How to Make Your Web Course Accessible

Description

This workshop will help course designers understand how to develop on an accessible online course.

Handouts

Workshop Handout
PowerPoint Presentation

Audience

Faculty, staff, and teaching assistants who are learning how to create an online course or who already teach in the online environment would benefit by taking this workshop.

Objectives

1) To illustrate why it is important to make your online course materials accessible
2) To demonstrate how to make your online course materials accessible

Agenda

10 minutes	Introduction
5 minutes	Why Do I Need to Make My Web Course Accessible?
25 minutes	How Do You Create An Accessible Web Course?
5 minutes	How Can WebCT Tools Increase Accessibility of a Course?
5 minutes	Checking Out Your Website
5 minutes	Resources

Table of Contents

How to Make Your Web Course Accessible

Introduction

Web Page Accessibility

Accessibility is a fundamental problem for disabled Internet users. While advances in cyberspace are evoking wonders for the general population, we continue to deprive people with impaired mobility their right to gain access to this wealth of knowledge and information. In this workshop, we will discuss and share some of the solutions that result in equal Access to all. We address the W3C Web Accessibility Initiative guidelines, related laws, and knowledge of how assistive technologies work. In the Best Practice sections, we provide examples and other information to help clarify and guide you through this process.

About Accessibility and the Internet

Several different legislative initiatives drive our work towards achieving equal access to information and education in the online environment. Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990 prohibits discrimination against individuals with disabilities. Section 508, signed into law by President Clinton on August 7, 1998, is actually an amendment to the Workforce Rehabilitation Act of 1973. Section 508 requires any electronic and information technology developed or purchased by the Federal Government, to be accessible to people with disabilities.

Our goal at Northern Arizona University and the E-Learning Center is to develop online course materials that comply with accessibility laws and make our course content as widely accessible and usable to a variety of disabled populations.

Why Do I Need to Make My Web Course Accessible?

Who Is Surfing the Internet?

The Survey on Income and Program Participation (SIPP, 1999, carried out by the U.S. Department of Commerce, Economics and Statistics Administration, National Telecommunications and Information Administration) reports the following statistics on the number of people with certain disabilities and access to the Internet.

* 1,542,410 people with vision problems
* 1,893,392 people with hearing problems
* 1,411,200 people with difficulty using hands
* 1,242,790 people with a learning disability

Our disabled audience is not a small one. The following table estimates the number of people with a visual impairment that have access to the internet and the number who use a computer on a regular basis. As the numbers illustrate, those individuals who have the technological ability to access the internet from home, the library, or at work are a bit higher than those who actually use a computer regularly. In any case, the numbers are high and we need to develop courses that are usable and accessible to them all.

Visual Status	Total Number	Have Access to the Internet Number	Use a Computer on a Regular Basis Number
No Impairment	166,108,000	94,597,000	84,621,000
Limitation in Seeing	7,326,000	1,549,000	979,000
(Severe)	(1,536,000)	(196,000)	(102,000)
(Not Severe)	(5,790,000)	(1,352,000)	(877,000)

Table 1. Estimated number of youths and adults, aged 15 and older, by visual status, who (a) have access to the Internet, and/or (b) use a computer on a regular basis.
Source: Unpublished data from the Bureau of Census, Survey of Income and Program Participation, 1999. (Taken from Gerber and Kirchner, 2001)

What Does It Mean to be Accessible?

Accessible means that all people can "perceive, understand, navigate, and interact with the Web (World Accessibility Initiative [WAI], 2005)." Accessible web sites in conjunction with specific software and hardware tools help to address the needs of visual, auditory, physical, speech, cognitive, and neurological disabilities. We need to design web pages that work in concert with these tools to read and interpret the content. Depending on the types of software and/or media you decide to integrate into your course, making your web course accessible can be simple or complex. Our goal is to develop web courses that are equivalent to a person with or without a disability. In the context of this document, the *equivalent* endeavor works to fulfill essentially the same function for the person with a disability, as the primary content does for the person without it.

