Lesson 6: Web Site Usability and Accessibility

Objectives
By the end of this lesson, you will be able to:

- 1.1.4: Determine the audience for the site.
- 1.1.15: Conduct audience usability tests.
- 2.2.6: Identify and apply user-accessibility standards and laws (e.g., W3C WAI/WCAG, ADA, Section 508, international standards).
- 2.2.7: Identify common user-accessibility challenges and solutions.
- 3.5.2: Perform site testing (functionality, usability, browser compatibility).
Pre-Assessment Questions

1. What is the most valuable information a Web designer can have to maximize a site's usability and increase its chances for success?

2. Why is it important to conduct usability tests on a Web site?
   a. So the customer can approve the color scheme and images
   b. So the design team can try using the live site online
   c. So the developer can continue planning the rest of the design
   d. So the developer can obtain an objective evaluation of the site

3. At what point in the production of a Web site should usability testing be conducted?
   a. As close as possible to the finished product
   b. As close as possible to the beginning of the project
   c. As soon as some pages are developed and available for testing
   d. As soon as the development team is assembled and available to test pages
Audience Usability and Accessibility

Among the most valuable information a Web developer can have is knowledge of his or her audience. Along with strong navigation, knowing your audience is crucial to the success of a site. For example, if you are creating a site for an older audience yet you choose to implement cutting-edge multimedia technology, you do not know your audience.

Knowing the audience requires you to learn demographics about its members: age, education, income and location. In addition, you need to determine the technology these users can support with their current computer systems, including connection speed, browser versions and available plug-ins. When you know these factors, you can tailor your content to maximize user support.

However, it is impossible to completely know your audience on the Web because the Web makes your site available to anyone with a browser. This fact makes accessibility important. To make your Web site usable to your entire audience, you need to consider all users, including users with various system capabilities and users with disabilities. A Web site with small text that cannot be adjusted may be usable for people with good vision, but that same site is not user-friendly for people with visual disabilities.

Defining Usability

In the ISO 9241 document, the International Organization for Standardization (ISO) defines usability as “the effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environments” ([www.w3.org/2002/09/usabilityws.html](http://www.w3.org/2002/09/usabilityws.html)). In other words, usability is the measure of how easy a given item is to use.

Although usability may seem basic and straightforward, it is actually a complex subject because there is no single type of user, and because Web sites can be used with so many different combinations of operating systems, browsers and system settings.

Elements of usability

The usability of a site can be divided into several distinct elements that are essential to high-quality design. These elements are in no particular order; each has equal importance because it is the combination of these elements that determines usability. Removing even one element will diminish usability.

- **High-quality content** — The quality of the content offered by a site is ultimately the value that the site provides.
- **Easy navigation** — Users must be able to navigate the site intuitively with little effort on their part. Otherwise, they will become frustrated and likely go elsewhere.
- **Coherent information architecture** — High-quality content is of little use if it is not organized in a way that the average user can effectively navigate. Therefore, a site’s information must be organized in a logical structure in the most simple, straightforward way possible.
- **Search capability** — All users are familiar with conducting searches, so providing a search engine capability will enhance content identification and retrieval.
- **Relevant services** — Consider what your audience needs. If users need your site to purchase your company’s products, to network and build communities, or to...
download the latest applications, make sure you provide the capability to do these things.

These usability elements can be addressed, implemented and improved even as Web and browser technology are in fluctuation.

**Software technology**

Imagine if the location of the File menu changed every time you started up a new software application, or if the print function always worked differently between programs, or if Microsoft released a new version of Word where the menus were totally rearranged and moved to the bottom. Unheard of, right?

Over the years, software developers have discovered that having standards for the placement and the functionality of common software elements increases the usability of their software.

Today, expectations for Web navigation and user options are beginning to emerge, and users want pages to stay within these expectations. The Web constitutes a single interwoven user experience, rather than a set of separate publications accessed one at a time like traditional books and newspapers. The Web as a whole is the foundation of the user interface, and individual sites are mere particles in the Web universe.

At first, Web design conventions such as left-margin navigation, Home buttons, column layouts and tabs may seem limiting to designers. However, as is the case with any product designed to be used by people, the conventions make it possible for designers to move forward. Having standards and conventions for the placement and functions of certain Web site elements makes users more comfortable with navigating the Web. This frees up designers because they do not need to continually reinvent these conventions; they can focus on and be innovative with other aspects of Web design.

**Web Site Usability Testing**

The only way to achieve maximum site usability is to conduct a usability test. Without sufficient testing, the developer cannot validly determine that his or her site design will be functional for the audience. The developer has an intimate knowledge and understanding of the intentions of the site from his or her production efforts. However, this closeness gives the developer a biased perspective of the site’s actual usefulness. The developer can navigate and find information mainly because of his or her close relationship to the project.

