site and to reduce the length of the code used in each individual page. The information about fonts, colors, layout features, etc. is saved in a text file with a “css” type designation. This file is then linked to a web page by inserting a link tag, such as <LINK REL="stylesheet" TYPE="text/css" HREF="your\_styles.css">, between the <HEAD> ... </HEAD> tags. By linking a style sheet CSS file to pages, the time spent developing of Web content can be greatly reduced. Unfortunately, many adaptive technology browsers do not support the use of CSS file links. Therefore, it is important to check your pages for layout and content with the link to the CSS removed.
  5. **“Update equivalents for generated content”** [WCAG 6.2] Frequently, Web designers include text that is autogenerated as a student moves the cursor around a page, as students clicks on or points at images, or as time passes. These events may be inaccessible unless auditory, textual equivalents and visual content are synchronized as they are generated. This may involve creating an alternative site that does not have graphic content.
  6. **“Don't make the screen flicker”** [WCAG 7.1] Flashing or strobing screen effects can trigger seizures in people with photosensitive epilepsy. Although photosensitivity is rare, 1 in 4,000, reactions to light flashes can have serious consequences.
  7. **Use plain, understandable English** [WCAG 14.1] People with cognitive disabilities, poor readers, and those for whom English is not their primary language, may be confused by technical language and jargon. For information about the Plain English Movement sponsored by ERIC Clearinghouse on Reading and Communication Skills [Urbana, IL] visit [http://www.ed.gov/databases/ERIC\\_Digests/ed284273.html](http://www.ed.gov/databases/ERIC_Digests/ed284273.html).
  8. **Use client-side imagemaps, not server-side** [WCAG 9.1, 1.2] An imagemap is an image for which various “hot spots” have been assigned addresses. Clicking on the hot spots have differing outcomes. However, not all users can use, or will have access to, a graphical pointing device such as a mouse. Therefore, an accessible web page is one that can be navigatable via keyboard or voice commands. Only client-side imagemaps, not server-side imagemaps, can be provide keyboard navigation by the user. This is because <MAP> ... </MAP> and related <AREA > tags that define the imagemaps are contained in the HTML document being viewed, and not on the page server. Some Web design experts suggest that you should avoid putting imagemaps on your pages unless you have a really good reason for using them.
  9. **Use HTML 4.0 table markup on data tables** [WCAG 5.1, 5.2] Increasingly tables are being used to control the placement of content on a Web page. However, the resulting table display can be altered by the user as result of the user’s preferences for font styles and sizes. Therefore, column sizes must be able to adjust to various sizes and fonts. In addition, windows based graphical user interfaces can create problems for visually impaired users. Though using the HTML 4.0 Specification for tables provided by the World Wide Web Consortium at <http://www.w3.org/TR/REC-html40/struct/tables.html>, proper used of the HTML table model can support accessibility. As an additional benefit, the contents of properly formatted tables can be readily imported into databases or spreadsheets.
  10. **Frames should have NOFRAMES and TITLES** [WCAG 12.1] Using frames should be avoid whenever possible. When frames are used, the following code should be included at the bottom of frameset page:

```
<NOFRAMES>
<BODY>
<P>This page uses frames.</P>
<P>Your browser does not support frames.</P>
</BODY>
</NOFRAMES>
```

Unfortunately, the use of a framed layout drastically hampers accessibility. For example, sometimes text readers for visually impaired users cannot find the inside frame that contains the body of the text. This is because screen reader or self-voicing browsers navigate only one screen at a time. This software can tell a visually impaired user the general content of a frame, but cannot follow multiple events in multiple frames. When there are no titles included in the code of individual framed pages, visually impaired users can easily be confused about the function and content of each page. [See Ebina and Miyake, 2001]. Therefore, every page that appears in

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a frame should have its own descriptive <TITLE> attribute set. Please note that simply presenting this <NOFRAMES> message to someone who is using adaptive technology that does not support frames is far from an adequate accommodation. Ideally, the <NOFRAMES> message should include links to an alternative presentation of the materials in text form.

11. **Don't rely solely upon scripts and applets.** [WCAG 6.3] Since a visitor to your web site may not be able to execute your javascript scripts or java applets, supplemental materials should be provided when javascript is disabled. Each page that relies on javascripts or applets, should include a script that verifies support of these codes.

The Mozilla Organization, established by Netscape Communications Corporation on February 23, 1998, has developed *Mozilla*, "an open-source web browser, designed for standards compliance, performance and portability" [<http://www.mozilla.org/mozorg.html>]. In support of this effort, the organization provides links to documentation for web pages writers at <http://www.mozilla.org/docs/web-developer/>. Included are links to "Dynamic HTML" and JavaScript sites where free codes for browser and JavaScript detection are available.

