

Providing Access to Students With Disabilities in Online Distance Education: Legal and Technical Concerns for Higher Education

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Students with disabilities who enroll in online courses continue to experience barriers to participation. Although no single U.S. law or court decision requires educators to provide online courses in a format that is accessible to all students, a patchwork of federal and state laws apply to online education in various ways.

As institutes of higher learning shift the delivery of courses from more traditional methods to asynchronous online methods, students with disabilities may be overlooked. The design of many online learning courses erects barriers to the full participation of students and instructors with some types of disabilities (Burgstahler 2002).

Of primary concern is the integration of existing information technology with assistive technology devices utilized by people with disabilities. A 1994 study by the National Center for Health Statistics (1994) revealed that over sixteen million Americans used some form of assistive technology. However, as technology advances at a rapid pace, the available information about persons who use assistive technology becomes quickly outdated (Carlson et al. 2001).

Assistive technology alone does not remove all access barriers in online education. Various strategies are needed to accommodate students with multiple disability types who use different types of information technology. For example, students who are blind could use alternative

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text for HyperText Markup Language, or HTML, graphic elements, whereas students who are deaf could benefit from captioning for multimedia video.

Benefits of Accessible Online Education

Designing online Internet-based courses that are accessible to students with disabilities results in courses that are easier to use and understand for everyone (Nielsen 2000). For example, accessible online courses that have alternative text included allow students to search for key words and phrases. Captioned videos may help students whose instructor's primary language differs from others in the class and whose speech is not easily legible. Accessible courses are more compatible with second-generation browsing devices, such as wireless handheld computers. As institutes of higher learning serve increasingly diverse populations, including individuals whose primary language differs from the others in the class, having additional textual content in online learning courses may help students succeed academically. Additionally, creating online courses that are accessible is much easier than retrofitting courses to provide access once a person with a disability has enrolled (Burgstahler 2002).

Likewise, instructors with disabilities can benefit from accessible online distance education. Dr. G. Denise Lance, an online instructor with cerebral palsy, reports that accessible online education allows her to keep her disability hidden if she chooses. Additionally, it allows her to communicate with students more effectively and answer more questions from students (Lance 2002).

Legal Considerations: Requirements for Access to Online Distance Learning in Higher Education

Unfortunately, no single law or court decision requires educators to provide online courses in a format that is accessible to students with disabilities. Instead, there is a patchwork of federal and state laws—some of them passed before the advent of the Internet—that apply to online education in various ways.

Federal Legislation

Three major federal laws apply to online courses in higher education.

The most wide-ranging laws regarding access for individuals with disabilities were passed long before the Internet was in wide use. Section 504 of the *Vocational Rehabilitation Act*, first passed in 1973, requires that institutions with federal funding not exclude or discriminate against people with disabilities. The *Americans with Disabilities Act* (ADA) was passed in 1990, and applies to programs and services offered by both private and public institutions of higher learning. Both Title II of the ADA (applying to public entities) and Title III of the ADA (applying to places of public accommodation) prohibit institutions from discriminating against students with disabilities or excluding them from equal access to services.

In 1998, Congress found that individuals with disabilities experienced significant barriers to information technology. Congress amended Section 508 of the *Vocational Rehabilitation Act* to provide that federal departments or agencies must ensure, absent an undue burden, that the electronic and information technology they acquire is accessible to individuals with disabilities who are federal employees or who are members of the public seeking information or services from a federal department or agency.

By its terms, Section 508 applies only to programs and services of the federal government. However, in 1999, officials at the U.S. Department of Education authored a letter indicating that they interpreted Section 508 to have application to state entities, including some public colleges and universities (Heumann and Seelman 1999). The letter stated that a provision of the *Assistive Technology Act* of 1998 regarding assurances provided by state governments under a 1988 grant program required states to comply with Section 508. However, this administrative interpretation has not yet been adopted by a federal court.

