



Forum Guide to Ensuring Equal Access to Education Websites

Introduction to Electronic Information Accessibility Standards



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National Cooperative Education Statistics System

The National Center for Education Statistics (NCES) established the National Cooperative Education Statistics System (Cooperative System) to assist in producing and maintaining comparable and uniform information and data on early childhood, elementary, and secondary education. These data are intended to be useful for policymaking at the federal, state, and local levels.

The National Forum on Education Statistics (the Forum) is an entity of the Cooperative System and, among its other activities, proposes principles of good practice to assist state and local education agencies in meeting this purpose. The Cooperative System and the Forum are supported in these endeavors by resources from NCES.

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July 2011

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Technical Contact

Ghedam Bairu
(202) 502–7304
ghedam.bairu@ed.gov

Working Group Members

A volunteer working group of the National Forum on Education Statistics produced this document. It was developed through the National Cooperative Education Statistics System and funded by the National Center for Education Statistics (NCES) of the U.S. Department of Education.

Chair

Lee Rabbitt, Newport Public Schools (Rhode Island)

Members

Jim Addy, Iowa Department of Education

Sheila Corey, Alaska Department of Education and Early Development

Kathleen Gosa, Kansas State Department of Education

Rachael Traub, Massachusetts Department of Education

Raymond Woten, Virginia Department of Education

Consultant

Tom Szuba, Quality Information Partners

Project Officer

Ghedam Bairu, National Center for Education Statistics

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Foreword

The National Forum on Education Statistics (the Forum) is pleased to release the *Forum Guide to Ensuring Equal Access to Education Websites: An Introduction to Electronic Information Accessibility Standards*. One goal of the Forum is to improve the quality of education data gathered for use by policymakers and program decisionmakers. An approach to furthering this goal has been to pool the collective experiences of Forum members to produce “best practice” guides in areas of high interest to those who collect, maintain, and use data about elementary and secondary education. Presenting education data in a manner that complies with both the letter and spirit of federal Section 508 accessibility laws is one of those high interest areas.

This guide is designed for use by information technology administrators, data specialists, and program staff responsible for the “content” in data reports, as well as education leaders (e.g., administrators who prioritize tasks for technical and data staff), and other stakeholders who have an interest in seeing that our schools, school districts, and state education agencies operate in an effective and equitable manner for all constituents, regardless of disability status. It is intended to raise awareness in nontechnical audiences and suggest best practices for complying with Section 508 goals at an operational level in schools, school districts, and state education agencies. It is not intended to recreate technical resources that already exist to facilitate Section 508 compliance.

This document reflects the judgment of experienced education data managers and information technology specialists. While there is no mandate to follow these principles, the authors hope that the contents will prove a useful reference to others in their work.

In This Guide

Chapter 1 raises awareness about how people with disabilities access electronic information, introduces the federal Section 508 accessibility law, and challenges education leaders to make their electronic resources accessible to all constituents regardless of disability status (i.e., to comply with the law).

Chapter 2 describes the technical capabilities required by Section 508 and international guidelines for achieving accessibility, although it does not present detailed technical guidance.

Chapter 3 recommends practical strategies for planning to improve accessibility and comply with Section 508 standards in an education organization.

Appendix A provides additional information about references cited in this document and other resources related to improving accessibility.

Appendix B presents a set of Section 508 compliance leadership indicators from the U.S. General Services Administration.

Appendix C presents a list of commonly asked questions (and answers) regarding Section 508.

Appendix D shares Web Content Accessibility Guidelines (WCAG) 1.0 checkpoints that explain how developers can operationalize the Section 508 guidelines.

The National Cooperative Education Statistics System

The work of the Forum is a key aspect of the National Cooperative Education Statistics System (Cooperative System). The Cooperative System was established to produce and maintain, with the cooperation of the states, comparable and uniform educational information and data that are useful for policymaking at the federal, state, and local levels. To assist in meeting this goal, the National Center for Education Statistics (NCES), within the U.S. Department of Education, established the Forum to improve the collection, reporting, and use of elementary and secondary education statistics. The Forum deals with issues in education data policy, sponsors innovations in data collection and reporting, and provides technical assistance to improve state and local data systems.

Development of Forum Products

Members of the Forum establish task forces to develop best practice guides in data-related areas of interest to federal, state, and local education agencies. They are assisted in this work by NCES, but the content comes from the collective experience of the state and school district task force members who review all products iteratively throughout the development process. Documents prepared, reviewed, and approved by task force members undergo a formal public review. This public review consists of focus groups with representatives of the product's intended audience, review sessions at relevant regional or national conferences, or technical reviews by acknowledged experts in the field. In addition, all draft documents are posted on the Forum website prior to publication so that any interested individuals or organizations can provide feedback. After the task force oversees the integration of public review comments and reviews the document a final time, publications are subject to examination by members of the Forum standing committee sponsoring the project. Finally, the entire Forum (approximately 120 members) reviews and formally votes to approve all documents prior to publication. NCES provides final review and approval prior to publication.



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Chapter 1. Why Should I Care About Accessibility?

Introduction

Schools, districts, state education agencies, and the U.S. Department of Education all routinely collect and report data electronically, most often via websites and online applications accessed through the Internet. Education data are shared with both educators and the public in the form of static and dynamic web pages, PDF® files, query and search engine output, build-your-own table tools linked to secure databases, and other easily exchanged electronic formats. As we enter the second decade of the 21st century, parents, educators, administrators, and community members often look first to the Internet to find the information they need about their schools and students. Because the Internet is no longer a secondary source of information, these are not casual visits. School and district websites are fundamental, and even vital, sources of information to the education enterprise.

But what if you were to search online for your local school’s activity calendar and saw a blank page, or perhaps only an indecipherable string of nonsensical characters? This is effectively what happens to scores of web users with visual disabilities when trying to access many forms of education data and resources. Similarly, some parents and students might hope to retrieve a podcast of the school superintendent’s back-to-school address, only to find that a hearing impairment prevents or limits access to the recording of the spoken message. And still other community members may find it impossible to navigate a website because of a physical condition that prevents them from maneuvering a mouse to “click here” and access new information.

According to the 2000 U.S. Census, nearly 20 percent of the population in the United States has some type of disability.¹ While this number may seem unexpectedly high to many people, it is supported by the fact that fully 7 percent of the male population in the United States (approximately 10 million men) “cannot distinguish red from green or see red and green differently from most people” (the most common form of color blindness).² Nonetheless, countless websites and paper publications “color code” data in a well meaning but misguided effort to improve understanding.

Other types of disabilities affect students, parents, school staff, and community members as well, including motor impairments, cognitive/developmental issues, hearing impairments, visual epilepsy, and other conditions. Even people who are not classified with traditional disabilities can find themselves “disabled” with respect to accessing information online. This includes people dealing with common age-related impediments, such as loss of vision, hearing, or motor dexterity (e.g., from degenerative conditions commonly associated with the aging process, such as arthritis).

Many people with disabilities participate in the education system because they or their children have something to gain from becoming educated—and something to contribute as members of society. Ensuring that all stakeholders can access information about educational organizations, processes, and performance is fair, necessary, and empowering. Providing this access, however, requires electronic and information technologies (EITs), such as websites, to be designed in a manner that adequately accommodates the capabilities of assistive technologies (screen readers, braille printers, screen enlargers,

Challenge: Try to navigate your school district’s website without using your mouse. If the experience proves futile, you’ll better understand what it is like for a viewer who cannot operate a hand-held pointing device, such as a mouse ... and you’ll know that the website does not comply with federal (and many state) laws requiring equal access to electronic information for people with disabilities.

¹ Census 2000 counted 49.7 million people with some type of long lasting condition or disability. They represented 19.3 percent of the 257.2 million people who were aged 5 and older in the civilian noninstitutionalized population (i.e., not in the military or otherwise institutionalized). Source: Disability Status: 2000 (Census 2000 Brief). Accessed September 2010 at <http://www.census.gov/prod/2003pubs/c2kbr-17.pdf>.

² *Color Blindness: More Prevalent Among Males*. Howard Hughes Medical Institute (2006). Accessed September 2010 at <http://www.hhmi.org/senses/b130.html>.

Making sure that all stakeholders can access information about educational organizations, processes, and performance is fair, necessary, and empowering. Doing so not only improves access for people with disabilities, but also helps people who are aging or otherwise technologically challenged. It also helps to clarify and improve an organization's overall communications.

text-to-voice translators, and various keyboard and mouse modifications). Interestingly, ensuring that websites and other electronic information are accessible by these devices not only aids people with disabilities, but also people using older computers and operating systems (who might argue that they are “technologically challenged”). It also motivates an education organization to more comprehensively consider its strategies and templates for improving and clarifying communications in general.

Section 508 Summary

In 1998, the U.S. Congress amended the Workforce Rehabilitation Act of 1973³ to require federal agencies to make their EIT accessible to people with disabilities. By definition, “inaccessible technology” refers to the electronic display or presentation of information that interferes with any individual’s ability to obtain and use information quickly and

easily. Section 508 (as amended) requires federal departments and agencies that develop, procure, maintain, or use EITs to ensure that federal employees and members of the public with disabilities have access to, and use of, information and data comparable to that of employees and members of the public without disabilities. Most states have similar laws, regulations, or policies designed to ensure that people with disabilities have equal access to public information (see appendix A).

Section 508 “standards” refer to a set of fairly technical specifications and performance requirements for developing, reporting, and sharing electronic information, tools, and resources that promote Section 508 compliance. Oftentimes, these standards are presented as a series of checklist items for technical developers (see chapter 2). Standards are sometimes organized by the type of EIT being addressed, such as software applications and operating systems; web-based information or applications; telecommunication products; video and multimedia products; self-contained, closed products (e.g., information kiosks, calculators, and fax machines); and desktop and portable computers. Although all of these technologies are important in the field of education, this document focuses on those more relevant to accessing, using, and reporting education data, such as

- software applications and operating systems, including purchased or developed operating systems and application software programs, or any products that contain software as an integral component of their functionality; and
- web-based information or applications, including purchased or contracted websites, and encompassing the information content as well as any associated applications, plug-ins, or web-based interfaces for other technologies and devices (such as telecommunications).

Document Purpose & Audience

While there are several highly technical resources related to Section 508 accessibility standards (see appendix B), this document focuses, instead, on raising awareness in nontechnical audiences and offers best practices for complying with Section 508 goals at an administrative level—that is, guidance for planning to adopt and implement Section 508 standards in schools, school districts, and state education agencies.

This document is written for information technology administrators, data and program specialists responsible for the “content” in data reports, education leaders (e.g., administrators who prioritize tasks for technical and data staff), and other stakeholders who have an interest in seeing that our schools, school districts, and state education agencies operate in an effective and equitable manner for all constituents, regardless of disability status.

³Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended by the Workforce Investment Act of 1998 (P.L. 105-220), August 7, 1998. Visit <http://www.section508.gov/> for more information.

Benefits of Section 508 Compliance

There are many benefits to an education organization that complies with Section 508 Accessibility Guidelines. In addition to adhering to existing federal (and state) laws, presenting information in a manner that can be used by all people, regardless of disability status, is the right thing to do. More tangible benefits of taking a proactive and systematic approach to presenting electronic information in a Section 508-compliant manner include

- promoting the use of “cleaner code” and other improvements to site development;
- developing web pages that are easier to print or otherwise exchange;
- encouraging consistency across websites that may have grown beyond management control over time, including an opportunity to reestablish a standard “look and feel” to the organization’s website and electronic resources through development standards, common frameworks, and templates (e.g., cascading style sheets);
- identifying (and removing) redundant information and orphaned web pages following site review;
- expanding access via additional platforms (e.g., handhelds and multiple browsers);
- improving usability for all stakeholders; and
- establishing or enforcing proactive data governance within the organization.

“Section 508” is shorthand for a federal law that requires federal agencies, and organizations receiving federal funds, to make their electronic and information technology accessible to people with disabilities.

Most states have comparable laws, regulations, or policies.

A Challenge to Education Leaders

Unfortunately, many schools, districts, and even state education agencies do not yet comply with many components of the Section 508 Accessibility Guidelines.⁴ In some cases, staff members are not aware of their responsibilities as mandated by Section 508. In other instances, perceived technical challenges interfere with compliance. And in many organizations, the sheer volume of work required to update websites (and other electronic resources) overwhelms planners to the point of making Section 508 compliance *appear* to be impractical.

In addition to complying with federal (and many state) laws, presenting information in a manner that can be used by all people, regardless of disability status, is the right thing to do.

This document is intended to raise awareness in nontechnical audiences and offer best practices for complying with Section 508 goals at an administrative level in schools, school districts, and state education agencies. It is not intended to recreate technical resources that already exist to facilitate Section 508 compliance (see appendix A).

Presenting electronic information in a manner that is accessible to people with disabilities does not automatically happen. Doing so requires raising awareness in technical staff, administrators, and policymakers (the purpose of this document); appropriate technological design and application (see chapter 2 and appendix A); and a commitment to proactively manage information technology by assigning staff and financial resources to update existing websites and EITs. As such, it is unlikely that progress toward compliance will occur unless education leaders actively support Section 508 goals as an important organizational priority (see appendix B). School leaders can establish policies and procedures that make accessibility an expectation in the organization or, alternatively, they can accept or even encourage a status quo in which many of their data users may be unable to access

information in a manner that is understandable to them. The tools to accomplish the job are available as long as there is commitment to doing so.

⁴ A 2009 assessment of Texas school districts found that only 12.89 percent (144 of 1,117 districts) had websites that were compliant with Section 508 Accessibility Guidelines as determined by the WatchFire Bobby Software, an online scanning tool commonly used to evaluate website accessibility. Source: May, S. and Zhu, Q. (2009). A Web Accessibility Assessment on the Texas Public School System. Universal Access in the Information Society. Accessed September 2010 at <http://www.springerlink.com/content/705q6n485445650m/?p=c6fa3c70b20f446892003fb3b174900d&pi=0>.

Examples of “Good” and “Bad” Electronic Resources (Section 508 Compliance)

Figures 1-1, 1-2, and 1-3 illustrate how the presentation of information can affect its accessibility to people with disabilities. These examples display an inaccessible resource juxtaposed to an accessible version of the same content, enabling readers to “see” what it is like to try to read this information with a disability.

Figure 1-1. Simulation of a fictional education report that relies on common red-green color codes to convey meaning, as viewed (through a simulation tool) by a person with red-green color blindness. Note the diminished difference the color coded scheme conveys (image A versus image B) to a person who is red-green color blind. The simulation tool was accessed through the Vischeck website at <http://www.vischeck.com/vischeck/>.

Original Image (A)	Red-Green Colorblind (Deuteranope) Simulation (B)
<p>2008 District-Wide AYP Report KEY Schools Making AYP in Green Print Schools Not Making AYP in Red Print</p> <ul style="list-style-type: none"> 1 Anderson Elementary 2 Babcock Middle School 3 Cheevers Elementary 4 County High School 5 Dodge Elementary 6 Eccand Elementary 7 Farmer Elementary 8 Groves Middle School 9 Highland Elementary 10 Jones Academy 11 Kilgore Middle School 12 Lambert Elementary 13 Milo Elementary 14 North County High School 15 Oswald Elementary 	<p>2008 District-Wide AYP Report KEY Schools Making AYP in Green Print Schools Not Making AYP in Red Print</p> <ul style="list-style-type: none"> 1 Anderson Elementary 2 Babcock Middle School 3 Cheevers Elementary 4 County High School 5 Dodge Elementary 6 Eccand Elementary 7 Farmer Elementary 8 Groves Middle School 9 Highland Elementary 10 Jones Academy 11 Kilgore Middle School 12 Lambert Elementary 13 Milo Elementary 14 North County High School 15 Oswald Elementary

Figure 1-2. People with visual impairments sometimes use a screen magnifier to enlarge text and images. Although enlarging text may help them see characters more clearly, it also reduces the amount of information that can be viewed at one time on a monitor screen. The upper image (A) illustrates how magnifying characters may detract from meaning when the column and row headings in the lower image (B) extend beyond the viewing frame.

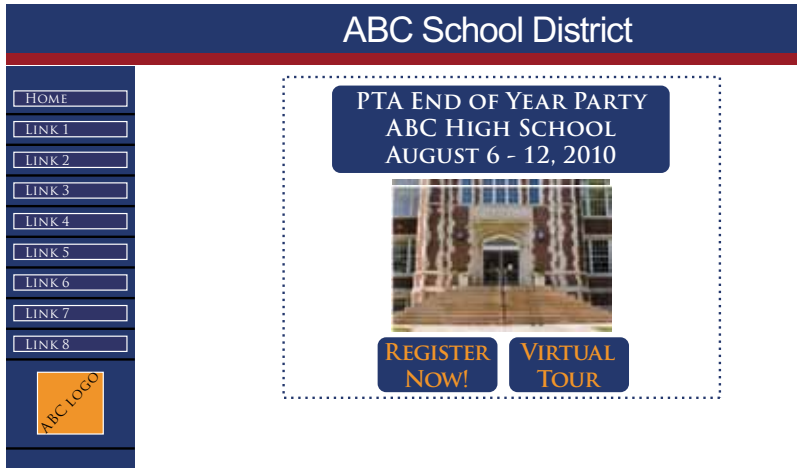
(A)

	C	D	E
7	460,731	462,287	0.34%
8	1,617,250	1,799,630	11.28%
9	57,758	58,052	0.51%
10	1,138,438	1,233,356	8.34%
11	7.98	7.96	-0.25%
12	7:40	7:35	-1.09%

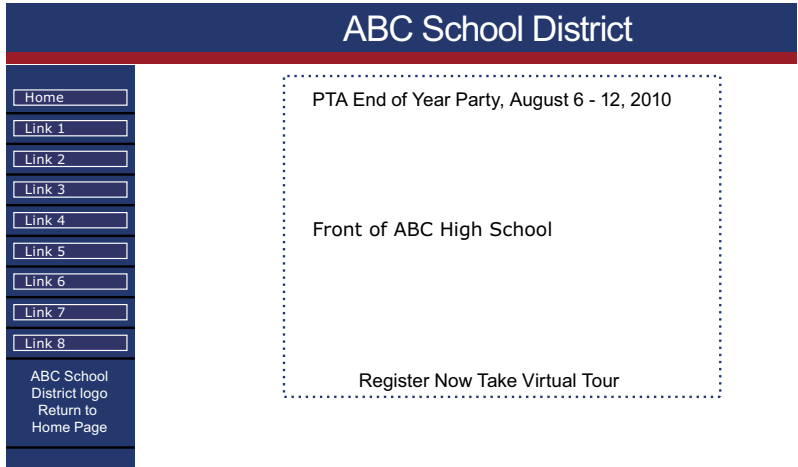
(B)

Category	February 2010	March 2010	% Change
Total Number of Pages Viewed	12,900,477	14,330,913	11.09%
Average Number of Pages Viewed Per Day	460,731	462,287	0.34%
Total Number of Visits	1,617,250	1,799,630	11.28%
Average Number of Visits Per Day	57,758	58,052	0.51%
Total Number of Visitors	1,138,438	1,233,356	8.34%
Average Number of Pages Viewed Per Visit	7.98	7.96	-0.25%
Average Visit Duration (In Minutes and Seconds)	7:40	7:35	-1.09%
Median Visit Duration (In Minutes and Seconds)	1:28	1:25	-3.41%
Most Active Day of the Week (Visits)	Tuesday (274,734)	Monday (342,148)	24.54%
Busiest Hour of a Day (Visits)	14:00–15:00 (110,557)	14:00–15:00 (120,802)	9.27%

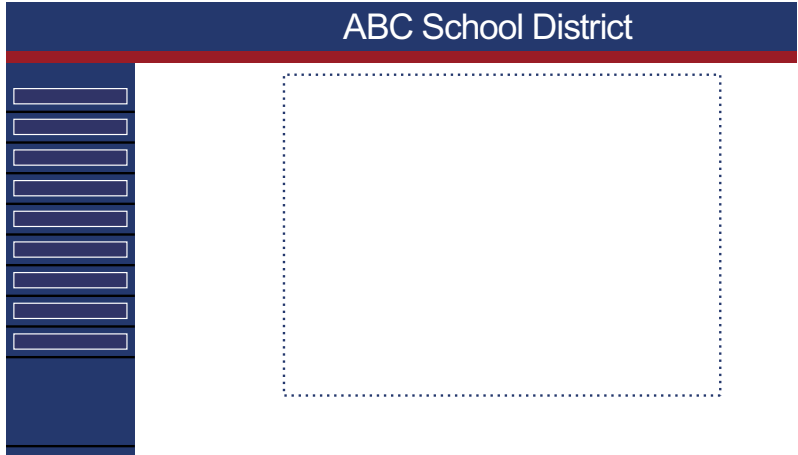
Figure 1-3. Websites without appropriate alt tags leave blind readers with little information to interpret meaning. (A) How a website is seen by a person who is not blind. (B) How a website with appropriate alt tags might be “seen” by a reader who is blind. (C) How a website without appropriate alt tags might be “seen” by a blind person. Screen readers will not help convey website content without functioning descriptive “text equivalents” like alt tags.



(A) What sighted viewers see.



(B) What blind viewers “see” when alt tags are available.



(C) What blind viewers “see” when alt tags are not available.

Chapter 2. What Do I Need to Know to Comply With Section 508 Accessibility Standards?

