

Information Technology Accessibility: A Guide for Assuring Equal Access For People with Disabilities



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Oklahoma ABLE Tech Program for Assistive Technology, which
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and services.

Oklahoma ABLE Tech

Linda Jaco, Project Manager
Oklahoma State University Seretean Wellness Center
1514 W. Hall of Fame
Stillwater, OK 74078
1-800-257-1705 Voice/TTY
405-744-2487 (Fax)
<http://okabletech.okstate.edu>



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**OSU Seretean Wellness Center
1514 W Hall of Fame
Stillwater, OK 74078-2026**



**ABLE Tech INFO-Line
888-885-5588**

Oklahoma ABLE Tech
405-744-9748 V/TTY 800-257-1705 V/TTY FAX: 405-744-2487
<http://okabletech.okstate.edu>

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Oklahoma ABLE Tech is pleased to share with you a copy of the Information Technology Accessibility: a Guide for Assuring Equal Access for People with Disabilities. This publication provides recommendations to assist entities with ensuring their Information Technology is accessible to people with disabilities.

The basic reason for exclusion of individuals with disabilities from the digital environment is inaccessibility of the information technology product, such as websites or automated phone systems. In general, an information technology system is accessible to people with disabilities if it can be accessed in a variety of ways that do not depend on a single sense or ability, and/or is compatible with add-on adaptive devices that allow for alternative input and output.

Examples of barriers that can exclude people from information technology may include: an individual with a visual impairment who uses a screen reader to navigate the Web will most often find Web pages inaccessible when the graphics or pictures are not labeled with alternative text information; an employee may find the office software incompatible with his/her computer access device; or, a person calling a voice automated system may find the system inaccessible when using an alternative phone.

Please use this guide for assistance when purchasing technology and share it with others who might find it useful. Let's not let the very technology that has the potential to close the educational, employment, and independent living gaps for individuals with disabilities, create an even larger divide. Copies of this booklet are available in a variety of formats and may be ordered by calling 1-800-257-1705. The booklet is also available on our website at <http://okabletech.okstate.edu>

Sincerely,

Linda Jaco
Program Manager

Brenda Unruh Dawes
Marketing and Web Manager

Information Technology Accessibility:

A Guide for Assuring Equal Access for People with Disabilities

The information provided in this guide can be used to assure that information technology is accessible to people with disabilities. This guide includes an in-depth description of recommended accommodations to insure access in the following program areas:

1) Telephony, 2) Computer Data and Sound, 3) Print Materials, 4) Aurally Communicated Information, 5) Website Design, and 6) Techniques for Accessible Web Design. A description of legal requirements governing architectural and program access is included. Architectural access and policy development are referenced.

Program Access

The following accommodations are recommended to meet unique disabilities or combinations of disabilities.

1) Telephony – The following basic assistive technology ensures effective communication with voice telecommunications for individuals with disabilities:

Amplified Telephone – Consumers with moderate to severe hearing loss will benefit from a telephone with high-grade amplification, either as a built-in phone feature or as an "in-line" addition. Such phones should be placed in quiet areas, removed from ambient noise, to support maximum speech discrimination.

TTY with Printout – Individuals who have hearing or speech disabilities can communicate by telephone through the use of a text telephone, referred to as a TTY. A TTY consists of: a keyboard to type messages, a display to receive messages, and a means to connect to a telephone.

Hands-Free Speaker Phone with Large Keypad – Individuals who have difficulty holding a receiver and/or dialing numbers will benefit from a telephone with an enlarged keypad and speakerphone access.

2) Computer Data and Sound – The following basic assistive technology ensures effective communication with computer input and output for individuals with disabilities:

19"-21" Large Monitor with Moveable Mounting Arm – Individuals with low-vision will benefit from a larger monitor. It provides for increased character size in proportion to monitor dimensions and provides a crisper, sharper image. The moveable mounting arm allows the user to position the screen where needed.

Screen Enlargement Software – This software is effective for persons with low-vision and can be paired with a 19"-21" monitor. It allows for enlargement of print on the monitor's screen, enabling the user to review a document with the text magnified to a comfortable size and with the colors of the screen adjusted for best contrast. The user can use any part of the screen by scrolling up, down, or across.

Speech Synthesizer and Screen Reading Software – These are effective for persons with visual disabilities and reading limitations (e.g., persons with learning disabilities in print decoding and reading comprehension). The hardware component of the speech access system, the speech synthesizer, can be a portable, external device or an internal circuit board. The screen reading program "instructs" the synthesizer. Screen reading software allows users to access commercial software applications by converting text or graphics display with text descriptions to verbal output.

Flatbed Scanner – The use of a scanner is effective for persons with all types of disabilities who need information in digital rather than print form. The scanner is an add-on to the computer that converts an image from a printed page to a computer file with the use of optical character recognition (OCR) software.