A site’s effectiveness should be tested with users who have had little or no exposure to the site and, if possible, limited experience with the Internet. Conducting a usability test gives the developer an objective view of the site.

**Before the test**

The first step in testing usability is to develop the site to a point very close to the finished product. If the project is not yet at this stage, a usability test cannot provide an accurate evaluation.

**Who should test usability?**

The test pool can range from as few as five or six users, to as many as you can accommodate. Testing the site with other design team members is inconclusive. Further, the test subjects should include actual target audience members. For example, you
should not test an online stock-trading site only with teen-agers, nor should you limit yourself to professional stockbrokers. A good cross-section should include some professionals, some users who are moderately familiar with online trading, and some users who know little about trading or have never traded stock online.

This type of pool provides valuable input from professionals, while non-traders can gauge how effectively your site accommodates an entry-level audience (which also provides a stream of new online traders to build the business). Whoever the testers are, be sure you clearly understand their backgrounds so that their evaluations can be put into perspective.

An exception to the diverse-background rule exists if the site is for internal corporate use as an intranet. In this case, the project team is very likely a part of the audience. However, you should still include others members of the organization, particularly those who are removed from the development process. This more objective group is the most accurate representation of successful site usability.

**Usability tasks**

During the test, participants should be asked to perform actual tasks. If the testing is choreographed with no real-world circumstances, you are unlikely to discover potential problems. Provide a list of tasks and operations to each participant, with no indication of how to perform them. The site itself should tell users all they need to know to navigate and complete tasks.

Participants should also be asked to note elements they like as well as those they do not. This feedback will make the site more effective.

As a developer, you may find it difficult to watch test participants stumble through tasks or become frustrated, but you must not interfere in the process. In fact, if you feel observation is necessary, conduct it through video or a one-way mirror. This method precludes any contamination of the testing.

**Results**

After testing, be sure to interview the participants upon exit. You can often help them recall observations they forgot or did not have time to write down. You can include questions such as the following:

- What was your first impression when you saw the site?
- What type of company image did the site portray?
- Do you understand the site structure?
- Can you recall the site’s major elements?

Written data should be compiled and analyzed from a distance. How many users had the same experience? Were any problems consistently noted? These trends are the real indicators of usability. Be sure to take a closer look at these problems individually, to see how you as the developer can heighten user awareness and usability.

**Applying the results**

Some insufficiencies will probably surface during the testing. As a designer, you may find it difficult to accept criticism for a site that you put much effort into producing, but you must consider feedback constructively and address the issues. The sting of critique from a few participants will be short-lived compared with a Web site catastrophe that could

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**NOTE:** You can conduct an unofficial usability test on a public Web site in **Optional Lab 6-1: Evaluating a Web site's usability.**

**NOTE:** You can devise tasks and interview questions to use when conducting a usability test in **Activity 6-1: Conducting a Web site usability test.**

**NOTE:** Note that leading your usability test participants into evaluating certain aspects of a site is acceptable during a post-test interview. However, eliciting specific information during the testing process can affect the participants’ visit to the site and alter their perceptions of the experience.

**NOTE:** You should be familiar with the concept of constructive criticism, but note that its importance is emphasized in Web development because Web sites are almost always designed for audience consumption. It is crucial to elicit honest feedback from other people.
occur if you go online with a faulty site and receive widespread criticism for preventable or foolish mistakes.

**Web Page Accessibility**

Web pages should be accessible to all people, including those with disabilities. To assist in this mission, the World Wide Web Consortium (W3C) has created the Web Accessibility Initiative (WAI). According to the WAI, the Web’s full potential can be realized only by “promoting a high degree of usability for people with disabilities” ([www.w3.org/WAI/about.html](http://www.w3.org/WAI/about.html)). The WAI works with worldwide organizations in five main areas: technology, guidelines, tools, education and outreach, and research and development.

WAI aims to ensure that core technologies used on the Web, such as HTML, CSS, XML and DOM, are equally accessible to users with physical, visual, hearing and cognitive disabilities. For example, a person with a visual disability may be unable to view a multimedia presentation on the Web. One way to solve this problem is to include text equivalents of the presentation in the code. The multimedia player, such as RealNetworks RealPlayer or Microsoft Windows Media Player, could then access the text equivalent and present it to the user in Braille or as speech.

The WAI works with various W3C Working Groups to ensure that the standards for various W3C technologies include accessibility options. For example, the HTML standard supports improved navigation, extended descriptions of complex graphics, and multimedia captions. It also supports device-independent user interface descriptions that allow users to interact with Web pages using a mouse, keyboard or voice input.