Understanding Accessibility Law, Guidelines, and Development Standards

As described in chapter 1, Section 508 of the Rehabilitation Act of 1973 was amended and signed into law in 1998 (Workforce Reinvestment Act) as a set of mandated standards that supplanted nonbinding guidelines from 1986. In other words, optional suggestions for helping disabled people to access information were transformed into mandated Section 508 implementation guidelines that now have the force of federal law. Many states have similar laws, regulations, and policies.

To help organizations implement Section 508 mandates, voluntary “best practices” for improving the accessibility of electronic information (and complying with Section 508 law) have been developed by two leaders in the field: the United States Access Board and the World Wide Web Consortium (W3C) Web Accessibility Initiative (WAI).

- The United States Access Board is an independent federal agency devoted to improving accessibility for people with disabilities.⁵ Created in 1973 to ensure access to federally funded facilities, the Board is now a leading source of information on accessible design. As such, it develops and maintains design criteria for the built environment, transit vehicles, telecommunications equipment, and EITs. In 1998, the Board established the Electronic and Information Technology Access Advisory Committee (EITAAC), which was composed of representatives from government, industry, and disability advocacy groups for the purpose of developing accessibility standards.
- The W3C (World Wide Web Consortium) is an international community in which member organizations, a full-time staff, and the public work together to develop web standards.⁶ A central goal of the W3C is to promote web accessibility so that people with disabilities can perceive, understand, navigate, interact with, and contribute to the World Wide Web. W3C hopes to contribute to this goal through the establishment of the WAI (Web Accessibility Initiative), which has developed several sets of voluntary standards that support both the specific mandates of Section 508, as well as more broadly constructed efforts to improve accessibility on the Web. The WAI developed Web Content Accessibility Guidelines (WCAG) for web developers (including content authors and

Challenge: Try to read a moderately complex spreadsheet on your handheld data device (e.g., an iPhone or Blackberry). Did you track the column and row formatting for each cell? Could you identify trends and patterns in the data? Might this be what it is like for a person who needs to use a screen magnifier to read data?

Section 508 standards are mandated by federal law.

WCAG standards are not required by federal law but, instead, help organizations become more compliant with Section 508 through the adoption and implementation of WCAG standards. Some state accessibility laws integrate both Section 508 guidance and numerous WCAG practices—giving WCAG the force of law in those states.

⁵ For more information about the United States Access Board, visit <http://www.access-board.gov/index.htm>.

⁶ For more information about the World Wide Web Consortium and its Web Accessibility Initiative, visit <http://www.w3.org/> and <http://www.w3.org/WAI/>.

site designers) in 1999 (WCAG 1.0). Version 2.0 (WCAG 2.0) was released in 2008 to apply to a broader and more advanced world of technology.

This chapter summarizes the legally mandated Section 508 Accessibility Guidelines as well as practical, but voluntary, WCAG standards and recommendations that support attaining the Section 508 requirements. Additional information about Section 508 concepts and implementation can be found in appendix C (Commonly Asked Questions About Section 508).

Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as Amended by the Workforce Investment Act of 1998

Subpart B—Technical Standards⁷

Section 1194.21 (software applications and operating systems) addresses purchased or developed operating systems and application software programs, or any products that contain software as an integral component of their functionality.

§1194.21 Software applications and operating systems⁸

Provision (a) Language—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.

- Interpretation—This provision is intended to permit people who cannot manipulate a mouse to still engage in all functions in an application by means of a keyboard. Similarly, the provision would be helpful to a user with a visual impairment that prevents them from pointing a mouse (even if they can use it) to a specific place to, for example, select a drawing tool or pick a color from a digital pallet. To comply with this provision, developers need to enable all application functions to be triggered via keyboard shortcuts that are identifiable with a text label (see figure 2-1).

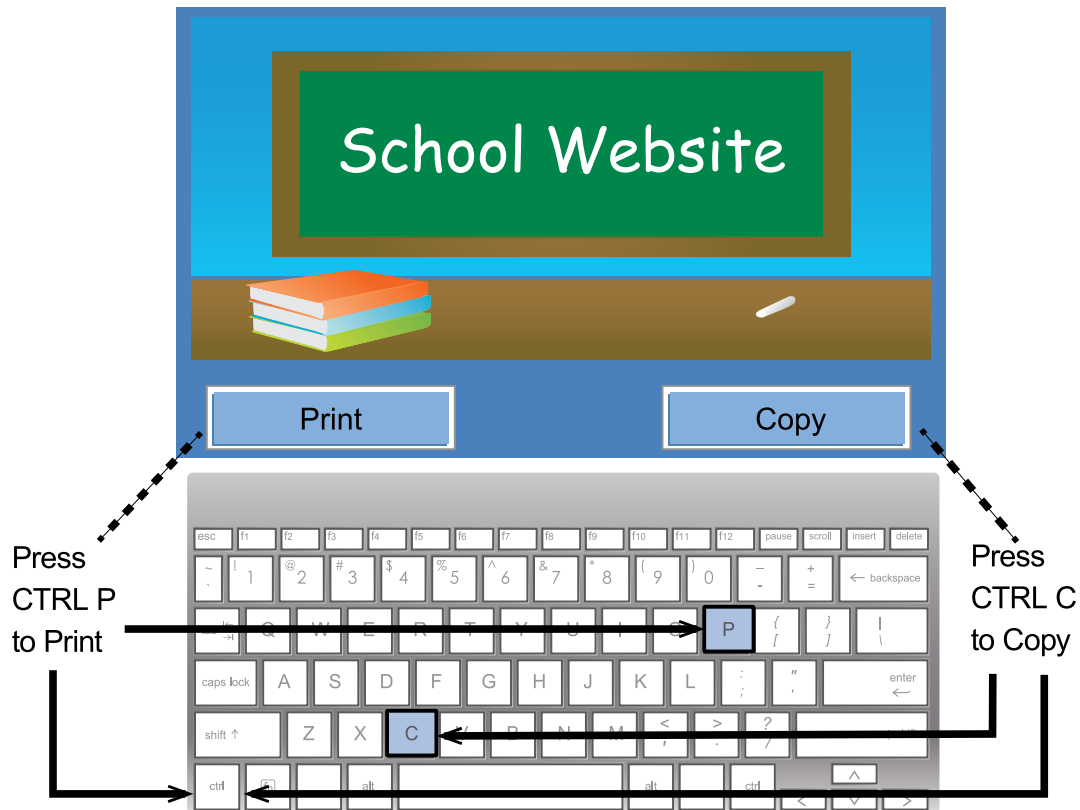
Provision (b) Language—Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where those features are developed and documented according to industry standards. Applications also shall not disrupt or disable activated features of 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.

- Interpretation—Many software applications and operating systems enable users to customize accessibility features (e.g., changing color schemes or adjusting sound frequencies). This provision prohibits applications from automatically disabling such features that have been activated by a user prior to running the application.

⁷For more information about how to interpret and respond to Section 508 requirements, visit the United States Access Board's resource Guide to the Section 508 Standards for Electronic and Information Technology at <http://www.access-board.gov/sec508/guide/>. Useful information is also available in the form of a side-by-side comparison of WCAG and Section 508 at <http://www.jimthatcher.com/sidebyside.htm#WCAG>.

⁸These provisions of Section 508 deal specifically with software applications and operating systems but, because of variation in programming languages, focus on concepts and functionalities rather than explicit coding instructions. For additional technical guidance, visit <http://www.access-board.gov/sec508/guide/1194.21.htm>.

Figure 2-1. Software/operating systems Provision (a) requires that all product functions be executable via a keyboard alternative to manipulating a mouse.



Provision (c) Language—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.

- Interpretation—The position on a screen where an action takes place is referred to as the “focus.” For example, when a user selects a button, that button becomes the “focus.” This provision requires that an application’s focus be identifiable to assistive technology (such as a screen view enlarger) through its code, so that a user of assistive technologies can identify, and therefore follow, the point of focus as it changes while running an application.

Provision (d) Language—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.

- Interpretation—This provision requires that all forms of visually displayed tools, such as a checkbox, menu, toolbar, scroll bar, and similar items, have both descriptive *and* status text associated with them. In other words, a button that toggles an element on or off (such as items on a tool bar) needs to not only describe the element (e.g., “page ruler”), but also its status or state (e.g., “toggled off”).

Provision (e) Language—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.

- Interpretation—Some applications assign meaning to images. For example, a right-pointing arrow in the bottom right corner of a page may mean “advance to the next screen.” This provision requires that the meaning of such an image (which should have a text description according to Provision (d) above) should

not change within an application. In other words, the right-pointing arrow should not have a text description on the first page that says “advance to the next screen” but then change in meaning to “select this item” on a subsequent page.

Provision (f) Language—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.

- Interpretation—A computer’s operating system is responsible for controlling its basic functions, such as receiving input from a keyboard or mouse, displaying information on a monitor, and storing data on a hard drive. Most software applications incorporate standard protocols used by the operating system for invoking these core functions. This provision prohibits applications from using uniquely derived instructions beyond standard operating system protocols for handling these key tasks—which potentially would not be operable by assistive technologies that are designed to be compatible with common operating systems.

Provision (g) Language—Applications shall not override user selected contrast and color selections and other individual display attributes.

- Interpretation—People with disabilities often adjust monitor display (color, contrast, ratios, etc.) to meet their viewing needs. This provision prohibits applications from automatically overriding user-selected display settings.

Provision (h) Language—When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.

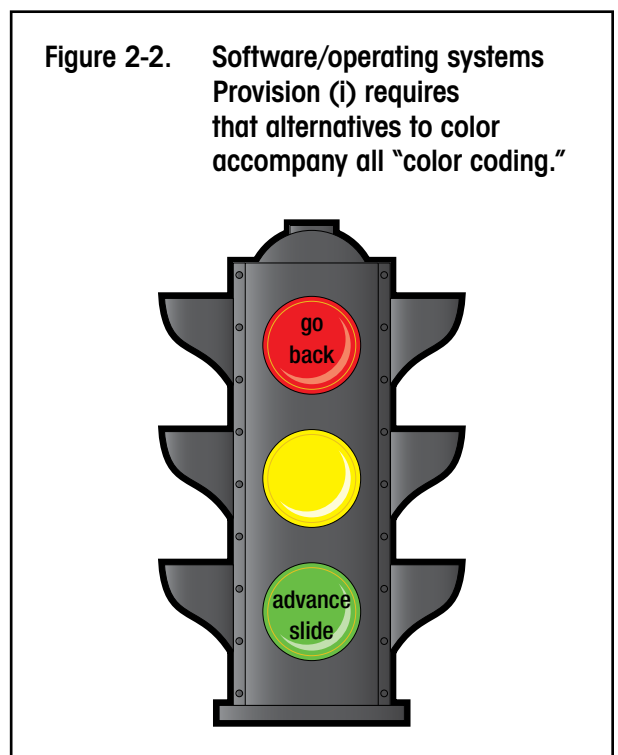
- Interpretation—Animation (motion) can present a challenge to certain types of assistive technology devices. As such, this provision requires that an alternative form of presenting information be available whenever animation is used to convey meaning in an application (e.g., such as an animated character guiding a user through the help section).

