



Implementation of an Accessible Web Site

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May 2005

Report Outline

The following report examines whether Web-site design should take into account the needs of individuals with disabilities. It begins by defining disability and examining the number of people in the United States who have a disability. It then explores how these individuals “surf” the Web—how they go on line and access Web sites. It explores the difficulty these individuals have and introduces a set of industry-standard guidelines that Web designers can use to make sites more accessible. The report then goes on to discuss the challenges Web designers face with accessible design and the benefits a business will gain if its site is accessible. The report then recommends that a business should implement an accessibility-based design for its Web site.

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Executive Summary

This report is for decision makers and stake holders, such as officers, middle-management, and product managers, who are involved in the design and maintenance of a business's Web site.

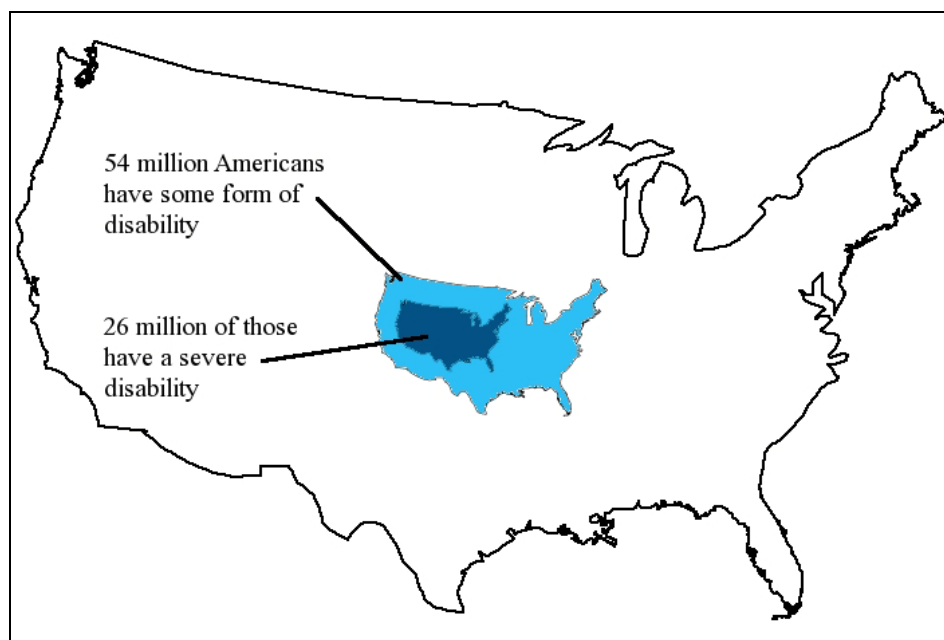
The report examines whether you should integrate accessibility design into your business's Web site. It begins with a brief survey of disabilities in the United States, tools these individuals use to access the Web, and the barriers typical site design creates. The report then introduces a set of industry-standard guidelines to ensure that your business's message overcomes these barriers to reach these individuals. Finally, the report discusses the challenges your design team might face and the benefits your business will gain when implementing accessibility design.

The report concludes that you should integrate accessibility design into your Web site and recommends that you implement the accessibility standards defined in the Web Content Accessibility Guidelines.

Disabilities and the Web

According to a 1997 Census Brief by the U.S. Department of the Census, twenty per cent of Americans—that's around 54 million people—have some form of disability; 26 million of those individuals have a severe disability.

Figure 1. *Americans with Disabilities*



According to “Marketing to Customers with Disabilities,” a 1997 article published by the U.S. Department of Labor, these Americans control \$175 billion in discretionary income. Current Web-design practices, such as those more than likely used by your competitors, ignore the needs of this largely untapped market.

Definition of Disability

Americans With Disabilities, a 1997 Current Population Reports publication from the U.S. Department of Commerce describes a person as having a disability if he or she is 15 years of age or older and meets one of the following criteria:

- has difficulty performing one or more daily activities, such as walking, eating, bathing, leaving the house, or doing housework
- has one or more specified conditions, such as a learning disability or mental retardation
- is between the ages of 16 and 67 and has difficulty working

The report describes a person as having a severe disability if he or she *cannot* perform one or more of these activities or requires personal assistance.

The report found that the likelihood of having a disability increases with age, an important fact to remember as the baby-boomer generation moves into retirement.

Assistive Technologies

The W3C is a consortium of businesses and organizations that develop Web standards, such as HTML, HTTP, and XML.

Individuals with disabilities use a range of assistive technologies to operate a computer and access the Web. The following table describes a few such technologies along with the disability the technology assists. The information is derived from *How People with Disabilities Use the Web*, a document published by the World Wide Web Consortium (W3C).