Federal Regulations

There are no specific regulations regarding accessibility of information technology in the ADA. Both the Title II and Title III regulations require that communication with people with disabilities be as effective as communication with others (28 Code of Federal Regulations § 35.160; 28 Code of Federal Regulations § 36.302(a)). However, the regulations provide no specific guidelines regarding what institutions of higher learning must do to make online course offerings accessible to students with disabilities. A Department of Justice letter opinion states that

Covered entities under the ADA are required to provide effective communication, regardless of whether they generally communicate through print media, audio media, or computerized media such as the Internet. Covered entities that use the Internet for communications regarding their programs, goods, or services must be prepared to offer those communications through accessible means as well. (Patrick 1996, 1)

The department also issued an *amicus* brief in a Texas case (U.S. Department of Justice 1999) arguing that the ADA applied to a private Internet site. Recently, the department also authored a technical assistance document regarding accessibility to local government Web sites (U.S. Department of Justice 2003). However, aside from this opinion, the ADA and its implementing regulations do not specify what steps online educators should take to make courses accessible to students with disabilities.

The only federal government regulations specific to information technology accessibility are the Section 508 regulations (36 Code of Federal Regulations §1194). These regulations were drafted by the federal Architectural and Transportation Barriers Compliance Board. The Section 508 regulations cover a wide range of information technology products and services. The majority of the standards cover procurement of software, hardware, and other information technologies. The regulations also contain standards for accessibility of federal Internet sites. However, these regulations do not specifically apply to courseware or other files typically used in distance education.

Federal Case Law

One federal court has ruled that an inaccessible Internet site of a public entity can contribute to a violation of the ADA. In *Martin v. Metropolitan Atlanta Rapid Transit Authority* 225 F Supp 2d 1362 (N.D. Ga. 2002), a federal district court judge found that the Web site of the Atlanta rapid transit authority agency was inaccessible to people with disabilities and that the system violated a provision of Title II of the ADA requiring that transit agencies make information available in accessible formats. However, the U.S. District Court for the Southern District of Florida, in *Access Now v. Southwest Airlines Co.*, 227 F Supp 2d 1312 (S.D. Fla. 2002), dismissed a Title III challenge filed by a disability group against Southwest Airlines. The group argued that the airline Web site was inaccessible for people who

are blind, but the court dismissed the case on the grounds that the Web site was not a “place of public accommodation.”

State Law and Institutional Policy

Several states have passed laws similar to Section 508. These laws vary in their scope and application. Some of them apply to state agencies, whereas others have wider applications to state universities. Faculty and staff members at public colleges and universities should be aware of the laws that may apply in their states. The Rehabilitation Engineering and Assistive Technology Society of North America compiled a list of states that have passed laws similar to Section 508 or have adopted policies on information technology access (RESNA 2002).

Additionally, colleges and universities may choose to adopt Section 508 as part of their Internet access policies. For example, the University of Wisconsin, Madison, adopted Section 508 as part of its Web accessibility standards (see <http://www.wisc.edu/wiscinfo/policy/wwwap.html>), both for newly designed pages and “legacy” pages designed before 2001—although, as stated earlier, there are no standards under the ADA for Internet accessibility. Universities that adopt Section 508 policies voluntarily likely are able to show that they are complying with the accessibility requirements of the ADA.

Technical Considerations: First- and Second-Generation Access Issues for Faculty Members

Scope of the Problem

Many online distance education programs present barriers to students with disabilities. A primary concern is the accessibility of the Web pages, which are generally presented in HTML. Rowland (2000) revealed that, in a random sample, only 24% of the 124 Web pages of online distance education providers were accessible. This tracked with an earlier study that showed a similar level of access problems in the front pages of colleges and universities. “It is apparent,” wrote the author, “that the current national snapshot of accessibility to postsecondary Web sites is horrible.”

Schmetzke (2002) looked at two sets of Web pages: university-based online distance learning pages and the pages of distance learning organizations. In the first set, only 15.1% of the 219 home pages of distance learning providers were accessible by an online validator. A more com-

prehensive look at pages linked to the home page showed that only 23.3% of the 3,366 pages surveyed passed an accessibility check. An overwhelming number of the errors, 81%, involved images presented without alternative text.