Provision (i) Language—Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.

- Interpretation—While this provision does not prohibit the use of color, it does require at least one alternative method of conveying any meaning associated with the use of color. For example, if a “green light” is to be clicked to advance a presentation slide and a “red light” to go backward, the application should identify the “advance” and “go back” functions in some way other than just color. In this example, text that describes the functions would suffice (see figure 2-2).

Provision (j) Language—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.

- Interpretation—This provision only applies to applications that allow users to adjust screen colors. Any such application should also enable users to adjust contrast settings in order to accommodate individual viewing needs.



Provision (k) Language—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.

- Interpretation—This provision is critical to accommodating the needs of viewers with photosensitive epilepsy. These users can have seizures triggered by displays that flicker, flash, or blink, particularly in frequencies greater than 2 Hz and lower than 55 Hz, which are, therefore, prohibited.

Provision (l) Language—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.

- Interpretation—This provision requires that keyboard alternatives enable users to navigate a form and that text labels accompany field elements in close proximity. In other words, labels should correspond directly with form input requirements (e.g., the “student name” label should be tagged directly to its input field rather than just somewhere on the same page so that a screen reader can clearly identify the relationship between the field and the tag). Moreover, users should be able to move from one form element to another by means of the keyboard (e.g., function keys) in addition to the use of a mouse.

§1194.22 Web-based intranet and internet information and applications^{9, 10}

Section 1194.22 (web-based intranet and internet information or applications) addresses purchased or contracted websites, and encompasses content as well as associated applications, plug-ins, or web-based interfaces for other products (such as telecommunications devices).

Provision (a) Language—A text equivalent for every non-text element shall be provided (e.g., via “alt”, “longdesc”, or in element content).

- Interpretation—“Text equivalent” refers to the use of words (i.e., text) attached to any nontextual feature, such as an image or audio clip, to describe the purpose and/or function of an image. Note that the text may describe the image (e.g., “an image of school supplies”), but should describe the functionality of the image (e.g., “a picture of school supplies that serves as a link to the school supply store at <http://www.fictionalschool/supplies>”). Developers must use some common sense when applying alt text—neither too little nor too much information is useful (see figure 2-3). This provision is intended to permit people who cannot manipulate a mouse to still employ all functions in an application by means of a keyboard. Similarly, implementing this provision would help a user with a visual impairment that prevents them from pointing a mouse (even if they can use it) to a specific place to, for example, select a drawing tool or pick a color from a digital pallet. To comply with this provision, developers need to enable the triggering of all application functions via keyboard shortcuts that are identifiable with a text label (see figure 2-1).

Because the functional limitations of disabled users do not change, there is considerable overlap between Section 508 provisions applicable to software applications and operating systems (§1194.21) and web-based intranet and internet information and applications (§1194.22).

⁹These provisions of Section 508 apply specifically to the development of websites and web pages. A site is considered to comply with Section 508 if it meets the standards established in Provisions (a) through (p). Some provisions may not be required if they are determined to impose an “undue burden” on the organization. By law, an “undue burden” is defined as “significant difficulty or expense.” In determining whether an action would result in an undue burden, an agency is directed to consider all agency resources available to the program or component for which the product is being developed, procured, maintained, or used. For more guidance, visit <http://www.access-board.gov/sec508/guide/1194.22.htm>.

¹⁰See appendix D for a priority-level checklist of WCAG 1.0 checkpoints that explain how developers can operationalize the Section 508 guidelines.

Provision (b) Language—Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.

- Interpretation—“Synchronizing” refers to the pace of the presentation of alternative representations of multimedia content. In other words, if a video clip includes audio, the timing of the captioning (i.e., the equivalent alternative) should match the pace of the audio so that someone reading a caption would see the text at an appropriate time to understand the video.**Language—Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.**
- Interpretation—While this provision does not prohibit the use of color, it does require at least one alternative method of conveying any meaning associated with the use of color. For example, if a “green light” is to be clicked to advance a presentation slide and a “red light” to go backward, the application should identify the “advance” and “go back” functions in some way other than just color. In this example, text that describes the functions would suffice (see figure 2-2).

Figure 2-3. Web-based Information Provision (a) requires that an appropriate text equivalent be provided for all images. “Appropriate” does not mean “detailed” but, rather, that the text equivalent adequately describes the image content and functionality (if any).

Not enough information.



(A) Image.

Too much unnecessary information.



(B) Head and shoulder image of a tricolored (white, brown, and black) dog wearing a black collar.

An appropriate text-equivalent of the image.



(C) Image of a dog's face.

Provision (c) Language—Documents shall be organized so they are readable without requiring an associated style sheet.

- Interpretation—A “style sheet” defines the color, font, text alignment, size, spacing, borders, etc. so as to establish the appearance and formatting of a web page. Some people with disabilities create their own style sheets to help accommodate their specific needs (e.g., a user with low vision may increase font size on the pages they view). This provision prohibits developers from designing web pages that override style sheets previously defined by viewers.

Provision (d) Language—Redundant text links shall be provided for each active region of a server-side image map.

- Interpretation—This very technical provision simply requires that any image used as a map to link to another web page must include a URL that a web viewer can read without additional communication with the web server, which would be an additional burden for a disabled user because it delays the flow of information (see figure 2-4).

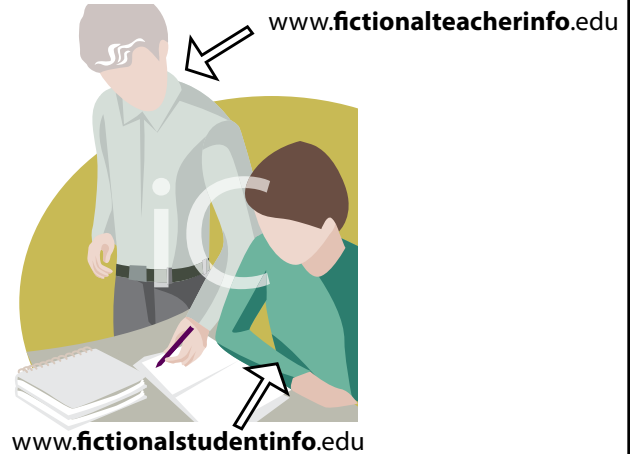
Provision (e) Language—Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

- Interpretation—This technical provision requires that user-readable tags accompany nongeometric shapes that serve as maps by including “alt” tags inside any “area” tag in any image.

Provision (f) Language—Row and column headers shall be identified for data tables.

- Interpretation—This provision, which requires that any rows and columns in a data table include labeled headers, is simply a necessary step to presenting any tabular data. In other words, identifying row and column header labels is necessary for any user including, but not limited to, people with disabilities.

Figure 2-4. Web-based Information Provision (e) requires that image link maps be readable by users without additional exchange with the server. In this example, the mouse arrow highlights a different URL depending on which part of the image is being pointed to by the viewer.



Provision (g) Language—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.

- Interpretation—This provision extends guidance in Provision (g) above based on the added need in large tables to label individual cells with both their column and row headings. Imagine, for example, a screen reader listing data for each cell in a table with 10 columns and 20 rows. This provision mandates that the column and row heading labels accompany each cell so that the user is not expected to recall each row and column heading based on headings listed once by the screen reader at the beginning of the table.

Provision (h) Language—Frames shall be titled with text that facilitates frame identification and navigation.

- Interpretation—Frames are design tools that allow a web page to be divided into separately managed, and effectively independent, parts. While the visual appearance of frames may be seamless to sighted users (allowing for content in different frames to be visually linked), linking content across frames often is difficult for many types of assistive technology tools, such as screen readers. For example, a navigation bar is often separated from web content by means of frames. Providing titles with text that clearly distinguishes a navigation frame from a content frame helps users navigate the page more reasonably.

Provision (i) Language—Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

- Interpretation—This provision is critical to accommodate the needs of viewers with photosensitive epilepsy, who can have seizures triggered by displays that flicker, flash, or blink, particularly in frequencies greater than 2 Hz and lower than 55 Hz, which are, therefore, prohibited.

Provision (j) Language—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.

- Interpretation—Running parallel websites for people with and without disabilities is not recommended in this document. However, in instances in which a web page cannot otherwise be designed to comply

with Section 508 guidelines, this provision requires an alternative, text-only presentation of the page with equivalent information and functionality. In order to preserve the integrity of the text-only alternative, it should be updated whenever the primary page is changed.

Provision (k) Language—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.

- Interpretation—This provision requires that meaningful content be included in code in a manner that can be read by assistive technologies. Application and site developers should familiarize themselves with the many acceptable technical ways of placing functional text within script and complying with this provision.

Provision (l) Language—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).

- Interpretation—This provision requires that any proprietary application for transmitting or displaying content (e.g., Adobe Acrobat’s Portable Document Format Viewer, or PDF Viewer) be included as a link that is readable by assistive technology tools. Providing this information is necessary for any user including, but not limited to, people with disabilities. This provision simply ensures that the links are readable by assistive technology tools.

Provision (m) Language—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.

- Interpretation—This provision requires that text labels be accessible near the field elements they are intended to describe. In other words, labels should correspond directly with form input requirements (e.g., the “student name” label should be tagged directly to its input field rather than just somewhere on the page, so that a screen reader can clearly identify the relationship between the field and the tag).

Provision (n) Language—A method shall be provided that permits users to skip repetitive navigation links.

- Interpretation—The content on many web pages does not begin until after a page’s heading and navigational information. This provision requires that page design include a mechanism that permits viewers to skip this repetitive information and go directly to content. Such a capability is especially important for someone using a screen reader, which would require that the entire navigation bar be read on each page prior to accessing content.

Provision (o) Language—When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

- Interpretation—Some web applications are designed to “time out” when a response is not received in a certain amount of time. While this practice may support certain security-related purposes, people using assistive technologies may sometimes need more time than other viewers to access, assimilate, and respond to web content and prompts. This provision requires that a viewer be given an option (by means of a prompt) to request additional time when necessary to enter a response.

Web Content Accessibility Guidelines 1.0¹¹

The WCAG 1.0 includes general principles of accessible web design that support and extend Section 508 web-based intranet and internet information and applications standards described above (§1194.22). WCAG 1.0 also includes checkpoints for each principle that explain how developers can operationalize Section 508 guidelines. Table 2-1 describes how WCAG 1.0 recommendations align with Section 508 web standards. See appendix D for more information, including a WCAG 1.0 checklist (by priority level).