Through lawsuits and settlement agreements, the Department of Justice has achieved greater access for individuals with disabilities in hundreds of cases. Web sites that are not assistive technology-friendly seriously diminish what disabled users can access online. When you do not create an accessible web site, you violate ADA. The Department of Justice may obtain civil penalties of up to $50,000 for the first violation and $100,000 for any subsequent violation. The BEST way to apply the ADA to the cyberspace is to build accessibility into the site itself.

What are Basic Assistive Technologies?

The Screen Reader

Screen reader software reads the contents of the web page aloud to a user. Individuals who are blind typically use screen readers. Screen readers can only read text and not pictures or other media. When it encounters pictures, sounds, or other multimedia information, it simply ignores it. It also neglects the columns and tables on a web page, automatically reading from left to right and from top to bottom. In addition, screen readers cannot read moving text.

Dynamic Braille Display

The dynamic Braille display is a computerized electro-mechanical device that displays Braille as it reads each line on a web page. The text-based information is recognized and transformed into the Braille code system. The user can sense the electronic code by placing their fingers on top of the display as the system raises and lowers the pins to form the Braille characters. This device is like a translator who sees and reads sentences and then presents the impaired person with an electronic coded language.

In a Nutshell

- Our disabled audience is not a small one and we need to develop courses that are usable and accessible to them all.
- Accessible means that all people can "perceive, understand, navigate, and interact with the Web (World Accessibility Initiative [WAI], 2005)."
- We need to design web pages that allow basic assistive technologies to read and interpret the content to our disabled audience.
- The Department of Justice may obtain civil penalties of up to $50,000 for the first violation and $100,000 for any subsequent violation.
- The BEST way to apply the ADA to the cyberspace is to build accessibility into the site itself.

How Do You Create An Accessible Web Course?

W3C Guidelines

The Web Accessibility Initiative (WAI) is a group that works with an international group to develop "strategies, guidelines, and resources to help make the Web accessible to people with disabilities (www.w3.org/WAI)."

WAI accessibility guidelines are the international standard for Web Accessibility. The guidelines are extensive and we urge you to visit the website to review all of them (www.w3.org/WAI). The guidelines have an internal priority system to help you determine what you need to do in order to make your web content accessible and usable to those people with disabilities. We present this compiled document illustrating several ways to make your web pages more accessible and usable to the disabled user. However, depending on the complexity of your web course content and associated media you may consider reading over, searching, and reviewing all or some of the Web Accessibility Initiative strategies and guidelines (www.w3.org/WAI).

What Is Accessible or Unusable to the Person with a Disability?

This compilation presents a variety of strategies detailed in the WAI Accessibility Guidelines. Not all of the guidelines will adhere to your work. In any case, if you follow those guidelines that do apply to your work, you will be several steps closer to making your course content equivalent to both the disabled and not disabled users. The Best Practice sections offer advice, links to good examples, and further clarification for each strategy.

Blinking, Moving, or Flickering Content

As a web content developer, avoid developing high intensity content that blinks, moves, or flickers at a rate range between 2 Hz and 55 Hz because it can cause photosensitive epileptic seizures for susceptible individuals. To avoid this situation and increase accessibility do not use the BLINK or MARQUEE elements to create blinking or flashing content, and create movement using style sheets so the user has the option to turn off the style sheets. Be sure to provide an option on the web page to view the content with movement disabled.

Best Practice: Blinking, Moving, or Flickering Content

Some people want to attract attention to a word or phrase on their web page by making it flash on and off or having it scroll across the screen.

Avoid the <blink> and <marquee> tags at all costs. The <blink> tag makes the text blink and the <marquee> makes text march across the screen. These tags are poor design choice.

Netscape created the <blink> tag and Microsoft Internet Explorer developed the <marquee> tag. Both tags do not work in all browsers and the blinking can cause seizures. Be sure to use standard HTML endorsed by the W3 Consortium.