Trackball – Trackballs are an alternative to the mouse for individuals who have difficulty maneuvering a mouse due to limited motor skills. A trackball is essentially an upside down mouse, with a moveable ball on top of a stationary base. The ball can be rotated with a pointing device, hand, or forearm.

Alternative Keyboard – An alternative keyboard is a modified version of the standard keyboard supporting key selection based upon the user's unique needs. Consumers who might benefit from an alternative keyboard may include: one-handed typists; those with limited use of their hands; those with limited gross or fine motor skills; those in need of a different keyboard layout; and, those who fatigue easily.

Word Prediction Software – Word prediction software enables the user to reduce the number of keystrokes used in typing by the selection of a desired word from an on-screen list or prediction window. This computer-generated list predicts words from the first one or two letters typed by the user. The word may then be selected from the list and inserted into the text. Individuals with physical or learning disabilities may benefit from this software.

Large Keyboard Caps and Keyboard Orientation Aids – These key markings assist low-vision users by enlarging letters and numbers on the keyboard. Many keyboards already have a raised dot or other tactile marker on the home row keys to give orientation.

Height Adjustable Table – Conventional tables are often not functional for people using wheelchairs or people of short stature. Height adjustable tables allow for adaptation to more comfortable height levels for computer use and other tasks.

If assistive technology, beyond these basic devices, is needed to provide access to computer sound and data, the entity should secure such assistive technology or provide an alternative method of access.

3) Print Materials – The following assistive technology shall provide effective communication with print materials:

Tape Recorder – A tape recorder can be used to record print information for consumers who have visual disabilities or reading disabilities so they can listen to the information instead of reading.

Speech Synthesizer, Screen Reading Software, and Flatbed Scanner – These are effective for persons with visual disabilities and reading limitations. The hardware component of the speech access system, the speech synthesizer, can be a portable, external device or an internal circuit board. The screen reading program "instructs" the synthesizer. Screen reading software allows users to access commercial software applications by converting text or graphics display with text descriptions to verbal output. Printed materials are scanned and converted from a printed page to a computer file and read aloud.

Electronic Enlarging – The magnification of print material by a closed circuit television system allows low-vision users to read a full range of print material. Electronic enlarging devices should have stationary beds for material placement (rather than hand-held cameras) and a 14-inch display monitor.

In providing print access, entities should be able to produce all materials in a full range of alternative formats. Materials can be made available in disk, Braille, large print, and audio, and produced by internal staff or by securing the services of external resources. Entities should establish procedures, which are timely for consumers to receive the requested alternative format.

4) Aurally Communicated Information – Entities can provide effective communication with auditory information via the following assistive technology:

Portable Assistive Listening Device – Assistive listening devices are often used by individuals who have mild to severe hearing losses. The main function of an assistive listening device is to increase the loudness of specific sounds (in most cases, the speaker) while also reducing background noise, allowing increased understanding of speech.

Captioning Display – Captioning display devices allow for viewing of text captions that correspond to the speech in videotapes and similar media. Caption decoders, or built-in decoding chips in the video display equipment, provide access to the text if the media has captioning.

In providing alternative methods of oral communication access, each entity should be able to furnish a full range of communication options (sign language interpreters, certified at the intermediate level or above,

real-time captioners, assistive listening devices). Entities need to establish procedures and time-lines for consumers to request oral communication options they need to participate. Delivery of both interpreter and real-time captioning services will likely involve contracting with external providers. [Reminder: requests for auxiliary aids and services are the responsibility of the consumer.] Computer Assisted Real-Time (CART) captioning is provided by a "real-time" trained court stenographer with specialized equipment that allows for immediate transcription of steno-code into readable text. Attention should be given to the type of language interpreting needed by the consumer (e.g., American Sign Language, Manually Coded English, oral interpreting, etc.).

5) Accessible Web Design – The World Wide Web has rapidly become the most popular Internet resource, combining hypertext and multimedia to provide a huge network of educational, governmental, and commercial resources. Yet, because of the multimedia nature of the medium, many Internet users cannot access some of these materials. Some users:

- Cannot see graphics because of visual impairments;
- Cannot hear audio because of hearing impairments;
- Use slow connections and modems which cannot download large files;
- Have difficulty when screens are unorganized, inconsistent, cluttered, and when descriptions and instructions are unclear. These difficulties may occur when an individual has a learning disability.
- Use adaptive technology with their computer to access the Web.

How People with Disabilities Use the Internet

To gain an understanding of the problems faced by people with disabilities when they reach an inaccessible website, we must understand their experiences. We all know each of us is unique; the same applies to each person's differences and disabilities. These differences are largely defined by each person's unique disabilities as well as the adaptations that each must use to browse the Web. To understand why this issue is so important, it is helpful to first understand how people with disabilities use the Internet and how their disability affects their use of the Internet.