Section 508 Web Standard (§1194.22 Web)	Related Web Content Accessibility Guidelines (Version 1.0)
Web Provision (a)	Checkpoint 1.1—Provide a text equivalent for every nontext 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.
Web Provision (b)	Checkpoint 1.4—For any time-based multimedia presentation (e.g., a movie or animation), synchronize equivalent alternatives (e.g., captions or auditory descriptions of the visual track) with the presentation.
Web Provision (c)	Checkpoint 2.1—Ensure that all information conveyed with color is also available without color; for instance, from context or markup.
Web Provision (d)	Checkpoint 6.1—Organize documents so that they may be read without style sheets. For example, when an HTML document is rendered without associated style sheets, it must still be possible to read the document.
Web Provision (e)	Checkpoint 1.2—Provide redundant text links for each active region of a server-side image map.
Web Provision (f)	Checkpoint 9.1—Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape.
Web Provision (g)	Checkpoint 5.1—For data tables, identify row and column headers.
Web Provision (h)	Checkpoint 5.2—For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.
Web Provision (i)	Checkpoint 12.1—Title each frame to facilitate frame identification and navigation.
Web Provision (j)	Checkpoint 7.1—Until user agents allow users to control flickering, avoid causing the screen to flicker.
Web Provision (k)	Checkpoint 11.4—If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information (or functionality), and is updated as often as the inaccessible (original) page.
Note: Provisions (l), (m), (n), (o), and (p) do not align with WCAG 1.0.	

¹¹ For more information about the WCAG 1.0 recommendations, visit <http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/>.

Web Content Accessibility Guidelines 2.0¹²

Organizations that have fully operationalized the basic standards established in WCAG 1.0 may wish to consider implementing the WCAG 2.0 released in October 2008. WCAG 2.0 standards were introduced in an effort to incorporate a wider range of technologies that had become available since the 1999 publication of the WCAG 1.0 recommendations. In many respects, WCAG 2.0 standards are not technology specific, but instead focus on sound approaches to presenting information on the web in an appropriate manner. As such, the 12 WCAG 2.0 recommendations are organized into 4 principles: perceivable, operable, understandable, and robust.¹³

1. **Perceivable**—Information and user interface components must be presentable to users in ways they can perceive, meaning that the information being presented cannot be invisible to all of a user’s senses. This principle is further demonstrated in the following examples.
 - 1.1 **Text alternatives**: Provide text alternatives for any nontext content so that it can be changed into other forms that people need, such as large print, braille, speech, symbols, or simpler language.
 - 1.2 **Time-based media**: Provide alternatives for time-based media, including captions and alternatives for audio and video content.
 - 1.3 **Adaptable**: Create content that can be presented in different ways (e.g., simpler layout) without losing information or structure; in other words, all content should be accessible through the use of assistive technologies.
 - 1.4 **Distinguishable**: Use sufficient contrast to make it easier for users to see and hear content, including separating the foreground from the background.
2. **Operable**—User interface components and navigation must be operable, meaning that users must be able to operate the interface and that the interface cannot require interaction that a user cannot perform.
 - 2.1 **Keyboard accessible**: Make all functionality available from a keyboard; that is, all functionality should be keyboard accessible.
 - 2.2 **Enough time**: Provide users enough time to read and use content.
 - 2.3 **Seizures**: Do not design content in a way that is known to cause seizures.
 - 2.4 **Navigable**: Provide ways to help users navigate, find content, and determine where they are; in other words, actively provide tools that help users to navigate and find content.
3. **Understandable**—Information and the operation of user interface must be understandable, meaning that the information and the operation of the user interface cannot be beyond their understanding.
 - 3.1 **Readable**: Make text readable and understandable.
 - 3.2 **Predictable**: Make content appear and operate in predictable ways.
 - 3.3 **Input assistance**: Help users avoid and correct mistakes.
4. **Robust**—Content must be robust enough so that it can be interpreted reliably by a wide variety of user agents, including assistive technologies, meaning that users must be able to access the content as technologies advance and evolve.
 - 4.1 **Compatible**: Maximize compatibility with current and future user agents, including assistive technologies.

These guidelines are divided into “testable” success criteria. When evaluating a website for accessibility, or planning an accessibility strategy, these success criteria can be assessed to make sure that WCAG 2.0 principles have been achieved (i.e., that they conform with WCAG 2.0). A reference guide to techniques for meeting all WCAG 2.0 recommendations is available online at <http://www.w3.org/WAI/WCAG20/quickref/>.

¹² For more information about how the WCAG 2.0 recommendations differ from WCAG 1.0, visit <http://www.w3.org/WAI/WCAG20/from10/diff.php>.

¹³ These descriptions of the four WCAG 2.0 principles are further discussed at <http://www.w3.org/TR/UNDERSTANDING-WCAG20/intro.html#introduction-fourprincs-head>.

Chapter 3. How Do I Implement Section 508 Accessibility Standards?

Introduction

Improving accessibility requires more effort than expertise. In fact, most of the conceptual standards and the vast majority of the technical procedures for making EIT compliant with Section 508 standards are relatively straightforward to implement. The greatest obstacles to success are a lack of commitment and perseverance.

The concepts outlined in this chapter focus on the steps that are particularly critical for, or unique to, planning to introduce Section 508 upgrades in an education setting.

Ensuring organizational commitment to Section 508 compliance is, in many ways, more easily achieved than it is for many technology initiatives. Unlike investing in new computer systems, databases, or decision support systems, most stakeholders agree that improving the accessibility of EITs is always the right thing to do—thus, the question in many people’s minds is not whether to improve accessibility, but how, and how much, to improve accessibility.

Buy-in from the policymakers and administrators who manage an organization is of utmost importance. These people establish the day-to-day procedures and practices that support the organization’s long-term priorities. If they agree that accessibility is an organizational priority, the technical and content staff they manage will most likely be able to improve the accessibility of the organization’s EITs. If, on the other hand, educational leaders believe that accessibility is unimportant (probably unlikely), unrealistic, or unachievable (a more likely scenario), then documents like this one and resources such as those described in appendix A may help to convince them of both the merit and practicality of committing the organization to Section 508 compliance.

Conducting a Self-Audit

With respect to Section 508 compliance, a “self-audit” is an examination of an organization’s EITs to assess and/or verify the accessibility of these resources to people with disabilities. As described in chapter 2, resources from the federal government (such as the United States Access Board) and other organizations (such as the W3C) can be used to identify a checklist of items for evaluating Section 508 compliance of EITs.

The product of a self-audit is an inventory of the organization’s EITs accompanied by measures of compliance. While, in theory, a page-by-page audit of a website or a file-by-file audit of spreadsheets is necessary to fully verify compliance, an audit that provides an accurate picture based on a fair sample of these resources is advisable during the early stages of planning. For example, a self-audit may reveal the following:

Challenge: Download a free screen reader (e.g., at <http://www.screenreader.net/> or <http://www.nvda-project.org/>) on a test workstation and try to access the information on a newspaper website. Was it easy to pick the article you wanted to read? Could you comprehend the information? How much or little did it slow you down? Does the experience change your perspective on the need to improve the accessibility of electronic resources?

Of the 2,000 pages on our website, we reviewed 80 pages from 6 different program areas to find that 20 of those pages (25 percent) were WCAG 1.0-compliant. No pages were compliant with WCAG 2.0.

While this information is not exhaustive, it does indicate that the organization’s website is largely not compliant with Section 508—and it provides enough information to develop a plan for improving accessibility. Note that a statistically

defensible approach to sampling web pages is not necessary to collect this useful information as long as common sense is used to “sample” a fair representation of the website.

Establishing Performance Goals

Although the results of a self-audit are not required for setting performance goals, audit findings provide a reality check with respect to the amount of work required to become Section 508-compliant. Continuing with the example of working to improve the compliance of an organization’s 2,000 page website, planners next need to set goals for achieving compliance. In theory, of course, 100 percent of a website should be Section 508-compliant, but it is likely that interim goals that greatly improve the accessibility of the site are more realistic. When establishing goals, good managers often break larger tasks into smaller, more manageable, modules that serve as test cases for the larger effort and, perhaps more importantly, are accomplishable. For example, a reasonable and practical set of goals might be presented as the following:

Although the organization endeavors to make its entire website Section 508-compliant, we will commit to improving accessibility over time in the following manner. Effective immediately, all new or updated web pages will comply with the WCAG 1.0 checklist. Within 6 months, 90 percent of the 200 most-viewed existing pages will comply with the WCAG 1.0 checklist. Within 1 year, the most-visited 50 percent of our web pages will comply with the WCAG 1.0 checklist.

Mission-Critical Applications for Education Institutions

Access to some EITs is more critical than others. Areas in which EIT accessibility is likely of greater importance include:

- ✓ Information intended for routine student and parent use
- ✓ Information intended for broad public dissemination
- ✓ Information necessary for staff to accomplish operations fundamental to the organization’s core mission and physical security.

Section 508 compliance is of paramount importance to these mission-critical areas.

Developing a Project Plan

A thorough and realistic project plan is critical to efficiently and effectively improving accessibility in an education organization. Good plans often

- ✓ start with something basic that staff members are likely to understand (e.g., the challenge that color codes present to people who are color blind) rather than a component that may be important, but does not speak clearly to their needs or experiences (e.g., technical fixes for clarifying code);
- ✓ build in evaluation time for a “feedback loop” that supports the iterative nature of developing, testing, and implementing new initiatives—as staff become more experienced with approaches and techniques for improving accessibility, they will grow in confidence and require less time to implement subsequent improvements; and
- ✓ stress extensibility, in which modules are expanded or customized after initial implementation has been successful—once stakeholders have retrofitted a few simple web pages, they can then address particularly popular pages prior to undertaking efforts to improve the entire website.

A project implementation plan should present work in discrete, manageable tasks. For example, retrofitting an entire state education agency website to become Section 508-compliant is a very big job—potentially too big to be accomplished in a single step. Instead, more manageable tasks might be identified and prioritized, such as improving the accessibility of a smaller set of particularly popular web pages. Another approach might be to divide a large systemwide job into subtasks based on data categories: public pages, student pages, student assessment, staff pages, etc. Activities in the implementation plan should be assigned, carried out, monitored, and completed in discrete units that can be comprehended, initiated, and accomplished by members of the implementation team.

A compliance schedule is an important part of any implementation plan, but a schedule is only effective when its goals and deadlines are realistic. If the goals are unattainable and deadlines are missed, subsequent deadlines lose their credibility. Thus, a key issue that often arises throughout the course of many large projects is “schedule slippage.” Organizational commitment to achieving Section 508 compliance gives project leaders confidence to use their management skills to overcome deadline issues because they know that the project is important and that failure will be noticed by the organization’s leadership team.

Training Staff

Although many people, including those in the role of information technology specialists, appear to lack awareness of the requirements of Section 508 accessibility standards, the technical steps needed to improve accessibility are not daunting. As such, training efforts can focus on the following two overarching priorities:

- 1) improving awareness and explaining the rationale for accessibility standards, and
- 2) pointing technical staff to existing resources that explicitly describe techniques for improving accessibility.