First-Generation Access Issues: HTML Accessibility

The federal Section 508 regulations (see <http://www.section508.gov>) cover the accessibility of HTML files and are easy to use and understand. The Section 508 standards (available online at <http://www.access-board.gov/sec508/508standards.htm>) are fairly easy to use and understand. The standards cover such issues as unlabeled graphics, timing of responses, and flashing elements. The Section 508 Internet standards, along with links to the various online tools, are summarized in Table 1.

Second-Generation Access Issues

Section 508 compliance alone does not guarantee accessibility. Courseware such as Blackboard or WebCT allows faculty and staff to present course materials in an online course easily and simply. However, they frequently present access barriers to students with disabilities (Harrison 1999).

Courseware products allow faculty members to include non-HTML elements within online courses. Examples of such elements include online slideshows (using software such as Microsoft PowerPoint), video presentations, animations, spreadsheets, charts, tables, and documents (in formats such as Microsoft Word or Adobe Portable Document Format). This provides a dual challenge to a faculty member creating an accessible online course for students with disabilities. The faculty member must first consider “first-generation” accessibility issues—that is, ensuring that the HTML structure of the page is accessible and meets the Section 508 standards, as outlined above. However, the faculty member must also consider “second-generation” access issues related to the online accessibility of non-HTML elements.

“Second generation” accessibility is a much more difficult task for the educator. Unlike “first generation” issues, several quick-and-easy online tools are available to evaluate the accessibility of “second generation” issues. In many cases, the software used to develop the non-HTML elements may have difficulty in turning out elements that are accessible. Addi-

Table 1. Section 508 Standards, Tools, and Techniques

Standard	Suggested Tool or Technique
(a) A text equivalent for every non-text element shall be provided (e.g., via “alt,” “longdesc,” or in element content).	Use the WAVE online accessibility tool developed by Temple University and hosted by WebAim (http://wave.webaim.org/) to check whether all images are accompanied by an appropriate text equivalents.
(b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.	Use the MAGpie Media Access Generator developed by the National Center for Accessible Media (http://ncam.wgbh.org/webaccess/magpie/) to add captions to multimedia files.
(c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.	Use the Lynx Viewer developed by Delorie Software (http://www.delorie.com/web/lynxview.html) to view your site in a text-only, black-and-white format.
(d) Documents shall be organized so they are readable without requiring an associated style sheet.	Turn off style sheets in your browser, or download an older browser that does not support style sheets.
(e) Redundant text links shall be provided for each active region of a server-side image map.	Use Lynx Viewer to check whether all the links provided on an image map appear as text within the document.
(f) Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.	Avoid server-side image maps whenever possible.
(g) Row and column headers shall be identified for data tables.	Use the Bobby validator developed by Watchfire (http://bobby.watchfire.com/bobby/html/en/index.jsp) to identify potential problems, then check manually.
(h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.	Use Bobby to identify potential problems, then check manually.
(i) Frames shall be titled with text that facilitates frame identification and navigation.	Use Bobby to check for presence of frame titles; ensure that frame titles are appropriate.

(continued)

Table 1 (Continued)

Standard	Suggested Tool or Technique
(j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.	Check manually; use the screen flickering demonstration developed by the National Center for Accessible Media (http://ncam.wgbh.org/richmedia/flicker_demo.html) as a guideline. WARNING: DO NOT USE THIS LINK IF YOU HAVE PHOTOSENSITIVE EPILEPSY.
(k) A text-only page, with equivalent information or functionality, shall be provided to make a Web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.	If the page as designed cannot be retrofitted to meet the Section 508 standards, consider designing a text-only page. Most pages can be made accessible with a little effort. Text-only pages are discouraged because they often are not updated as often as other pages.
(l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.	Use Lynx Viewer to see the page in a text-only format with scripts disabled. Use the NOSCRIPT tag to add in text content for people who cannot access scripts.
(m) When a web page requires that an applet, plug-in, or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).	For example, if your page has a link to an Adobe PDF document, provide a link download the Adobe Acrobat reader.
(n) When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.	Use Bobby to check accessibility of forms. Consider adding default, place-holding characters in edit boxes and text areas.
(o) A method shall be provided that permits users to skip repetitive navigation links.	Use Lynx Viewer to check for presence and placement of skip-navigation links. See the Digital Media Access Group (http://www.dmag.org.uk/resources/design_articles/skip.asp) page for an example of a link.
(p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.	If your page requires timed responses, consider testing the page using assistive technology, like a virtual keyboard, or by tapping the keyboard with a pencil.