Figure 2. Brief Look at Assistive Technologies

Technology	Target disability	How it works
screen readers	vision	Software application that outputs Web content via a voice synthesizer. It reads text from a Web page's HTML code, ignoring the format and layout that is rendered in the browser.
refreshable Braille	vision	Peripheral device that outputs a single line of text to a series of pins in order to dynamically render Web Content into Braille. It also reads text from a Web page's HTML code.
captioning	hearing	Software application that outputs a text-based translation for audio and video content. Many media players, such as QuickTime and Windows Media Player, have options to caption video.
head-mouse, head-pointer, mouth stick	physical	Input device that substitutes a mouse and/or keyboard. The device is either attached to the user's head or the user holds the device in his or her mouth.

While these technologies represent great strides, their efficiency depends entirely on a Web site's design. Unfortunately, typical design practices can render assistive technologies useless. For example, navigation and content presented only in an image, a common practice, is invisible to both a screen reader and refreshable Braille. This makes it impossible for a person who uses one of these technologies to access information.

Barriers to Web Content

In their article “Web Accessibility,” the Alliance for Technology Access (a network of individuals, agencies, companies, and community-based resource centers) describes five areas in which individuals with disabilities encounter barriers to Web content:

- **Vision**
Low color contrast, fixed font sizes, tables for page layout, and images for navigation present barriers to people with color blindness, poor vision, blindness, and other vision disabilities.
- **Hearing**
Audio and video clips present barriers to people who are hard of hearing, deaf, or have some other hearing disability.
- **Learning and Cognitive**
Inconsistent layout, intricate navigation, animated images, timed pages, and complex language present barriers to individuals with learning and/or cognitive disabilities.
- **Physical**
Reliance on a mouse for navigation and timed pages present barriers to individuals who have limited mobility.
- **Economic**
Integrating “bleeding-edge” technologies or expecting visitors to have high-speed Internet connections presents barriers to individuals who do not have the latest hardware or software.

Fortunately, there are techniques you can build into your Web site to maximize the effectiveness of assistive technologies. This, in turn, will make it easier for you to reach individuals who depend upon these technologies. The design techniques are set out in a standard published by the W3C called the Web Content Accessibility Guidelines.

Web Content Accessibility Guidelines

The WAI is currently working on WCAG 2.0. These updated guidelines are not yet a W3C recommendation.

The Web Content Accessibility Guidelines 1.0 (WCAG 1.0) is a set of standards maintained by the Web Accessibility Initiative (WAI), a working group under the W3C. WCAG 1.0 emphasizes graceful transformation (a Web site’s ability to remain usable regardless of the technologies used to access it), understandable content, and clear navigation in order to overcome barriers to Web content.

WCAG 1.0 includes fourteen guidelines:

- (1) Provide equivalent alternatives to auditory and 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

Each guideline has one or more design requirements called checkpoints. The impact a checkpoint has on accessibility is measured by its priority level, as described below:

- Priority 1
Checkpoint must be satisfied otherwise one or more groups will find your Web site impossible to access. This is the minimal amount of work you can do and still claim accessibility.
- Priority 2
Checkpoint should be satisfied otherwise one or more groups will find your Web site difficult to access.
- Priority 3
Checkpoint may be addressed otherwise one or more groups will find your Web site somewhat difficult to access.

In order to claim that your site is accessible, you must meet at minimum all Priority 1 checkpoints. This can be done in a number of ways.

Implementing an Accessible Web Site

The W3C publishes several useful documents to help you design for and meet WCAG 1.0. *Implementation Plan for Web Accessibility*, for example, describes a detailed process for implementing an accessible site. It can be summarized in the following three steps:

1. Plan
2. Design
3. Evaluate

Plan

Your Web team should consider the accessibility barriers discussed earlier in this report. This can be done as a part of the usual site-planning activities. *Evaluating Web Sites for Accessibility* provides step-by-step instructions for conducting such a preliminary review.

Your team may want some training in accessible design. The *Curriculum for Web Content Accessibility Guidelines 1.0*, provided free by the WAI, is a good place to start.

Your team will want to select its tools based on its preliminary review. Many common Web tools, such as Macromedia's Dreamweaver and Microsoft's FrontPage, include the necessary functionality. There are also additional third-party services, such as Bobby (<http://bobby.watchfire.com/bobby/html/en/index.jsp>), to help out.

Design




The WCAG provides tips on meeting each of its checkpoints. The WAI publishes a handy *Quick Tips Reference Card* that provides further suggestions and the W3C has published a set of helpful stylesheet techniques called *CSS Techniques for Web Content Accessibility Guidelines 1.0*. Jeffrey Feldman's book *Designing with Web Standards* is an excellent resource for designing Web sites using valid HTML, a major first step to making your site accessible.