Images and Sounds

As the assistive devices are generally text-based, each image or sound must have an alternative text. An alternative text description should exist for every image or sound that punctuates, highlights, separates content, or helps control the layout of the page. The alternative text must clearly state why the graphics are in that specific part of the page and how they fit into the continuity of the overall the text.

Although current browsers support an ALT attribute for image tags, they do not offer such an attribute for the EMBED and OBJECT tags. When providing the viewer with alternate content (if the plug-in content cannot be displayed), other options may be considered.

Best Practice: Images and Sounds

Techniques for Web Content Accessibility Guidelines 1.0

W3C: Provide equivalent alternatives to auditory and visual content.
http://www.macromedia.com/resources/accessibility/flash8/

Is your chosen medium accessible to people who have disabilities?
http://www2.nau.edu/ctel-web/resources/media/content/choosing/05_page.htm

Animations

Macromedia Flash, the most commonly used Internet-delivered animation software package, offers a visual display to help engage students. You can address multiple learning disabilities by including audio, audio transcripts, video, video transcripts, and interactivity. However, due to the diverse needs of our audience, the NOEMBED tag can provide text representations for browsers that do not support the Flash Player (although most if not all newer browsers currently support the free Flash player plug-in).

Best Practice: Animations

Addresses multiple learning styles by displaying information in multiple representations
http://www.webaim.org/techniques/flash/examples/triangle.html

Flash animations easily scale to fit your screen
http://www.webaim.org/techniques/flash/examples/scaleable.html

Flash offers a higher level of keyboard access
http://www.webaim.org/techniques/flash/examples/interactive_map.html

Flash 8 Accessibility
http://www.macromedia.com/resources/accessibility/flash8/

Hyperlinks

Hyperlinks should use descriptive words that guide the reader to where the link will lead them. "Click Here" makes little sense to someone listening to a screen reader. It is much better if we can explain what new information the hyperlink is leading us to (i.e., Visit the Zoological Lab).

Best Practice: Hyperlinks

The Dayton Art Institute, Hyperlink Text and Titles
http://tours.daytonartinstitute.org/accessart/access08.cfm

A Linear Order

While laying out a page, visualize a screen reader as it moves across a page and reads the text and alternative text of an image or other media. Since the path of the reader is linear, we recommend that the text follow a related logical order.

Best Practice: A Linear Order

Using the Mozilla Firefox Extension called Fangs here is a text version of the first half of the NAU Home Page showing how a screen reader would read the page.

"Page has fifty-four links Northern Arizona University dash Mozilla Firefox Table with three columns and twenty-four rows Graphic Northern Arizona University Founded one thousand eight hundred ninety-nine Link PROSPECTIVE STUDENTS Link DISTANCE LEARNING Link ACADEMICS and RESEARCH Link ATHLETICS Graphic Photos courtesy University Marketing NAU Index vertical bar Link a Link b Link c Link d Link e Link f Link g Link h Link i Link j Link k Link l Link m Link n Link o Link p Link q Link r Link s Link t Link u Link v Link w Link x Link y Link z Graphic quicklinks Link Admissions Link Apply Now Link Campus Visits Link Current Students Link Faculty slash Staff Link Alumni Link Parents Link Search Center Link LOUIE Online Link Maps Link MyNAU Link Webmail Link Careers at NAU Link About NAU and Flagstaff Table with three columns and twelve rows Table with two columns and seven rows Go retro at Link 'That seventy s Yard Sale' , hosted by the Public Relations Student Society of America. nine a.m. to four p.m. Oct. twelve Tinsley dash Wilson dash Allen Quad. The NAU Symphony presents its Link season dash opening concert at seven colon thirty p.m. Oct. twelve in Ardrey Auditorium. Free. Come see what we have to offer. Join us for an Link open house . eight a.m. to three colon thirty p.m. Oct. fifteen."