You can visit the following Web sites to learn more about Web page accessibility for disabled users:

- **Web Accessibility Initiative (WAI)** — [www.w3.org/WAI/](http://www.w3.org/WAI/)
- **Curriculum for Web Content Accessibility Guidelines 1.0** — [www.w3.org/WAI/wcag-curric/](http://www.w3.org/WAI/wcag-curric/)
- **ADA Standards for Accessible Design** — [www.ada.gov/stdspdf.htm](http://www.ada.gov/stdspdf.htm)

**WAI conformance**

The WAI Web Content Accessibility Guidelines (WCAG) 1.0 specification ([www.w3.org/TR/WAI-WEBCONTENT/](http://www.w3.org/TR/WAI-WEBCONTENT/)) divides conformance requirements into a hierarchy with three levels. Note that in accordance with accessibility guidelines, conformance level names are spelled out in text so they may be understood when rendered to speech. The conformance levels are defined as follows.

- **Conformance Level "A"** — All Priority 1 checkpoints are satisfied.
- **Conformance Level "Double-A"** — All Priority 1 and 2 checkpoints are satisfied.
- **Conformance Level "Triple-A"** — All Priority 1, 2 and 3 checkpoints are satisfied.

Each level of conformance encompasses a specific set of checkpoints, each with an assigned priority level. The WAI defines the three priority levels of checkpoints as follows.

- **Priority 1** — A Web content developer must satisfy this checkpoint to provide accessibility for all users. If a Priority 1 checkpoint is not satisfied, then one or more groups of users will be unable to access information in the Web document. This checkpoint is a basic requirement for some groups to access Web documents.
• **Priority 2** — A Web content developer *should* satisfy this checkpoint. If a Priority 2 checkpoint is not satisfied, then one or more groups of users will have difficulty accessing information in the Web document. This checkpoint removes significant barriers to accessing Web documents.

• **Priority 3** — A Web content developer *may* address this checkpoint. If a Priority 3 checkpoint is not satisfied, then one or more groups will have some difficulty accessing information in the document. This checkpoint improves access to Web documents.

All checkpoints are organized under 14 specific guidelines. The guidelines are developed with consideration for groups of users with specified disabilities or needs. The WAI defines the 14 guidelines as follows.

1. Provide equivalent alternatives to auditory and visual content.
2. Do not rely on color alone.
3. Use markup and style sheets properly.
5. Create tables that transform gracefully.
7. Ensure user control of time-sensitive content changes.
8. Ensure direct accessibility of embedded user interfaces.
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.

Although different situations should be considered when designing Web documents, each accessible design choice generally benefits several disability groups, and the Web community as a whole. For more detailed information, you can read the WAI specification at [www.w3.org/TR/WAI-WEBCONTENT/](http://www.w3.org/TR/WAI-WEBCONTENT/).

### Section 508 of the Rehabilitation Act

In 2001, the U.S. government implemented Section 508 of the Rehabilitation Act: Electronic and Information Technology Accessibility Standards. Section 508 requires that all electronic and information technology developed, procured, maintained or used by federal agencies be comparably accessible to users with disabilities. Section 508 is based on the Priority 1 and 2 checkpoints of the W3C’s WAI Web Content Accessibility Guidelines (WCAG) 1.0. You can learn more about Section 508 by visiting the following URLs:

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**NOTE:** Most of these guidelines seem sensible for all Web pages, whether the developer is considering user disabilities or not. Good Web design practices such as these are often a simple matter of common sense.

**NOTE:** Section 508 is presented by the U.S. government. The WAI is presented by the W3C, which is concerned with international [worldwide] standards.
• **Section 508 Homepage: Electronic and Information Technology**
  (www.access-board.gov/508.htm)

• **Section 508: The Road to Accessibility** (www.section508.gov)

In the following lab, you will use a Web site that helps you identify common user accessibility issues and find ways to remedy problems. Suppose you are designing a Web site for a customer who has mentioned that many of her business’s users have disabilities and use specialized software for accessibility. Whether your customer has specified that the site must conform to accessibility standards or not, you can ensure that you address accessibility during development of the site. Your customer will have happy customers, and she will not have to return to you with requests to investigate and repair complaints. Complying with accessibility standards is not as difficult as you might think.

**Lab 6-1: Identifying common accessibility issues**

In this lab, you will use a site that tests Web pages for compliance with accessibility guidelines and suggests solutions to the problems it finds.

1. **Browser:** Open your browser and go to www.cynthiasays.com/. You should see the HiSoftware Cynthia Says home page, as shown in Figure 6-1. Cynthia Says is a free service for testing the accessibility of Web pages.

![Figure 6-1: HiSoftware Cynthia Says home page](image)

2. Enter the URL for any Web site into the **Web Page (Required)** field on the form. Then click the **Test Your Site** button to display the resulting accessibility report.

