

MICHIGAN STATE  
UNIVERSITY

# Web Accessibility

---

*breaking down barriers*

[www.msu.edu/~rcpd/webaccess](http://www.msu.edu/~rcpd/webaccess)

# Web Accessibility Explained

## What is accessibility?

Accessibility, in the context of the World Wide Web, means maximizing the ability of all users to access information, services, and resources. A successful website adapts to the needs and preferences of its audiences, customizing content to fit the user's expressed desires within the constraints of available hardware, software, and bandwidth.

Today, the Web is not only making previously difficult activities *easier* for many people, (reading the news; shopping; taking classes); it is also rapidly becoming *essential* for many tasks in the workplace and the home. Making the web accessible to everyone, including persons with disabilities, has reached a new level of importance.

## Accessibility is reachable

Designing pages that everyone can use requires two things:

1. *Awareness* of a variety of user skills/preferences, and
2. *Knowledge* of current browser technologies.

A combination of thoughtful design and simple HTML techniques can make pages more readable by a diverse population. Increasing accessibility doesn't mean making text-only pages or compromising design – it means making content available in flexible ways. Every step made toward a more usable design, from providing captions for images to ensuring that pages meet comprehensive standards, counts toward the ultimate goal of accessibility.

## Accessibility benefits everyone

People often talk of accessibility as if it meant only “designing for users with disabilities”. In truth, accessibility is relevant for everyone. Just as everyone's experience is enhanced by *multimedia* content, since it's easier to digest and remember, everyone can benefit from *multimodal*<sup>1</sup> interfaces, since they're easier to use. And for persons using an alternative browser (such as a mobile phone or voice interface) or facing situational constraints (see Table 1), accessible design can become essential at any time.

Functional Limitation	Situational Constraint	Possible Accommodation
Blindness; low vision	Poor lighting; small display	Large, resizable text
Cognitive impairment	Distractions present	Simplified navigation
Hard of hearing	Noisy environment	Captioning; text equivalents
Mobility limitation	No mouse available	Keyboard compatibility

**Table 1:** Equivalence of some functional limitations and situational constraints.

<sup>1</sup> Just as *multimedia* content presents itself in several ways (text; audio; video) simultaneously, a *multimodal* interface allows interaction in several different ways (keyboard; voice; mouse).



**"The power of the Web is in its universality. Access by everyone, regardless of disability, is an essential aspect."**

- Tim Berners-Lee, W3C Director and inventor of the World Wide Web

## 48 percent

of persons with disabilities say the Internet has improved their lives, compared to 27 percent of other populations.

(iCan Online)

# Universal Design

## Everyone has different skills

Every user comes to the web with a unique set of skills and preferences. While many users may turn off graphics to speed up their slower-bandwidth connections, foreign-language speakers may rely heavily on graphics and icons to understand page content. Advanced users may want access to a multitude of options that can enhance their experience, but would confuse a beginner. Some users may be colorblind; others may simply be using a black-and-white screen. One simply cannot predict what hardware, software, and skill sets a user will bring to the web.

## Giving power and choice to users

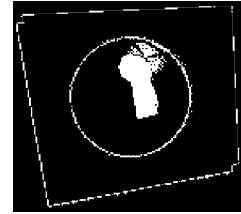
The solution to this problem is to *give the power of choice to users*. Browsers attempt to give the user control over window size, image loading, and scripting, but sometimes designers remove these choices to deliver a prescribed experience. Beyond this, a user's web browser may, according to his or her needs, transform pages into an audio stream, a different language, or high-contrast colors. It's important to understand the methods by which alternative browsers deliver content to users – and techniques to enhance those methods.

Always make content available in flexible ways; avoid overly prescribing the “look and feel” of a site to the user. Instead, rely on marking up *content* and trusting the browser to do its job. It's not necessary to have a database-driven site to do this; properly marked-up HTML is meant to render in different ways, as with a heading element that both looks bigger on a screen and sounds louder on an audio browser.