Because some of the techniques for improving accessibility are technical in nature (i.e., for web developers) and others are content related (i.e., for program or data staff who prepare content for websites), it often makes sense to customize training for these two distinctly different groups of staff.

Introducing the concept of “Section 508 compliance”—Training programs should be designed so that those unfamiliar with Section 508 standards will not be overwhelmed with technical details, while those stakeholders who bring some familiarity with accessibility issues will not be bored. One strategy for providing this type of customized training program is to adopt a modular approach, with each module building upon content from the previous session. Stakeholders can begin training activities at the level that is most appropriate for their knowledge and experience. The initial training module might, for example, introduce the concept of accessibility and the goals of the Section 508 (and related state) laws without delving too deeply into technical details and terminology. A subsequent module might address more formal terminology and model either technical- or content-related practices for improving accessibility, depending on the audience type. A final module would then describe the organization’s preferred practices and long-term strategy for improving accessibility and achieving compliance.

Including meaningful “real” examples to illustrate training points—People who participate in training activities generally learn better when they are exposed to concepts and techniques that can be readily applied to their everyday jobs. Training becomes meaningful when it is clearly applicable to the duties of the participants. Good trainers often illustrate points through the use of “real-life examples” that are directly related to the duties of session participants.

Customizing training to match audience needs—Not all stakeholders need to improve accessibility in the same way. For example, web developers generally are responsible for the technical details of web page construction. Program staff, on the other hand, often focus on what information belongs on a web page and how it should be presented. Customizing training content to meet functional needs, while minimizing the presentation of less relevant information, makes training efforts more efficient and effective.

Maintaining appropriate governance structures—As with other data governance and quality control initiatives, all parts of the organization need to comply with Section 508 guidance. “Independent” entities, such as athletic departments or school board committees, should not be able to develop “external” sites when they are really a part of the organization and should be accountable for meeting standards.

It is unlikely that staff will understand how to help an education organization become Section 508-compliant unless they

- ✓ become aware of the law, practical recommendations, and related expectations;
- ✓ accept personal responsibility for improving accessibility; and
- ✓ learn how to become compliant through technical training.

Dedicating Adequate Resources

In spite of the effort that goes into a self-audit and project plan, it is fairly simple to set goals and create plans. Achieving goals according to plan, on the other hand, demands more work.

New concepts, such as improving EIT accessibility, become institutionalized by

- ✓ establishing clear expectations;
- ✓ delivering high-quality training; and
- ✓ holding staff accountable in a consistent and routine manner.

The policymakers and administrators who establish and manage the day-to-day procedures and practices guiding the organization need to formally task individual staff members or teams with the responsibility of ensuring that web pages and other EITs comply with Section 508 to reflect the organization's goals on this front. After appropriate training (see above), individual programmers will need to retrofit the existing website based on management's priorities (e.g., improving accessibility on high priority pages in a targeted and modular manner). In organizations with large websites or that are under substantial time pressure (e.g., when facing a compliance-related

lawsuit), accomplishing compliance goals will likely require more resources than in smaller organizations that are in a position to proactively transition to Section 508 compliance at a less aggressive pace.

Making Accessibility a Part of Routine Operations

Because many education organizations find themselves with relatively extensive websites that are not yet Section 508-compliant, senior leaders will likely find themselves in "retrofit mode" as they endeavor to improve accessibility. Once websites achieve reasonable accessibility goals (e.g., 100 percent of new or updated web pages and 90 percent of the 200 currently most-viewed pages are in compliance with the WCAG 1.0 checklist), leaders need to consider how to institutionalize Section 508 accessibility expectations. Maintaining website/EIT compliance requires effective staff training and ongoing accountability.

The reason education organizations share data with students, staff, parents, and community members is because the information is judged to be of value to the recipients. Ensuring that all stakeholders have adequate access to information about educational organizations, processes, and performance is fair, necessary, and empowering. Doing so not only improves access for people with disabilities, but also helps people who are aging or otherwise technologically challenged. It also is the right thing to do.

Appendix A. Forum/NCES Resources & Selected State Laws and Policies Governing Accessible Technologies

Web Resources Referenced in This Document

<http://www.section508.gov/>—Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended by the Workforce Investment Act of 1998 (P.L. 105-220), August 7, 1998.

<http://www.access-board.gov/index.htm>—The United States Access Board, a federal agency committed to accessible design.

<http://www.w3.org/>—The World Wide Web Consortium (W3C).

<http://www.w3.org/WAI/>—The Web Accessibility Initiative (WAI).

<http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/>—An introduction to Web Content Accessibility Guidelines (WCAG) 1.0 recommendations.

<http://www.w3.org/TR/UNDERSTANDING-WCAG20/intro.html>—An introduction to WCAG 2.0 recommendations.

<http://www.jimthatcher.com/index.htm>—A useful website for anyone looking to better understand the implications of website accessibility.

<http://www.w3.org/WAI/WCAG20/from10/diff.php>—Information about how the WCAG 2.0 recommendations differ from WCAG 1.0.

<http://www.w3.org/WAI/WCAG20/quickref/>—A quick reference to WCAG 2.0 recommendations (success criteria) and techniques.

<http://www.access-board.gov/sec508/guide/>—A Guide to the Section 508 Standards for Electronic and Information Technology.

<http://www.access-board.gov/sec508/guide/1194.22.htm>—Provisions of Section 508 dealing specifically with web-based intranet and internet information and applications.

<http://www.access-board.gov/sec508/guide/1194.21.htm>—Provisions of Section 508 dealing specifically with software applications and operating systems.

<http://www.vischeck.com/vischeck/>—A simulation tool for showing users what images and websites look like to someone who is color blind.

<http://www.screenreader.net/>—A free screen reader to support blind and visually impaired computer users.

<http://www.nvda-project.org/>—A free and open source screen reader for the Microsoft Windows operating system.

<http://www.census.gov/prod/2003pubs/c2kbr-17.pdf>—*Disability Status: 2000 (Census 2000 Brief)*. U.S. Census Bureau, accessed September 2010.

<http://www.hhmi.org/senses/bl30.html>—*Color Blindness: More Prevalent Among Males*. Howard Hughes Medical Institute (2006), accessed September 2010.

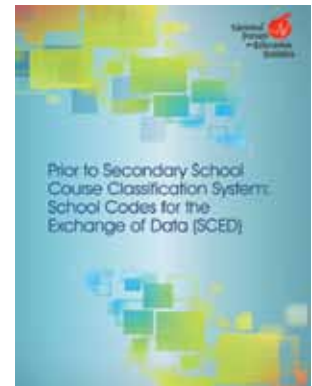
<http://www.springerlink.com/content/705q6n485445650m/?p=c6fa3c70b20f446892003fb3b174900d&pi=0>—May, S. and Zhu, Q. (2009). *A Web Accessibility Assessment on the Texas Public School System*. Universal Access in the Information Society, accessed September 2010.

Forum/NCES Resources

Prior-to-Secondary School Course Classification System: School Codes for the Exchange of Data (SCED)

<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2011801>

This document presents a taxonomy for assigning standard codes to elementary and middle school courses. It is intended to make it easier for school districts and states to maintain longitudinal student records electronically—and to transmit coursetaking information from one student information system to another, from one school district to another, and from a school district to a state department of education.



Traveling Through Time: The Forum Guide to Longitudinal Data Systems (Series)

Book I: What is an LDS?

<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2010805>

Book II: Planning and Developing an LDS

<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2011804>

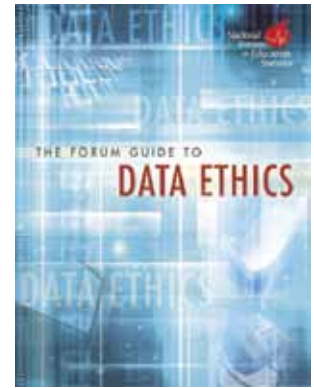
Longitudinal data systems (LDSs) are increasingly becoming the state of the art in education data. An LDS makes it possible to not only monitor the success of individual students, but also to identify trends in those students' education records. These systems provide powerful and timely insights about students and allow educators to tailor instruction to better meet individual needs. They can also reveal with great clarity the effects that our policies, programs, and decisions have on schools. The *Traveling Through Time* series is intended to help state and local education agencies meet the many challenges involved in developing robust systems, populating them with quality data, and using this new information to improve the education system. The series introduces important topics, offers best practices, and directs the reader to additional resources related to LDS planning, development, management, and use.



The Forum Guide to Data Ethics

http://nces.ed.gov/forum/pub_2010801.asp

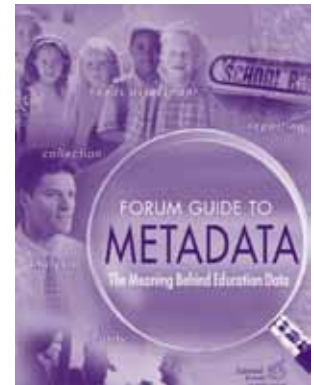
While laws set the legal parameters that govern data use, ethics establish fundamental principles of “right and wrong” that are critical to the appropriate management and use of education data in the technology age. This guide reflects the experience and judgment of seasoned data managers; while there is no mandate to follow these principles, the authors hope that the contents will prove a useful reference to others in their work.



Forum Guide to Metadata: The Meaning Behind Education Data (2009)

http://nces.ed.gov/forum/pub_2009805.asp

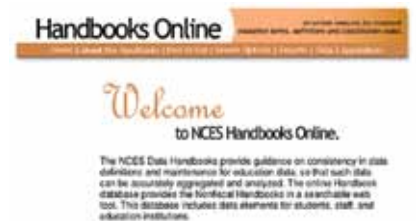
This document offers best practice concepts, definitions, implementation strategies, and templates/tools for an audience of data, technology, and program staff in state and local education agencies. It is hoped that this resource will improve this audience’s awareness and understanding of metadata and, subsequently, the quality of the data in the systems they maintain.



NCES Nonfiscal Data Handbook for Early Childhood, Elementary, and Secondary Education (2007)

http://nces.ed.gov/forum/pub_2003419.asp

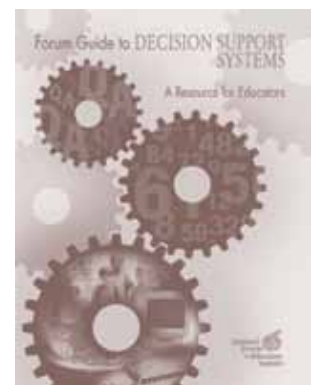
The NCES Handbooks define standard education terms for students, staff, schools, local education agencies, intermediate education agencies, and state education agencies. They are intended to serve as reference documents for public and private organizations (including education institutions and early childhood centers), as well as education researchers and other users of data.