Don't Rely on Color Alone

Approximately, 8 - 12% of European descent males and roughly 1/2 of a percent of females suffer from color blindness. Individuals who are colorblind typically cannot distinguish between the colors red and green or blue and yellow. To make your web pages accessible to color blind people you only have to do a few things. First, think about what color palette you decide to use for your course layout and design. If you use color as a way to communicate difference, stay away from using the colors red and green. Ensure that text and graphics are understandable when viewed without color. For example, do not use a red symbol to signify 'stop' and the same symbol but in green to denote *go*. Ensure that all information conveyed with color is also available without color.

Best Practice: Don't Rely on Color Alone

Color Vision Simulator Examples
http://www.vischeck.com/examples/

HTML and Style Sheets

Employing HTML code for page structure or presentation rather than to support the content seriously influences the ability of assistive technology to *read* a page. When it comes to the structural details, the most important thing for people with a visual recognition barrier is keeping the screen uncluttered and using consistent page layouts. If you use a Cascading Style Sheet to define how to display your HTML elements, then your HTML pages refer to an external style sheet file. Consequently, if you need to change the overall look and feel of your website you only need to change the style sheet and all the linked HTML pages will update to the new look. Cascading Style Sheets can save you a lot of time and work.

Best Practice: HTML and Style Sheets

Look at the following web page to see how using different style sheets works.

http://www.w3schools.com/css/demo_default.htm

Alternatively, you can take the E-Learning Center's Dreamweaver Workshop to learn how to apply a correctly formatted, accessible Cascading Style Sheet developed by the E-Learning Center to your web course pages.

Clarify Natural Language Usage

Use markup that facilitates pronunciation or interpretation of abbreviated or foreign text. When content developers mark up natural language changes in a document, speech synthesizers and Braille devices can automatically switch to the new language, making the document more accessible to multilingual users. Content developers should identify the predominant natural language of a document's content. Content developers should also provide expansions of abbreviations and acronyms.

Best Practice: Clarify Natural Language Usage

In addition to helping assistive technologies, natural language markup allows search engines to find the definition of the words and identify documents in a desired language. Natural language markup also improves readability of the Web for all people, including those with learning disabilities, cognitive disabilities, or people who are deaf.

When you do not identify abbreviations and natural language changes, they become indecipherable when machine-spoken or Brailled.

Example

```
<P>And with a certain <SPAN lang="fr">je ne sais quoi</SPAN>,
she entered both the room, and his life, forever. <Q>My name
is Natasha,</Q> she said. <Q lang="it">Piacere,</Q>
he replied in impeccable Italian, locking the door.
```

(Taken from http://www.w3.org/TR/WCAG10-HTML-TECHS/#changes-in-lang on November 29, 2005).

Problem with Tables

Tables for any use such as page layout or data arrangement present special problems to users of a screen reader, especially if the content is in columns. Going from left to right, screen readers read across the columns, jumbling the order of the text. In addition, older browsers do not support certain table formats. Tables should mark up truly tabular information also known as data tables. Each table should have clearly defined headers and make sense when read from left to right. Moreover, you should avoid using tables for page layout, also known as layout tables.

Best Practice: Problem with Tables

When using tables to present data, you need to define the headers of each column to help the user understand the table content.

Example

(Taken from http://www.w3.org/TR/WCAG10-HTML-TECHS/#identifying-table-rows-columns on November 28, 2005)

This example shows how to associate data cells using the <TD> tag with their corresponding headers by means of the "headers" attribute. The "headers" attribute specifies a list of header cells (row and column labels) associated with the current data cell. This requires each header cell to have an "id" attribute.

```
<TABLE border="1"
       summary="This table charts the number of
                cups of coffee consumed by each senator,
                the type of coffee (decaf or regular),
                and whether taken with sugar.">
  <CAPTION>Cups of coffee consumed by each senator</CAPTION>
  <TR>
      <TH id="header1">Name</TH>
      <TH id="header2">Cups</TH>
      <TH id="header3" abbr="Type">Type of  Coffee</TH>
      <TH id="header4">Sugar?</TH>
  <TR>
      <TD headers="header1">T. Sexton</TD>
      <TD headers="header2">10</TD>
      <TD headers="header3">Espresso</TD>
      <TD headers="header4">No</TD>
</TABLE>
```