## Practicing universal design

- **Design for different browsers.** Download a text-only browser (Lynx) or a free screen reader (IBM's Home Page Reader), as well as older versions of IE and Netscape. Test with images, scripting, and style sheets turned off, and using only a keyboard. Be aware that Flash, Acrobat, and other plug-ins are often less accessible than HTML. If in doubt, ask someone else to test pages, since designers rarely foresee all possible problems.
- **Follow standards.** Web standards were developed to help designers deal with the increasing variety of user technologies. Writing valid HTML is the designer's job; rendering content appropriately is the browser's. Nevertheless, designers should be aware of quirks in browsers that prevent correct display and work to ensure that pages remain usable.
- **Be aware.** Ask: what does this page sound like in a linear order? What does it look like without color? Can I use it without a mouse? Do uncaptioned<sup>2</sup> audio or video streams prevent access to information? Solutions can be creative, once potential problems are identified.

<sup>2</sup> If captioning isn't possible, a descriptive paragraph or transcription may suffice.



**Every web user has a unique set of skills and preferences.**

Functional ability is just one factor among many.

(Illustration: NCAM Universal Design logo)

## More than 50 million

persons in the U.S. have a functional limitation due to aging, illness or injury.

(1998 Harris Survey)



**Requiring a specific browser or plug-in** makes pages inaccessible to those who don't have the latest technology.

# Disabilities Affecting Web Access

Four main types of disabilities affect web access: Visual, Mobility, Cognitive, and Auditory.

**1. Visually impaired users** may use text-magnification software or hardware, either browser-based or third-party. Make font sizes relative, use CSS, and avoid small text, poor color contrast, or relying solely on color to convey information (e.g., “Items in red are 25% off”). This will help remove barriers for color-blind and low-vision users. Blind users will use a “screen reader,” a software program acting as a visual interpreter for what’s happening on-screen, to access web pages. Multi-column text, links that make no sense by themselves<sup>4</sup> (e.g., “click here”), and graphics with no ALT text are obstacles to screen readers. Since most web designers have no idea how a page can be experienced non-visually, one should test pages with an actual screen reader if possible. A good approximation, however, is to use a text-only browser or a graphical browser with picture loading disabled.

**2. Persons with mobility limitations** often use specialized hardware for input. This can range from a single-switch device, to voice recognition, to a special keyboard. Mouse access is often not an option; if it is, then clicking or hovering on small areas may be difficult. Designing pages for compatibility with keyboard use removes most barriers for persons with mobility limitations. Avoiding “auto-refresh” pages and deep navigation (requiring many clicks) can further improve access.

**3. Cognitively impaired users**, or those with learning disabilities, have fewer technologically-based needs, although some use a screen reader. Most benefit extensively from well-designed and well-organized pages. Illustrating text with graphics, and graphics with text, or providing multimedia content, is very helpful for these users (and for anyone in a distracting environment). Write as clearly and simply as possible, and break information into manageable chunks to aid comprehension and navigation over the entire site.

**4. Deaf and hard of hearing users** typically experience fewer problems on the web than visually impaired users, but multimedia can still pose barriers. Just as a graphics only chart represents lost information to a blind user, an un-captioned lecture represents lost information for a deaf user. Make sure that any audio streams are captioned or that a text equivalent is provided.

## Benefits of accessibility techniques

Search engines rely on text, headings, and metadata to understand pages. Providing alternatives to graphical or script-generated text (which may not be indexed) can move pages higher in rankings. Also, many services today

---

<sup>3</sup> About 24% of employed persons with disabilities use the Internet. Source: Kaye, H.S. (2000). Computer and Internet Use Among People with Disabilities. *Disability Statistics Report (13)*.

<sup>4</sup> Many people browse pages by tabbing through available links. “[Click here](#)” or “[More...](#)” makes no sense apart from surrounding text, and thus hinders this mode of browsing.

## Colorblindness Scenario:

**MX10A ..... 25.00**  
**MX35A ..... 18.00**  
**MX64A ..... 12.00**

“Items in red are 25% off!”

Without color, it’s impossible to tell which items are on sale. A better approach would be to denote sale items with an asterisk, or allow users to sort the two groups.



**Above:** James Renuk uses an adaptive interface with his computer.

**Popular screen readers** in use today include JAWS, Window-Eyes, and IBM Home Page Reader.

(such as Google or BabelFish) provide free, automatic language translation, making pages with text equivalents accessible to foreign-language speakers.