Forum Guide to Decision Support Systems: A Resource for Educators (2006)

http://nces.ed.gov/forum/pub_2006807.asp

This document was developed to remedy the lack of reliable, objective information available to the education community about decision support systems. It is intended to help readers better understand what decision support systems are, how they are configured, how they operate, and how they might be developed and implemented in an education setting.



Forum Guide to Elementary/Secondary Virtual Education (2006)

http://nces.ed.gov/forum/pub_2006803.asp

This guide provides recommendations for collecting accurate, comparable, and useful data about virtual education in an elementary/secondary education setting.



Forum Unified Education Technology Suite

http://nces.ed.gov/forum/pub_tech_suite.asp

The Forum Unified Education Technology Suite presents a practical, comprehensive, and tested approach to assessing, acquiring, instituting, managing, securing, and using technology in education settings. It will also help individuals who lack extensive experience with technology to develop a better understanding of the terminology, concepts, and fundamental issues influencing technology acquisition and implementation decisions.



Selected State Laws and Policies Governing Accessible Technologies

Arkansas (web policy, procurement law 1999)

<http://www.techarch.state.ar.us/domains/accessibility/resources/main.htm>

Arizona (procurement law 2004, web policy, no rules found)

<http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/41/03531.htm&Title=41&DocType=ARS>

<http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/41/03532.htm&Title=41&DocType=ARS>

California (procurement law 2002)

http://www.calstate.edu/accessibility/EIT_Procurement/APPENDIX.A.GOVCODE11135.doc

http://www.calstate.edu/accessibility/section508/section_508_FAQs.shtml

<http://caselaw.lp.findlaw.com/cacodes/edc/60060-60062.html> (education statute)

Colorado (procurement law, 2000)

http://www.oit.state.co.us/resources/docs/imc_ADAStandardsFACTS-Guidelines-handout_03-06-01.pdf

Connecticut (web policy)

<http://www.cmac.state.ct.us/access/policies/accesspolicy40.html>

Florida (2006 procurement statute)

http://www.flsenate.gov/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0282/part03.htm&StatuteYear=2006&Title=%2D%3E2006%2D%3EChapter%20282%2D%3EPart%20III

Illinois (2007 procurement statute)

<http://www.ilga.gov/legislation/fulltext.asp?DocName=&SessionId=51&GA=95&DocTypeId=SB&DocNum=511&GAID=9&LegID=28307&SpecSess=&Session=>

Indiana (procurement law 2001)

<http://www.in.gov/legislative/bills/2001/HE/HE1926.1.html>

Kansas (web policy)

<http://www.da.ks.gov/kito/itec/Policies/itecitpolicy1210.htm>

Kentucky (procurement law 2000)

<http://www.lrc.ky.gov/KRS/061-00/980.PDF>

<http://www.lrc.ky.gov/KRS/061-00/982.PDF>

<http://www.lrc.ky.gov/KRS/061-00/984.PDF>

<http://www.lrc.ky.gov/KRS/061-00/986.PDF>

<http://www.lrc.ky.gov/KRS/061-00/988.PDF>

Louisiana (procurement law 2001; RS 39.302 and RS 39.301, 2001)

<http://www.legis.state.la.us/lss/lss.asp?doc=96331>

Oklahoma (procurement statute, 2004)

<http://www.accessibility.ok.gov/>

Maine (procurement and web policy)

<http://www.maine.gov/oit/accessibility/>

Maryland (web standards, procurement law 1998)

<http://mlis.state.md.us/PDF-Documents/1998rs/bills/hb/hb0185e.PDF>

Massachusetts (2006 procurement MOU and web policy)

http://www.mass.gov/Eoaf/docs/itd/policies_standards/web-access-std.pdf

http://www.mass.gov/?pageID=afterterminal&L=6&L0=Home&L1=Research+%26+Technology&L2=IT+Policies%2C+Standards+%26+Guidance&L3=Technical+Guidance&L4=Accessibility+Guidance&L5=Web+Accessibility&sid=Eoaf&b=terminalcontent&f=itd_policies_standards_web_accessibility&csid=Eoaf

Michigan (web policy)

http://www.michigan.gov/documents/Look_and_Feel_Standards_2006_v3_166408_7.pdf

Minnesota (procurement statute 1998, web policies)

<http://www.revisor.leg.state.mn.us/stats/16C/145.html>

Missouri (procurement law 1999 & 2001)

<http://www.oa.mo.gov/itsd/cio/standards/ittechnology.htm>

<http://www.oa.mo.gov/itsd/cio/standards/ITGS0003.pdf>

Nebraska (procurement law 2000)

http://www.nitc.state.ne.us/standards/accessibility/accessibility_standards.pdf

<http://www.nitc.state.ne.us/standards/accessibility/tacfinal.html>

<http://www.nitc.state.ne.us/standards/accessibility/accessibilitycheck.pdf>

North Carolina (antidiscrimination law 2001)

<http://www.ncleg.net/Sessions/2001/Bills/Senate/HTML/S866v7.html>

Pennsylvania (web policy, updated 2006)

http://www.portal.state.pa.us/portal/server.pt?open=514&objID=200500&mode=2&contentid=http://pubcontent.state.pa.us/publishedcontent/publish/cop_general_government_operations/oa/oa_portal/omd/p_and_p/itbs/domains/access/itbs/itb_acc001.html

Texas (web guidelines, procurement law 1999)

<http://www.dir.state.tx.us/standards/srrpub11-accessibility.htm>

<http://www.dir.state.tx.us/standards/S206.htm>

Virginia (2001 procurement law) Access Standard Document

<http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+2.2-2012> (Statute 202-2012)

<http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+2.2-3500> (Statute 2.2-3500)

Washington (procurement and web policy)

<http://isb.wa.gov/policies/references.aspx>

Appendix B. Section 508 Leadership Indicators From the U.S. General Services Administration

Assess Your Agency's Section 508 Program Agency Best Practice Indicators



1. 508 Leadership

- 1.1. Has current agency leadership made public statements in the last year communicating commitment to complying with Section 508?
- 1.2. Is there a senior executive in your agency responsible for Section 508 compliance?
- 1.3. Does management meet periodically to discuss improvement of your agency's Section 508 decision processes?

2. Acquisition Process for Compliance

- 2.1. Does your agency have a standard process for considering and documenting compliance with Section 508 in E&IT acquisitions?
- 2.2. Does your agency have a standard process for considering and documenting compliance with Section 508 for in-house E&IT development (typically websites and software)?
- 2.3. Is the Buy Accessible Wizard used by your agency for Section 508 acquisitions?

3. Planning

- 3.1. How is E&IT accessibility considered in acquisition planning for your agency?
- 3.2. Is Part I, Section C, item 3 of the Exhibit 300 completed for major E&IT projects in your agency with more than a standard "yes we will comply" statement?

4. Market Research

- 4.1. Does your agency communicate with vendors about general information on Section 508, agency compliance process, accessibility design guidelines and generally accepted test methods?
- 4.2. Does your agency suggest that vendors register with the Buy Accessible Data Center and provide information about the accessibility of their products and services (e.g. VPAT)?
- 4.3. Does your agency have a process in place to re-examine accessibility information on standard acquisitions (e.g., multiple award, indefinite-delivery, indefinite-quantity type contracts, preferred product lists, 508 preferred product lists)?

5. Solicitation

- 5.1. Is Section 508 included in the SOW or statement of objectives?
- 5.2. Do solicitations identify applicable provisions, criteria and requirements of the Access Board Standard?
- 5.3. Do solicitations provide vendors with specific information on how their proposals will be evaluated?
- 5.4. Do solicitations provide vendors with specific information on how their deliverables will be inspected and tested?

6. Accessibility Information

- 6.1. Does your agency require vendors to provide specific accessibility information in a standard format for proposed deliverables?

7. Source Selection

- 7.1. Is accessibility explicitly considered and documented as a factor in your source selection decision?

8. Acceptance

- 8.1. Is accessibility explicitly considered and documented as a factor for inspection and acceptance of E&IT deliverables?
- 8.2. Are generally accepted accessibility test methods used when inspecting E&IT deliverables?

9. Document and Audit

- 9.1. Is there consistent documentation of Section 508 considerations for each E&IT acquisition?
- 9.2. Is there consistent documentation of Section 508 considerations for in-house (not procured) E&IT development activities?
- 9.3. Is there a formal audit check at each Section 508 decision point in the E&IT acquisition process? (e.g., Do contract officers conduct a review of requiring official acquisition documentation?)
- 9.4. Is documentation of agency-wide Section 508 compliance readily available?

10. Awareness and Training

- 10.1. Is Section 508 training readily available to all agency personnel?
- 10.2. Has your agency broadly communicated to agency personnel their responsibilities under Section 508, including Section 508 Coordinators?
- 10.3. Does agency staff know where to get help and advice on Section 508?

Need more tips? Contact us at section.508@gsa.gov (email) or 202-501-4906.

Appendix C. Commonly Asked Questions About Section 508

The following questions are commonly asked about the application, interpretation, and implementation of Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended by the Workforce Investment Act of 1998.

Q1) Why should I care about Section 508 compliance?

A1) Section 508 compliance is required by federal law and many similar state laws. Moreover, presenting information in a manner that can be used by all people, regardless of disability status, is the right thing to do. An organization that improves compliance will accrue many other tangible benefits, including establishing or enforcing proactive data governance within the organization; promoting the use of “cleaner code” and other improvements to site development; developing web pages that are easier to print or otherwise exchange; encouraging consistency in websites that may have grown beyond management control over time, including an opportunity to reestablish a standard “look and feel” to the organization’s website and electronic resources through development standards, common frameworks, and templates (e.g., cascading style sheets); identifying (and removing) redundant information and orphaned web pages following site review; expanding access via additional platforms (e.g., handhelds and multiple browsers); and improving usability for all stakeholders.

Q2) What technologies are covered by Section 508?

A2) Section 508 accessibility standards apply to software applications and operating systems; web-based information or applications; telecommunication products; video and multimedia products; self-contained, closed products (e.g., information kiosks, calculators, and fax machines); and desktop and portable computers. Although all of these technologies are important in the field of education, this document focuses on those more relevant to accessing, using, and reporting education data, including software applications, operating systems, and web-based information or applications.

Q3) Who is helped by Section 508 accessibility standards?

A3) Any person using assistive technologies (e.g., many people with disabilities), as well as people dealing with common age-related impediments, such as loss of vision, hearing, or motor dexterity (e.g., from degenerative conditions commonly associated with the aging process, such as arthritis). People using older computing technologies also benefit.

Q4) Is it really that difficult for disabled people to access information on websites?

A4) Yes, especially if the sites are not compliant with Section 508. To further assess the experience of viewers requiring assistive technologies, attempt any or all of the “challenge” activities in this document and experience a first-hand simulation demonstrating why accessibility standards are necessary.