In addition, you want to avoid using tables for page layout. See the section in this document for more information about HTML and Style Sheets or visit the W3C Website http://www.w3.org/TR/WCAG10-CSS-TECHS/#style-alignment

Ensure Users Control of Time-Sensitive Content Changes

Ensure that moving, blinking, scrolling, or auto-updating objects or pages may be paused or stopped. Some people with cognitive or visual disabilities are unable to read moving text quickly enough or at all. People with physical disabilities might not be able to move quickly or accurately enough to interact with moving objects. Movement can also cause such a distraction that the rest of the page becomes unreadable for people with cognitive disabilities. Screen Readers are unable to read moving text.

Ensure Direct Accessibility of Embedded User Interfaces

Ensure that the user interface follows principles of accessible design: device-independent access to functionality, keyboard operability, self-voicing, etc. Device-independent access means that the user may interact with a document with a preferred input (or output) device -- mouse, keyboard, voice, head wand, or other. The user interface consists of the different components used for a person to communicate with the computer. For example, in the browser window, you open a file by selecting File > Open. The short cut key is CTRL - O. When an embedded object has its "own interface" (i.e., Flash, applets, or scripts), that interface must be accessible. If the interface of the embedded object is not accessible, you must provide an alternative accessible solution.

Best Practice: Ensure Direct Accessibility of Embedded User Interfaces

If you use the <APPLET> tag, be sure to provide a text equivalent with the alt attribute and in the content in the APPLET element. This is useful when assistive technologies only support the alt tag or the APPLET content. However, the APPLET tag is out of date and now the preferred tag is the OBJECT tag. Yet, the OBJECT tag does not have an alt attribute.

Example

```
<APPLET code="Water.class" width="800" height="800"
        alt="Java applet: Model of the Water Cycle">
      As temperature increases, the water droplets...
</APPLET>
```

For more information about developing accessible applets, please refer to JAVAACCESS (http://www.w3.org/TR/WCAG10-HTML-TECHS/#ref-JAVAACCESS) and IBMJAVA (http://www.w3.org/TR/WCAG10-HTML-TECHS/#ref-IBMJAVA). Both companies developed an Accessibility API and made the Java Swing classes accessible.

Provide Content and Orientation Information (Frames)

Grouping elements and providing contextual information about the relationships between elements can be useful for all users. Complex relationships between parts of a page may be difficult for people with cognitive disabilities and people with visual disabilities to interpret. Title each frame to facilitate frame identification and navigation.

Best Practice: Provide Content and Orientation Information

Example

Use the "title" attribute to name frames.