3. Scroll the page and review the results that Cynthia Says returns. Note the accessibility issues that Cynthia Says cites, and its suggestions for making the reviewed Web site more accessible.
4. Try analyzing additional sites. Do most of the sites you visit meet Conformance Level "A"? Do any of them meet this level? Of the problems that were found under Conformance Level "A," are any of them issues that would dramatically change the way the site looks or works?

Case Study
Eating It

Jean and his small team of developers had finished creating the Web site for a new online business called I8IT, which sells unusual artistic and sculptural food items. I8IT's products are unique and unconventional, and its owners had asked the Web team to design a very visual, unusual, ultra-modern site to match the business's personality.

Jean's team proposed design ideas that the customer loved: graphical icons for all the navigation links and buttons, visual images in place of descriptions, a minimum of text, and text that did appear consisted of clever and unusual spellings and abbreviations. The completed site was unique and eccentric, and both Jean's team and I8IT's owners were pleased.

The business's desired launch date was very close, so there was little time for testing the site. Jean asked all the members of the development team and the I8IT owners to join him in spending half a day browsing and using the site to check for errors in design or functionality. Some invited their spouses or close friends to participate in the testing. Although the testing elicited a few questions, Jean and his team were easily able to answer them.

Shortly after the site and marketing were launched, I8IT noticed that they had received almost no orders, but a great many complaints and puzzled inquiries through the site feedback. Some site visitors said they could not find their way around the site because they did not understand the navigational icons. Others were confused by the clever shorthand text descriptions. Some wondered whether the products were food, toys or art. Several mentioned that when they tried to purchase items, they had trouble backing out of the shopping cart to do more shopping and eventually gave up.

I8IT's owners were no longer pleased. Although they liked the design, they did not understand why site visitors had such trouble with the site when the owners themselves thought it worked just fine. In any case, they held Jean and his development team responsible for the site's poor usability because, as they said, Jean was the Web professional — he should know what works and what does not. They insisted he redesign the site for free.

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Consider this scenario and answer the following questions.

- With this site's design, what mistakes did Jean and his team make in relation to site usability? Which site design elements should be changed?
- What particular accessibility challenges did this site's design pose for users with disabilities or special accessibility software?
- What mistakes did Jean make in his usability testing process? How should the steps and participants have been different?
Lesson Summary

Application project

This lesson explained that a good usability test should be conducted using objective participants who represent a cross-section of actual audience members. It makes sense that you may not learn much from the opinions of people who never use the Web. However, technical experts are not necessarily recommended to represent your audience in a Web usability test either. Why not?

By contrast, subject matter experts can present a different level of feedback because they are familiar with the content and thus know what to look for when evaluating a site’s usability. Those who are unfamiliar with the subject matter can only help you gauge the site’s usefulness to a novice.

Conduct an unofficial usability test on the Web site posted by your company or school. What is your first impression of the site? Is it easy to use? Is the site missing any features that you think would improve its usability? Does it offer all the information you might look for? Do you have questions that are left unanswered after visiting the site? Look for a Contact link or e-mail address for the site’s Webmaster or technical team, and send an e-mail message with feedback. Be sure to note positive aspects of the site in addition to any problems or questions.

Now visit a site whose subject matter is unfamiliar to you. For example, if you know little or nothing about Java programming, bocce ball or the social traditions in Tonga, use a search engine to find a Web site that discusses that topic. Conduct another unofficial usability test, asking the same questions as you did for your school or company site. Do you find that you have more questions about the site’s usability, or fewer? Do you think any difference in your evaluation is related to your lack of familiarity with the content?

Skills review

In this lesson, you learned that audience usability is an integral part of user satisfaction. You also learned how to conduct a usability test. Finally, you studied accessibility guidelines to help you create Web sites that are equally accessible by Web users with disabilities. In the past, usability and accessibility for Web design have been vague topics that were considered to be good ideas, but not necessarily as important as other aspects of Web design. Today, best-selling books on usability, as well as efforts by standards organizations and governments, are changing all that.

Now that you have completed this lesson, you should be able to:

- 1.1.4: Determine the audience for the site.
- 1.1.15: Conduct audience usability tests.
- 2.2.6: Identify and apply user-accessibility standards and laws (e.g., W3C WAI/WCAG, ADA, Section 508, international standards).
- 2.2.7: Identify common user-accessibility challenges and solutions.
- 3.5.2: Perform site testing (functionality, usability, browser compatibility).
Lesson 6 Review

1. Name three types of information about the user audience that a Web designer can use to increase usability.

2. What are the five elements of Web site usability?

3. Why is it important for Web pages to have conventions, or functions that are similar across many sites?

4. Should a site developer participate in the usability testing of his or her own site? Why or why not?

5. Describe the most effective test pool for conducting a Web site usability test.

6. What types of tasks should participants in a usability test be asked to perform?

7. What is the WAI, and what is its purpose?