Q5) What is the difference between Section 508 and Web Content Accessibility Guidelines?

A5) Section 508 of the Workforce Rehabilitation Act of 1973 was amended and signed into law in 1998 as a set of mandated standards that supplanted nonbinding guidelines from 1986. In other words, the guidelines for implementing Section 508 standards have the force of federal law. In contrast, voluntary practical recommendations for implementing Section 508 mandates stem from a group of organizations committed to the development of “best practices” for improving the accessibility of electronic information. The WCAG 1.0 standards are voluntary principles generated by the World Wide Web Consortium (W3C) that, if adopted, improve website accessibility and support and extend Section 508 requirements.

- Q6) What is the difference between WCAG 1.0 and WCAG 2.0?**
A6) WCAG 1.0 was released in 1999 for web developers, including content authors and site designers. Version 2.0 (WCAG 2.0), which was released in 2008, applies to a broader and more advanced world of technology.
- Q7) Does my state have a law that is similar to Section 508?**
A7) According to links provided in appendix A, many states have enacted laws requiring that people with disabilities have equal access to public information.
- Q8) Where can one access the nuts-and-bolts technical standards necessary for complying with Section 508?**
A8) Appendix A includes an extensive list of websites referenced in this document, including several that provide information about technical approaches to improving accessibility.
- Q9) How does an organization know if it is complying with Section 508?**
A9) By conducting a self-audit (e.g., of a random sample of its web pages), an organization can compare the information it shares via its websites relative to WCAG 1.0 or WCAG 2.0 standards. Navigating a website without a mouse, downloading and using screen readers or screen magnifiers, and otherwise attempting to evaluate the accessibility of web content through the lens of commonly used assistive technologies should provide a reasonable measure of Section 508 compliance.
- Q10) Isn't this just another technology project?**
A10) No; it is a technology project on the surface, but it is more accurate to describe Section 508 as a communications project, requiring the attention, support, and resources of senior leaders committed to making compliance an organizational priority. Once such a commitment has been made, and accountability established, information and technology leaders will play key roles in improving the accessibility of an organization's electronic information.

Appendix D. Web Content Accessibility Guidelines 1.0

The WCAG 1.0 recommendations include general principles of accessible web design that support and extend the Section 508 web-based intranet and internet information and applications standards described in Subpart B, §1194.22. WCAG 1.0 also includes checkpoints for each principle that explain how developers can operationalize Section 508 guidelines. These checkpoints have been assigned one of three priority levels, which are dependent upon the anticipated impact that the checkpoint will have on accessibility:

- ✓ **WCAG Priority 1 (Required)**—A web content developer must satisfy this checkpoint or one or more groups will find it *impossible* to access information in the document. Satisfying this checkpoint is a basic requirement for some groups to be able to use web documents.
- ✓ **WCAG Priority 2 (Desired)**—A web content developer should satisfy this checkpoint or one or more groups will find it *difficult* to access information in the document. Satisfying this checkpoint will remove significant barriers to accessing web documents.
- ✓ **WCAG Priority 3 (Ideal)**—A web content developer may address this checkpoint. Otherwise, one or more groups will find it *somewhat difficult* to access information in the document. Satisfying this checkpoint will improve access to web documents.

Websites are sometimes evaluated relative to these WCAG 1.0 checkpoint priority levels, and conformance can be designated as: Conformance Level “A”—all Priority 1 checkpoints are satisfied; Conformance Level “Double-A”—all Priority 1 and 2 checkpoints are satisfied; or Conformance Level “Triple-A”—all Priority 1, 2, and 3 checkpoints are satisfied. For more information about the WCAG 1.0 recommendations, visit <http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/>.

WCAG 1.0 Checklist (by Priority Level)

Priority 1 Checkpoints

In General [Priority 1]

- ✓ 1.1—Provide a text equivalent for every nontext 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.
- ✓ 2.1—Ensure that all information conveyed with color is also available without color (e.g., from context or markup).
- ✓ 4.1—Clearly identify changes in the natural language of a document’s text and any text equivalents (e.g., captions).
- ✓ 6.1—Organize documents so that they may be read without style sheets. For example, when an HTML document is rendered without associated style sheets, it must still be possible to read the document.
- ✓ 6.2—Ensure that equivalents for dynamic content are updated when the dynamic content changes.
- ✓ 7.1—Until user agents allow users to control flickering, avoid causing the screen to flicker.
- ✓ 14.1—Use the clearest and simplest language appropriate for a site’s content.

And if you use images or image maps [Priority 1]

- ✓ 1.2—Provide redundant text links for each active region of a server-side image map.
- ✓ 9.1—Provide client-side image maps instead of server-side image maps, except where the regions cannot be defined with an available geometric shape.

And if you use tables [Priority 1]

- ✓ 5.1—For data tables, identify row and column headers.
- ✓ 5.2—For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.

And if you use frames [Priority 1]

- ✓ 12.1—Title each frame to facilitate frame identification and navigation.

And if you use applets and scripts [Priority 1]

- ✓ 6.3—Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page.

And if you use multimedia [Priority 1]

- ✓ 1.3—Until user agents can automatically read aloud the text equivalent of a visual track, provide an auditory description of the important information of the visual track of a multimedia presentation.
- ✓ 1.4—For any time-based multimedia presentation (e.g., a movie or animation), synchronize equivalent alternatives (e.g., captions or auditory descriptions of the visual track) with the presentation.

And if all else fails [Priority 1]

- ✓ 11.4—If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information (or functionality), and is updated as often as the inaccessible (original) page.

Priority 2 Checkpoints

- ✓ 2.2—Ensure that foreground and background color combinations provide sufficient contrast when viewed by someone having color deficits or when viewed on a black-and-white screen. [Priority 2 for images, Priority 3 for text.]
- ✓ 3.1—When an appropriate markup language exists, use markup rather than images to convey information.
- ✓ 3.2—Create documents that validate to published formal grammars.
- ✓ 3.3—Use style sheets to control layout and presentation.
- ✓ 3.4—Use relative rather than absolute units in markup language attribute values and style sheet property values.
- ✓ 3.5—Use header elements to convey document structure and use them according to specifications.
- ✓ 3.6—Mark up lists and list items properly.
- ✓ 3.7—Mark up quotations. Do not use quotation mark up for formatting effects, such as indentation.

- ✓ 6.5—Ensure that dynamic content is accessible or provide an alternative presentation or page.
- ✓ 7.2—Until user agents allow users to control blinking, avoid causing content to blink (i.e., change presentation at a regular rate, such as turning on and off).
- ✓ 7.4—Until user agents provide the ability to stop the refresh, do not create periodically auto-refreshing pages.
- ✓ 7.5—Until user agents provide the ability to stop auto-redirect, do not use mark up to redirect pages automatically. Instead, configure the server to perform redirects.
- ✓ 10.1—Until user agents allow users to turn off spawned windows, do not cause pop-ups or other windows to appear and do not change the current window without informing the user.
- ✓ 11.1—Use W3C technologies when they are available and appropriate for a task and use the latest versions when supported.
- ✓ 11.2—Avoid deprecated features of W3C technologies.
- ✓ 12.3—Divide large blocks of information into more manageable groups where natural and appropriate.
- ✓ 13.1—Clearly identify the target of each link.
- ✓ 13.2—Provide metadata to add semantic information to pages and sites.
- ✓ 13.3—Provide information about the general layout of a site (e.g., a site map or table of contents).
- ✓ 13.4—Use navigation mechanisms in a consistent manner.

And if you use tables [Priority 2]

- ✓ 5.3—Do not use tables for layout unless the table makes sense when linearized. Otherwise, if the table does not make sense, provide an alternative equivalent (which may be a linearized version).
- ✓ 5.4—If a table is used for layout, do not use any structural mark up for the purpose of visual formatting.

And if you use frames [Priority 2]

- ✓ 12.2—Describe the purpose of frames and how frames relate to each other if it is not obvious by frame titles alone.

And if you use forms [Priority 2]

- ✓ 10.2—Until user agents support explicit associations between labels and form controls, for all form controls with implicitly associated labels, ensure that the label is properly positioned.
- ✓ 12.4—Associate labels explicitly with their controls.

And if you use applets and scripts [Priority 2]

- ✓ 6.4—For scripts and applets, ensure that event handlers are input device-independent mechanisms.
- ✓ 7.3—Until user agents allow users to freeze moving content, avoid movement in pages.
- ✓ 8.1—Make programmatic elements, such as scripts and applets, directly accessible or compatible with assistive technologies [Priority 1 if functionality is important and not presented elsewhere; otherwise, Priority 2.]
- ✓ 9.2—Ensure that any element that has its own interface can be operated in a device-independent manner.
- ✓ 9.3—For scripts, specify logical event handlers rather than device-dependent event handlers.

Priority 3 Checkpoints

- ✓ 4.2—Specify the expansion of each abbreviation or acronym in a document where it first occurs.
- ✓ 4.3—Identify the primary natural language of a document.
- ✓ 9.4—Create a logical tab order through links, form controls, and objects.
- ✓ 9.5—Provide keyboard shortcuts to important links (including those in client-side image maps), form controls, and groups of form controls.
- ✓ 10.5—Until user agents (including assistive technologies) render adjacent links distinctly, include nonlink, printable characters (surrounded by spaces) between adjacent links.
- ✓ 11.3—Provide information so that users may receive documents according to their preferences (e.g., language, content type, etc.).
- ✓ 13.5—Provide navigation bars to highlight and give access to the navigation mechanism.
- ✓ 13.6—Group related links, identify the group (for user agents), and, until user agents do so, provide a way to bypass the group.
- ✓ 13.7—If search functions are provided, enable different types of searches for different skill levels and preferences.
- ✓ 13.8—Place distinguishing information at the beginning of headings, paragraphs, lists, etc.
- ✓ 13.9—Provide information about document collections (i.e., documents consisting of multiple pages).
- ✓ 13.10—Provide a means to skip over multiline ASCII art.
- ✓ 14.2—Supplement text with graphic or auditory presentations where they will facilitate comprehension of the page.
- ✓ 14.3—Create a style of presentation that is consistent across pages.

And if you use images and image maps [Priority 3]

- ✓ 1.5—Until user agents render text equivalents for client-side image map links, provide redundant text links for each active region of a client-side image map.

And if you use tables [Priority 3]

- ✓ 5.5—Provide summaries for tables.
- ✓ 5.6—Provide abbreviations for header labels.
- ✓ 10.3—Until user agents (including assistive technologies) render side-by-side text correctly, provide a linear text alternative (on the current page or elsewhere) for all tables that lay out text in parallel, word-wrapped columns.

And if you use forms [Priority 3]

- ✓ 10.4—Until user agents handle empty controls correctly, include default, place-holding characters in edit boxes and text areas.