12. **As a last resort, make an alternate page.** [WCAG 11.4] Web designers should use alternative pages in only the most extreme cases.

### HOW TECHNOLOGY VENDORS ARE ADDRESSING THESE ISSUES

Major information technology vendors, including Apple, Microsoft, Oracle and IBM, currently build accessibility features into new software designs. Microsoft provides resource guides based on the nature of the impairment. Impairments covered include vision, hearing, mobility, and cognitive and language impairments. These guides are made available to educators and the public at <http://www.microsoft.com/enable/guides/default.htm>. For each impairment, Microsoft lists assistive technology products. Microsoft supplies an impressive set of links to papers covering access issues, which are organized by impairment type. Another important feature of Microsoft's Web site are the step-by-step tutorials for enhancing the accessibility of each of its products. These tutorials can be used to make certain that impairments will not bar users from having access to Microsoft products.

Apple Computers Worldwide Disability Solutions Group (WDSG) supports the development and distribution of Apple's *Macintosh Human Interface Guidelines*, which is freely available at <http://developer.apple.com/techpubs/mac/pdf/HIGuidelines.pdf> in PDF format. These guidelines specifically address issues involving people with a seizure disorder as well as accessibility for individuals with physical, visual, hearing, and

speech or language disabilities. These guidelines provide the design requirements to achieve universal access for all people, including those with a disability. Most items on the Apple checklist are comparable to those on the W3C checklist. An important feature of this book is that it includes numerous examples of the guidelines applied to the Macintosh platform.

### INTERNET SITES THAT PROVIDE INFORMATION

Numerous internet sources are available to ABSEL members and the public that provide support, information, and free testing of existing materials. The following are among the most well known.

1. **Disability Information Links.** The National Information Center for Children and Youth with Disabilities is an information and referral center focusing on disabilities and disability-related issues of children from birth to age 22. Their information is targeted at families, educators, and other professionals. This site offers an extensive set of links to PDF-format publications. The NICHCY home page is located at <http://www.nichcy.org/>.
2. **Web Content Accessibility Guidelines.** The World Wide Web Consortium (W3C) provides a comprehensive set of Web design guidelines at <http://www.w3.org/TR/WCAG/>.
3. **Quick Tips. Department Of The Navy Web Information Service provides** "Quick Tips On How to be Section 508 Compliant" located at <http://lej-www.med.navy.mil/section508/tips.htm>. These tips address specific html code requirements for images and image maps, multimedia, page organization, table and frame layouts, and hypertext links.
4. **Website Design.** The Trace Center of the College of Engineering at the University of Wisconsin provides a comprehensive set of links dedicated toward building more usable Web sites at <http://trace.wisc.edu/world/web/>. These links include valuable Web access tools for both users and authors.
5. **Page Checker.** Validate your pages with an ADA validation tool such as Bobby, originally sponsored by IBM and now owned by Wildfire Corporation. Bobby is downloadable from <https://www.elicense.com/watchfire/store/index.asp> for a \$99 charge. A second alternative is A-prompt Test Program available at <http://aprompt.snow.utoronto.ca/help/test.html> as a free download. W3C HTML Validation Service is freely available at <http://validator.w3.org/>. This service checks documents for compliance with W3C accessibility guidelines and makes recommendations for improvements.
6. **Model Programs.** The Family Center on Technology and Disability (Family Center) is a project funded by the Office of Special Education under the U.S. Department of Education. One of its goals was to identify exemplar

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programs that provide technology support and services to families of students with disabilities. The Family Center Web site at <http://fctd.ucp.org/fctd/aboutfctd.htm> provides a brief description of six model technology support and service programs, including source of funds, populations served, and services provided, as well as contract information. These can serve as templates that organizations can use in establishing their own program.

### CONCLUSION

Given that most ABSEL members have developed web sites for their classes, it is now imperative that they examine these sites to determine if they meet the requirements of the Americans with Disabilities Act and Section 508 of the Rehabilitation Act of 1973. Given the fact that most ABSEL members are not lawyers, a good first step might be to check with those at the university who are responsible for web site operations or the university attorney to review what needs to be done to be compliant. In addition, faculty may want to access some of the many references provided in this paper to obtain information or to conduct a free testing of their existing materials.

Abascal and Civit [2001] point out that there are huge social improvements that wireless technologies, for example, have brought to many disabled and older people. These include more personal autonomy as well as improved security via hand held personal communication devices. The benefits of all of these technologies including those related to the internet will only be realized when equal access is achieved. ABSEL members can help by making sure that their course web sites are available to all.

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