## Example: Designing Effective ALT Text

Today's screen-reader technology cannot interpret the content of images unless the page's author has provided alternate, or "ALT", text. In that case, screen readers substitute the ALT text for the content of the image. Taking a short time to design appropriate ALT text increases accessibility tremendously for visually or cognitively impaired users using screen readers. ALT text should be written as a sentence or phrase with punctuation at the end; the length and detail level of the description depends upon the intended audience and purpose of the image. The following table serves as a guide:

If an image is a...	Its ALT text should...
Chart or illustration	Summarize and explain
Photograph or work of art	Describe the image's content
Graphic or button with text	Be the same as the image's text
Functional icon with no text	Describe the action to be taken
Background or other decoration	Contain an empty space (" ")

**Table 2:** Guidelines for choosing ALT text, based on image type

## Providing longer descriptions

ALT text is meant to be short and to the point. When a longer description or explanation of an image would be helpful (as for a chart or graph), linking to a separate page containing a longer description is a good idea. In HTML 4.0, the LONGDESC attribute can contain the URL of such a page. However, since older browsers don't support LONGDESC, one should additionally provide a link within the original page's body text. Either:

- Add a single letter "D" following the image, and link the "D" to the page containing the longer description, or
- Write an appropriate caption for the image and link it to the complementary page.

## Other considerations

ALT text is often needed because the designer wished to place text on graphical buttons or use a specialized font that most users don't have. However, text downloads faster than graphics, and text can be resized by persons with low vision while graphics cannot. Color combinations, which are fixed in graphics, can make text unreadable in black-and-white, low-color, or poor-contrast conditions. Finally, search engines and translation services rely on text, not graphics, to understand page content. Therefore, using text rather than graphics, where possible, is an excellent idea. Alternatives to using text in graphics, such as Scalable Vector Graphics (SVG), are in development and may provide better options in the future.

## Exercise: Writing Effective alt="" Text

Imagine reading a web page aloud over the phone to a friend. As you encounter each image, what would you say?



## Captioning

Text should be provided for video and audio, too. The text can be a separate description, or (better yet) a tool like MAGpie ([ncam.wgbh.org/webaccess/magpie/](http://ncam.wgbh.org/webaccess/magpie/)) can be used to caption the original multimedia file.

# Standards in Web Accessibility

## Official guidelines from the W3C

The World Wide Web Consortium (**W3C**) is the public body responsible for official web standards such as HTML and CSS. In May 1999, the W3C issued a set of recommendations called the Web Content Accessibility Guidelines (**WCAG**) intended to address the issue of accessibility across all browsers, platforms, and user experiences.

The WCAG consists of fourteen comprehensive guidelines to follow in producing accessible web content. Each guideline covers one or more “checkpoints”, which are more specific applications of each guideline. The full version of the Guidelines, a detailed interpretation, and techniques for applying each checkpoint, are available at

<http://www.w3.org/TR/WAI-WEBCONTENT/>.

## WCAG: Fourteen guidelines for accessibility

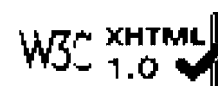
1. Provide equivalent alternatives to auditory & visual content.
2. Don't rely on color alone.
3. Use markup and style sheets and do so properly.
4. Clarify natural language usage.
5. Create tables that transform gracefully.
6. Ensure that pages featuring new technologies transform gracefully.
7. Ensure user control of time-sensitive content changes.
8. Ensure direct accessibility of embedded user interfaces.
9. Design for device-independence.
10. Use interim solutions.
11. Use W3C technologies and guidelines.
12. Provide context and orientation information.
13. Provide clear navigation mechanisms.
14. Ensure that documents are clear and simple.

## Federal law – Section 508

Section 508, an amendment to the Rehabilitation Act of 1973, requires federal agencies to make all of their “electronic resources” accessible—including websites. Section 508 guidelines are based primarily on WCAG Priority 1 guidelines. Persons producing web pages directly for federal agencies should be aware of the impact of Section 508. State universities are not immediately affected, though subsequent interpretations of section 508 and other disability rights legislation may change this. For more information, visit <http://www.section508.gov>.