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Frameset//EN">
<HTML>
<HEAD>
<TITLE>A simple frameset document</TITLE>
</HEAD>
<FRAMESET cols="10%, 90%"
          title="Our library of electronic documents">
    <FRAME src="nav.html" title="Navigation bar">
    <FRAME src="doc.html" title="Documents">
    <NOFRAMES>
       <A href="lib.html" title="Library link">
             Select to go to the electronic library</A>
    </NOFRAMES>
</FRAMESET>
```

If the frame titles are not obvious, use the <longdesc> attribute or a description link.

(Taken from http://www.w3.org/TR/WCAG10-HTML-TECHS/#frame-names on November 28, 2005).

Provide Clear Navigation Mechanisms

Provide clear and consistent navigation mechanisms -- orientation information, navigation bars, a site map, etc. -- to increase the likelihood that a person will find what they are looking for in a course.

Best Practice: Provide Clear Navigation Mechanisms

A navigation bar is a group of graphical or textual hyperlink buttons that appear on the main pages of your content. WebCT will control most of your course navigation through the WebCT interface. Typically, you will not need to create custom navigation bars.

However, you may face this challenge and you want to keep the following tips in mind:

1. Use navigation to let the user know where they are
2. Provide a way back to the Home Page
3. Provide a way to the top of long pages
4. Make sure navigation links look like navigation links (i.e., underlined text, borders, etc.)
5. Create buttons or links that coordinate with the page
6. Be sure graphic links have an alternative text equivalent

Ensure Documents Are Clear and Simple

Consistent page layout, recognizable graphics, and easy to understand language really benefits all users. In particular, they help people with cognitive disabilities or who have difficulty reading. (However, ensure that images have text equivalents for people who are blind, have low vision, or for any user who cannot or has chosen not to view graphics). Using clear and simple language promotes effective communication. Access to written information can be difficult for people who have cognitive or learning disabilities. Using clear and simple language also benefits people, whose first language differs from your own, including those people who communicate primarily in sign language.

How Can WebCT Tools Increase Accessibility and Usability of a Course?

WebCT, the learning management system used by Northern Arizona University's E-Learning Initiative, is Priority 1 compliant with the W3C Web Accessibility Standards and "adheres to Section 508 of the American with Disabilities Act." A Priority 1 checkpoint means the web developer must comply with this checkpoint according to the WAI guidelines. The following information comes from the WebCT Features page to see how WebCT is compliant with Section 508 and how the WebCT tools can be used for students with disabilities (Taken from http://www.webct.com/accessibility on November 29, 2005).

Auto-refresh Option

The Mail and Who's Online tools, automatically refresh when new users login and new mail arrives. WebCT determined that this feature was helpful for sighted users but difficult for users with vision problems. Consequently, users have the option of turning this auto-refresh feature on or off.

Course Material Selective Release

The selective release feature allows course designers and instructors to provide specific material to individual learners or groups of learners. Therefore, you can limit the release of carefully designed materials created for users with disabilities and/or you can provide more time for completion.

Task Completion Confirmation

After completion of tasks, users receive a confirmation or feedback. The feedback appears as the top item on the page to ensure users of screen reader technology do not have to read through the entire page to access this information.

Color Set Options

The color set option in WebCT includes high-contrast selections for colorblind or poor vision users.

Header Tags

Header tags help users of screen readers to understand the page structure. This aids in the scanning of pages.

Checking Out Your Website

Use an automated accessibility tool and browser validation tool available in Dreamweaver and at the W3C Website. Here is a list of some things to focus on when reviewing your web pages for accessibility:

- Validate syntax (e.g., HTML, XML, etc.). http://validator.w3.org/
- Validate style sheets (e.g., CSS). http://jigsaw.w3.org/css-validator/validator-uri.html
- Use a text-only browser or emulator. http://lynx.isc.org/
- Use multiple graphic browsers, with:
    - sounds and graphics loaded,
    - graphics not loaded,
    - sounds not loaded,
    - no mouse,
    - frames, scripts, style sheets, and applets not loaded
- Use several browsers, old and new.
- Use a self-voicing browser, a screen reader, magnification software, a small display, etc.
- Use spell and grammar checkers. A person reading a page with a speech synthesizer may not be able to decipher the synthesizer's best guess for a word with a spelling error. If you eliminate grammar problems, you increase comprehension.
- Review the document for clarity and simplicity. Readability statistics, such as those generated by some word processors may be useful indicators of clarity and simplicity. Better still, ask an experienced (human) editor to review written content for clarity.