tionally, the responsibility for ensuring “first generation” accessibility is generally in the hands of courseware developers or Web designers. The responsibility for ensuring “second generation” accessibility is generally in the hands of the faculty member creating the course—that is, a person without the technical background to provide accessibility.

***Example of Second-Generation Accessibility:
Microsoft PowerPoint***

One example of a second-generation barrier is the use of Microsoft PowerPoint software. Presentations generated by the PowerPoint program are common in both classroom settings and in online education. In the classroom, providing access to PowerPoint presentations could require an instructor to read information on slides as they are projected so students with visual impairments can have equivalent access to the information. In an online learning environment, providing access to PowerPoint presentations requires a bit more ingenuity.

Students with disabilities who have access to a copy of the PowerPoint software can download any PowerPoint files that are included in an online learning course and save them on their own computers. The students can then view the files by using the accessibility options built into their specialized copy of PowerPoint. However, individuals with disabilities who do not own a copy of PowerPoint may have difficulty accessing online presentations.

Exporting a PowerPoint file to another format, such as HTML or PDF, is another option. However, this may cause additional barriers for people with disabilities. PowerPoint automatically generates HTML pages that use five separate frames, which may make the site difficult to navigate for a person who does not use a mouse.

Additionally, PowerPoint presentations may use a variety of non-text elements, such as charts, images, and graphics, to portray information. Although PowerPoint allows users to associate alternative text with elements, this alternative text does not automatically appear in an online presentation. Not having textual equivalents means that a user with visual impairments would not have access to that information.

One method of addressing both of these issues would be to transform a PowerPoint presentation into an accessible HTML document. For individuals with a good basic knowledge of PowerPoint and HTML coding, this is a relatively simple process:

1. Save the PowerPoint presentation as a series of graphic files in one of a variety of formats (i.e., JPG, GIF, BMP). These files can then be saved in a separate folder.
2. Save the presentation as a Rich Text Format document, which will create a text-only version of the presentation.
3. Copy that text-only presentation into an HTML editor.
4. Use the HTML editor to code an HTML page that integrates the text content with the graphic content and that meets accessibility standards.

This method allows the slide to be presented both as a graphic (for users who are sighted) and as text (for users with visual impairments). If the slide contains images, graphs, charts, maps, or other nontextual information, the author of the presentation could include descriptions of those elements in the text. The author could also use a Cascading Style Sheet or other method to make the text appear very small, or match the color of the text with the background so that it would not appear to the sighted user but would be read by a screen-reader. Additionally, presentations offered in an accessible HTML format are easier to navigate than those presented in frames, and the presence of text means that the file can be easily searched by users or by search engines.

PowerPoint is just one of many different file types commonly used in distance education. The Center for Assistive Technology and Environmental Access at the Georgia Institute of Technology, under a grant from the Office of Postsecondary Education of the U.S. Department of Education, is developing a ten-module course that will provide tips and technical assistance to faculty members seeking to make Word, Excel, Flash, and other file types accessible to people with disabilities (see <http://www.accesslearning.net/>).

Conclusion

Both the legal and technical requirements to remove barriers to online learning for students with disabilities are complex. However, institutions of higher learning can take steps to adopt policies, use tools, and develop techniques to improve accessibility for online learning for all students. Institutions that take proactive steps to enhance accessibility of online learning can avoid costly litigation and offer online distance education courses that are more usable by all students, with or without disabilities.

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