The W3C's logo can indicate a claim of conformance to a certain level of the W3C Guidelines.



**HTML Validation**, a standard step in producing accessible content, is available for free from [validator.w3.org](http://validator.w3.org).



**Bobby**, available at [www.cast.org/bobby](http://www.cast.org/bobby) automatically checks many WCAG v1.0 checkpoints.

**The Wave** is another checking tool, available at [www.temple.edu/inst\\_disabilities/piat/wave/](http://www.temple.edu/inst_disabilities/piat/wave/).

**All** accessibility tools in use at this time require manual checking as well.

## Recommended Resources

Each of the following high-quality sites is an excellent starting point for learning more about web accessibility. Each also provides numerous secondary resources as links and opportunities to become part of the accessibility community through discussion groups.

### Online version of this document

For a more extensive list of web resources, and further discussion of topics in this brochure, please visit [www.msu.edu/~rcpd/webaccess/](http://www.msu.edu/~rcpd/webaccess/).

### Training and "how-to"

In addition to technical information, there are links to evaluation tools, seminars, legal issues, and news at all of these sites:

#### [www.webaim.org](http://www.webaim.org)

Includes a Section 508 checklist and news on technologies like Flash and PDF. Also features a discussion list, suggested University guidelines, a screen reader simulation, and a comprehensive database called SearchAbility.

#### [aware.hwq.org](http://aware.hwq.org)

Sponsored by the HTML Writer's Guild, this site offers a six-week online course through Blackboard.com. Good resources on CSS and JAVA issues.

#### [www.webable.com](http://www.webable.com)

Mike Paciello, co-founder of the W3C's Accessibility Initiative (WAI), maintains an exhaustive set of resources and news here. WebAble also offers consultations and workshops.

### World Wide Web Consortium (W3C)

#### [www.w3c.org/WAI/Resources/](http://www.w3c.org/WAI/Resources/)

This is the most official set of resources available. Beginners should start with the "Frequently Asked Questions" or "WAI Online Overview" as an introduction, while those with more background might start with the official Guidelines.

The "Techniques" document and "Curriculum" slide-show provide excellent examples for every Guideline, while "Evaluation Repair Tools" and "Alternative Web Browsing" highlight different users' needs. Experts have already discussed many issues in the mailing list archives

([lists.w3.org/Archives/Public/w3c-wai-ig/](http://lists.w3.org/Archives/Public/w3c-wai-ig/)) – ask questions there.

### Example of independent guidelines

Many organizations are starting to use WCAG as a foundation:

- Wright State U: [www.wright.edu/web/access/guidelines.html](http://www.wright.edu/web/access/guidelines.html)
- U of Wisconsin: [www.wisc.edu/wiscinfo/policy/wwwap.html](http://www.wisc.edu/wiscinfo/policy/wwwap.html)
- WebAIM (prototype and discussion): [www.webaim.org/standards/](http://www.webaim.org/standards/)



# MICHIGAN STATE UNIVERSITY



**Resource Center for  
Persons with Disabilities**

Libraries, Computing & Technology  
**LCTTP**  
Training Program

This information was written and/or compiled by David Holstius ([holstius@msu.edu](mailto:holstius@msu.edu)) of the Resource Center for Persons with Disabilities (RCPD) at Michigan State University (MSU), in partnership with the Libraries, Computing, and Technology Training Program (LCTTP). Please contact the author for questions about using this material for educational purposes. The latest version of this document is available at [www.msu.edu/~rcpd/webaccess/](http://www.msu.edu/~rcpd/webaccess/). Use of trademarked terms in this document is not an attempt to infringe on the rights of the respective trademark holder(s).

MSU is an affirmative-action, equal-opportunity institution.

Version 4.0, September 2001 – Many thanks to the following organizations and individuals for making this project possible: MSU's Accommodating Technology Committee; MSU's President's Advisory Committee on Disability Issues; Patricia Lowry; Paulette Granberry-Russell; Robert Banks; Lee June; MSU's Libraries, Computing, and Technology group; Jo Silsby; Mary Longcore; Michael Hudson; Stephen Blosser; G. Thomas Bigwood; and the rest of the hardworking staff at MSU's Resource Center for Persons with Disabilities.