- Use the Firefox extension to create a text version of your website so you can read over your material and determine if it makes sense to someone using assistive technologies. http://www.mozilla.org/products/firefox/.

10 Quick Tips to Make Your Web Course Accessible

1. Blinking, Flickering, and Moving Content: Do not use the <BLINK> or <MARQUEE> tags to avoid creating a web page that blinks, flickers, or moves.

2. Images, Animations & Multimedia: Use the alt attribute to describe the function of each visual and provide captioning and transcripts of audio and descriptions of video.

3. Hypertext Links: Use text that makes sense when read out of context. For example, avoid "click here."

4. Page Organization & Layout: Use headings, lists, and consistent structure. Use Cascading Style Sheets (CSS) for layout and style where possible, layout text in a linear order, clarify natural language usage, and do not rely on color alone to convey information.

5. Tables, Graphs & Charts: Summarize or use the longdesc attribute. Make line-by-line reading sensible.

6. Time Sensitive Content Changes: Ensure users have the option to turn on or off auto-refresh options.

7. Scripts, Applets, & Plug-ins: Make sure users have direct accessibility to these embedded user interfaces and provide alternative content in case active features are inaccessible or unsupported.

8. Frames & Page Navigation: Use the NOFRAMES element and meaningful titles to provide content and orientation information. Make sure you provide clear and redundant navigation mechanisms so it is easy for users to find what they are looking for.

9. Simple & Clear: Double check spelling and grammar and make sure you use easy to understand language.

10. Check Your Work: Validate. Use tools, checklists, and guidelines at http://validator.w3.org/

Resources

The information in this compilatin comes from a variety of sources listed below. We also included sources that might be of interest to you for further reading and research.

Research and Articles

Gerber, Elaine and Corinne Kirchner (2001). Who's Surfing? Internet Access and Computer Use by Visually Impaired Youths and Adults, USABLE Data Report #7, (Using Statistics About Blindness and Low Vision Effectively). Reprinted at URL: http://www.afb.org/section.asp?Documentid=1521 with permission from the Journal of Visual Impairment & Blindness, March 2001, pp. 176-181. Copyright 2001 by American Foundation for the Blind, 11 Penn Plaza, Suite 300, New York, NY 10001. All rights reserved.

Henry, Shawn Lawton (2005) and participants of the Education and Outreach Working Group. Introduction to Web Accessibility, World Accessibility Initiative, Strategies, guidelines, resources to make the Web accessible to people with disabilities. Retrieved on November 23, 2005 from http:// www.w3.org/WAI/intro/accessibility.php.

Kurniawan, Sri and Panayiotis Zaphiris (2005). Research-derived web design guidelines for older people. ACM SIGACCESS Conference on Assistive Technologies, Proceedings of the 7th international ACM SIGACCESS conference on Computers and accessibility, 129 – 135. Baltimore, MD.

Moss, Trenton (2005). Web Accessibility Resources. http://www.webcredible.co.uk/user-friendly-resources/web-accessibility/ (28 November 2005).

Web Accessibility Initiative (WAI), (1999). *Web Content Accessibility Guidelines 1.0, W3C Recommendations W3C.* Retrieved on November 29, 2005, from http://www.w3.org/.

Accessibility Tools

1. http://www.cast.org/bobby/

Bobby is a Web-based tool that analyzes Web pages for their accessibility to people with disabilities. The Center for Applied Special Technology (CAST) offers Bobby as a free public service in order to further its mission to expand opportunities for people with disabilities through the innovative uses of computer technology.

Enter the URL of the page that you want Bobby to examine and click Submit. Bobby will display a report indicating any accessibility and browser compatibility errors found on the page.

2. http://www.webable.com/

WebABLE! is the authoritative Web site for disability-related internet resources. WebABLE!'s accessibility database lists hundreds of internet based resources on accessibility. The WebABLE! site goal is to stimulate education, research, and development of technologies that will ensure accessibility for people with disabilities to advanced information systems and emerging technologies.

3. http://www.w3.org/TR/WAI-WEBCONTENT

These guidelines explain how to make Web content accessible to people with disabilities. The guidelines are intended for all Web content developers (page authors and site designers) and for developers of authoring tools. The primary goal of these guidelines is to promote accessibility. However, following them will also make Web content more available to ALL users.

4. http://www.macromedia.com/

Macromedia enables professional Web developers to create engaging and effective next-generation Web sites. Professional Web developers, enterprises, and dotcom companies turn to Macromedia for comprehensive, integrated solutions that manage the Web Content Lifecycle from content authoring, management, delivery, and display to personalization and analysis.

5. http://www.webct.com/accessibility

WebCT provides a list of links you might want to visit to help you design course content that is accessible in their course management system.