



Designing Software that is Accessible to Individuals with Disabilities

DO-IT

By Sheryl Burgstahler, Ph. D.

People with disabilities continue to face challenges in accessing the full range of opportunities available to people without disabilities. Specifically, barriers to standard computer software limit opportunities in education and employment for some people with disabilities. For example, part of a multimedia tutorial that uses voice narration without captioning or transcription is inaccessible to students who are deaf. Similarly, an educational tutorial program that requires the use of a mouse is inaccessible to a student who cannot operate this device. And, a software program that requires an unnecessarily high reading level may be inaccessible to some people who have learning disabilities.

Some individuals use specialized software and hardware, called assistive technology, to operate software products. For example, a person who is blind might use a screen reader program with a speech synthesizer to access the content and functionality of a program. This system enhancement provides access to text presented on the screen and to keyboard commands, but does not allow the person who is blind to view graphics or to access features that require the use of a mouse. To ensure access to all potential users, it is important that software producers avoid creating access barriers to people with disabilities and develop products that are compatible with standard assistive technology.

Designing products that can be used by people with a wide range of abilities and disabilities is called “universal design.” In contrast, most software producers focus on the characteristics of the “average” user. For example, in a survey of twenty-five award winning companies who produce pre-col-

lege instructional software, only two of the nineteen who responded indicated they were aware of accessibility issues. Sixty-five percent of the remaining seventeen companies were not aware of accessibility as an issue, 100% were not currently addressing accessibility in their product development, and 88% had no plans to address accessibility in the future (Golden, 2001).

Clearly, much work needs to be done before software that is accessible to people with disabilities is widely available. This publication summarizes key legal issues, accessibility guidelines, and resources for making software accessible to individuals with disabilities.

Legal Issues

Congress has responded to the need to increase access to products and services for people with disabilities by passing legislation in a range of areas, including education, employment, transportation, assistive technology, and electronic and information technology. Some guarantee the civil rights of individuals with disabilities; others establish procurement requirements for specific agencies; still others impose accessibility requirements on producers of products and providers of services. Some legislation is at the federal level and some is at the state level. Some focus on disability-related access issues exclusively; other legislation includes access issues as part of broader applications. Relevant federal laws in the United States include, but are not limited to, the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act, the Individuals with Disabilities Education Act (IDEA) of 1997, and the Assistive Technology Act of 1998. The paragraphs below summarize the provisions



of several key pieces of federal legislation that relate to accessible software—Section 504 of the Rehabilitation Act, the Americans with Disabilities Act, and Section 508 of the Rehabilitation Act.

Section 504 of the Rehabilitation Act of 1973 requires that programs and services that receive federal funding make those options available to individuals with disabilities and provide reasonable accommodations.

The Americans with Disabilities Act of 1990 (ADA) is civil rights legislation that builds on and extends the reach of Section 504. It requires that public programs and services be accessible to people with disabilities and that they provide accessible, “effective communication,” regardless of what medium is typically used for that communication. For example, if a software program is used in a course at a postsecondary institution, then the essential content that it delivers should be made accessible to qualified students who have disabilities. The ADA also covers issues related to nondiscrimination on the basis of disability in employment decisions and requires that employers provide reasonable accommodations, that may involve access to software and other electronic and information technology.

In 1986, **Section 508** was added as an amendment to the **Rehabilitation Act of 1973**. Section 508 requires that when federal agencies develop, procure, maintain, or use electronic and information technology, they ensure that the electronic and information technology allows federal employees with disabilities to have access to and use of information and data that is comparable to that of federal employees who do not have disabilities, unless doing so would impose an undue burden on the agency. Section 508 also requires that members of the public with

disabilities who seek information or services from a federal agency have access to and use of information that is comparable to that provided to members of the public who do not have disabilities.

Accessibility Standards

As required by Section 508, the Access Board developed technical and functional performance criteria necessary for electronic and information technology to comply with Section 508. The accessibility standards for procurement of software applications and operating systems set forth in Section 508 (<http://www.access-board.gov/sec508/guide/1194.21.htm>) include the following:

- a. When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually.
- b. Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where those features are developed and documented according to industry standards. Applications also shall not disrupt or disable activated features of any operating system that are identified as accessibility features where the application programming interface for those accessibility features has been documented by the manufacturer of the operating system and is available to the product developer.
- c. A well-defined on-screen indication of the current focus shall be provided that moves among interactive interface elements as the input focus changes. The focus shall be programmatically exposed so that assistive technology can track focus and focus changes.



- d. Sufficient information about a user interface element including the identity, operation, and state of the element shall be available to assistive technology. When an image represents a program element, the information conveyed by the image must also be available in text.
- e. When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application's performance.
- f. Textual information shall be provided through operating system functions for displaying text. The minimum information that shall be made available is text content, text input caret location, and text attributes.
- g. Applications shall not override user selected contrast and color selections and other individual display attributes.
- h. When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.
- i. Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.
- j. When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided.
- k. Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.
- l. When electronic forms are used, 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.

Although these standards specifically apply to the procurement and use of software applications and operating systems by federal agencies, they provide a model of accessibility that has been adopted by other organizations as they create policies to meet their obligations under the ADA and other federal and state legislation.

Benefits for Everyone

Individuals with disabilities benefit from the efforts of companies to apply Section 508 guidelines in order to market their software to the federal government and to other organizations that are mandated to or choose to adopt Section 508 standards for software procurement. It will result in a greater number of software products accessible to people with disabilities.

When software is designed to be accessible to individuals with a broad range of disabilities, it is more usable by others. For example, providing text captions to a multimedia presentation with speech output can provide access to the content for both a user who is deaf and one for whom English is a second language. And, making educational software available to a student who has a learning disability that affects reading ability, can make it accessible to younger users as well. Applying accessibility standards in the design of software products will help level the playing field in education and employment for everyone.



Resources

For the most current version of this publication, consult <http://www.washington.edu/doi/Brochures/Technology/>.

Accessible Digital Media: Design Guidelines for Electronic Publications, Multimedia and the Web by the National Center on Accessible Media, can be found at <http://ncam.wgbh.org/cdrom/guideline/>

ADA (Americans with Disabilities Act) Department of Justice website provides further information on the ADA. Visit the website at <http://www.ada.gov/>

Instructional Software Accessibility: A Status Report by Diane Cordry Golden includes the results of a survey of instructional software companies regarding accessibility issues. It can be found at <http://www.ataporg.org/instructionalreport.asp>

Section 508 Homepage: Electronic and Information Technology website, developed by the Access Board can be found at <http://www.access-board.gov/508.htm>. For explanation of the guidelines for software applications and operating systems, consult <http://www.access-board.gov/sec508/guide/index.htm>.

Software Accessibility Checklist, based on the U.S. Department of Education's Requirements for Accessible Software Design can be found at <http://www.usdoj.gov/crt/508/archive/oldsoftware.html>. The Department of Education's requirements can be found at <http://www.ed.gov/fund/contract/apply/clibrary/software.html>.

Universal Design for Learning, is a resource created by CAST (the Center for Applied Special Technology). It can be found at <http://www.cast.org/>

About DO-IT

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For further information, to be placed on the DO-IT mailing list, or to request materials in an alternate format, contact:

DO-IT
University of Washington
Box 355670
Seattle, WA 98195-5670
doi@u.washington.edu
<http://www.washington.edu/doi/>
206-221-4171 (FAX)
206-685-DOIT (3648) (voice / TTY)
888-972-DOIT (3648) (toll free voice / TTY)
509-328-9331 (voice / TTY) Spokane
Director: Sheryl Burgstahler, Ph.D.

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