Evaluate

Your Web team must evaluate your site for its conformance to WCAG 1.0. The functionality of common Web tools and services can make this a fairly inexpensive task. Ideally, your team will also perform end-user testing to ensure that your site's design is indeed accessible. This can be as simple as installing one of the many free screen-reader applications, turning off your monitor, and attempting to surf your site.

After evaluation is complete, your Web team must determine your site's level of conformance. This is based on the priority checkpoints that you met, according to the following:

Figure 3. Conformance Levels

Conformance Level	Description
 Conformance Level "A"	Your Web content conforms to all Priority 1 checkpoints.
 Conformance Level "Double-A"	Your Web content conforms to all Priority 1 <i>and</i> Priority 2 checkpoints.
 Conformance Level "Triple-A"	Your Web content conforms to all Priority 1 <i>and</i> Priority 2 <i>and</i> Priority 3 checkpoints.

Your conformance level is a mark of pride and you have every right to advertise your efforts. In fact, you can place the appropriate logo from *Figure 3* on each of your Web pages to announce its conformance level.

Note that evaluation should be an ongoing process that is conducted along with your site's regularly-scheduled maintenance.

Challenges

In *Web Accessibility and Design: A Failure of the Imagination*, Bob Regan from Macromedia, USA, highlights three challenges Web designers face when implementing an accessible site:

- lack of concrete answers
- shift in thinking
- lack of examples

Lack of Concrete Answers

While WCAG 1.0 is clear in expressing what makes a Web site accessible, it is much less clear in defining specific techniques to ensure accessibility. In some cases, the guidelines seem to contradict each other, a fact due to the conflicting needs of some disabilities. For example, what makes a Web site accessible for a person with a vision disability may make the site less accessible for a person who cannot hear.

Shift in Thinking

According to Regan, Web designers are visually oriented. This mode of thinking puts a premium on the look of a Web site, with little need for concern about what's going on with the page's underlying code. Accessibility design requires designers to become aware of the code that creates a Web page and treat that code with as much concern as what appears in the browser.

Lack of Examples

Like any artist, Web designers thrive on the work of others. At the moment, there are very few examples of Web sites that are both visually appealing and accessible. Regan demonstrates this with a quick survey of Webby Award winners. Your design team will be breaking new ground and perhaps even setting new trends with their designs, which is both exhilarating and daunting.

Benefits to You

Despite these challenges, designing for accessibility is no more costly or time-consuming than designing without accessibility. However, you stand to gain much by including accessibility. The following section describes a few benefits. *Auxiliary Benefits of Accessible Web Design*, published by the W3C, provides additional benefits.

Increased Market Penetration

The 54 million Americans who have a disability are in all socio-economic levels (Paciello, 2004). These individuals have money they want to spend, but they can't do that at an inaccessible site. You can win these customers simply by making your site accessible.

WCAG 1.0 conformance may also put you into compliance with Section 508, a law that requires Federal agencies to purchase only products that are accessible (<http://www.section508.gov/index.cfm>). Meeting Section 508 standards opens Federal markets that are closed to competitors who do not meet those requirements.

Improved Search-Engine Ranking

WCAG 1.0 requires that a site use understandable content, provide equivalent alternatives to auditory and visual content, and provide context and orientation information. Each of these requirements increases the occurrence of key concepts and keywords on a page. This,

in turn, can increase your search-engine ranking—putting your site before your competitors’ in a list of search results—which will steer customers away from your competitors and to you.

Reduced Site-Maintenance Costs

In typical Web design, any change in existing technology or arrival of new technology requires a review of your site’s functionality. WCAG 1.0 requirement to code to Web standards reduces this need.

Typical Web design also requires a page-by-page update process every time you want to rebrand or change your content. WCAG 1.0 requirements to use a stylesheet means that you only need to make a change to format or layout once—in the stylesheet—for that change to automatically update to every page in your site.

Improved Customer Experience

Many of the accessibility guidelines improve the experience of every visitor to your Web site, not just those with a disability. Equivalent alternatives to auditory and visual content provide additional ways for visitors to access and understand your message. Using W3C standards ensures a site will function properly regardless of a visitor’s browser. Context and orientation information provides clearer navigation through your site’s structure. Clear and simple documents ensure that anyone can understand and appreciate your message, including those individuals who are not be native speakers.

Conclusion and Recommendation

There are at least 54 million Americans with some form of disability who have \$157 billion dollars to spend. If an individual with a disability can’t access your Web content, they’ll take that money to your competitors.

Accessibility design enables you to reach these individuals.

While designing for accessibility may present a number of challenges, you stand to gain important benefits that will give you an edge over your competitors, including increase market penetration, improved search-engine ranking, reduced site-maintenance costs, and improved customer experience.

This report recommends that you immediately implement an accessible Web site following WCAG 1.0. It's good for your customers. It's good for society. It's good for you.

Resources

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