There are five disability categories that affect Internet usage: vision, hearing, motor, cognitive and a composite miscellaneous category including seizure disorders and age-related processes. Solutions for disability access must look at the experiences of ALL people. This overview of Web accessibility will take a look at each one of these disability types individually.

Vision Impairments: Blindness, Low-Vision, Color-blindness

Blindness Facts

- Approximately 10.4 million people (about 4 percent) are visually impaired or blind.

- 1.3 million people (about 0.5 percent) are legally blind.
- About 5.7 million elderly individuals (2 percent of total US population) are blind or visually impaired.
- About 57,300 (.2 percent of total US population) of children are legally blind.
- The World Health Organization estimates that there are 150 million people worldwide with a disabling vision limitation. Over 38 million people in that group are totally blind.

Web Challenges for those who are Blind and How to Address those Challenges

For the most part, people who are blind do not have use of the monitor, nor their mouse. Instead of reading Web pages or viewing the images, they listen to the Web through a software program that acts as a screen reader. These screen readers convert text into synthesized speech. Despite the robotic sound of the synthesized voice, screen readers are a godsend to those who are blind. No longer do they need to depend on others to access common information that others take for granted; such as newspapers, magazines, bank statements, scholastic transcripts, and accessible Internet-based registration systems. This new capability provides them with a greater level of independence, which was previously impossible to obtain. Given the enormous potential benefit of the Internet for individuals who are blind, it is tragic when one realizes that the vast majority of websites have design flaws, which effectively shut out people who are blind.

Challenges of interface and navigation with blindness:

- Users generally do not use a mouse.
- Users often listen to the Web pages using a screen reader.
- Users often jump from link to link using the TAB key.
- Frames cannot be "seen" all at once. They must be visited separately, which can lead to disorientation.
- It may be difficult for users to tell where they are when listening to table cell contents.
- Complex tables and graphs that are usually interpreted visually are unusable.
- Not all screen readers support image maps.
- Images, photos, graphics are unusable.
- Colors are unusable.
- Users expect links to take them to another page or site.

Low-Vision Facts

- Approximately 9.2 million individuals (3.5 percent of the population) have low-vision.

Web Challenges for those with Low-Vision and How to Address those Challenges

Not everyone with a visual impairment is completely blind. Some people have partial sight. People with low vision usually benefit from enlarged, high contrast visual displays. When working on a computer, they often use screen enlarger

software. Such software improves the readability of small text, but it limits the visible area of a document, sometimes requiring a great deal of side-to-side scrolling as well as the more normal top-to-bottom scrolling. Enlarged graphics also become very pixelated. If these graphics contain text, they can be difficult to read. For this reason, normal text is usually preferable to images with text. As the aging population of the world grows, the incidence of age-related visual impairments, such as macular degeneration, glaucoma and cataracts will likewise increase. These individuals will benefit from Web designs that allow the text size to be enlarged, that limit the number of graphical text elements, and that minimize the amount of side-to-side scrolling required.

Challenges of interface and navigation with low-vision:

- Users often use screen enlargers.
- Text in graphics does not enlarge without special software, and looks pixelated when enlarged.

Web Challenges for those who are Color-Blind and How to Address those Challenges

Although color-blindness is not always considered to be a disability per se; Web developers may inadvertently create designs that juxtapose colors that are indistinguishable to individuals who are color-blind. There are different types of color-blindness and various degrees of severity. In most cases, it is more accurate to say that a person experiences "color deficiencies" rather than complete "color-blindness," since the majority can distinguish some difference between problematic colors, even if that difference is reduced compared to normal vision. Those with true color-blindness - a somewhat rarer condition - are completely unable to distinguish between problematic colors. The colors that present the most potential for confusion are reds, greens, oranges and yellows. More severe cases of color-blindness result in difficulties distinguishing other colors as well. Brighter, purer colors are less likely to be confused than darker, more muted tones. The key here is to ensure that pages do not rely on colors alone to convey important meaning. For example, if color-coding is used to distinguish information in a Web document, some other distinguishing feature should also be present (such as an asterisk or other textual indication). It would be inaccurate to say that being color-blind is like viewing a black and white monitor. However, viewing a Web page on a black and white monitor (e.g. a monochrome Palm Pilot) can be a useful way to ensure that the page is comprehensible to people with different types of color deficiencies. A more accurate representation of different color-deficiencies can be experienced through the online colorblindness simulator found at www.vischeck.com.

Challenges of interface and navigation with color-blindness:

- Reds and greens are often indistinguishable.
- Other colors may be indistinguishable.

Hearing Impairments: Deafness

Facts

- There are approximately 120 million people worldwide with a disabling hearing limitation.
- Approximately 22 million Americans (8.2%) report some level of hearing loss.
- 2.4 million of these have severe hearing loss.

Web Challenges for those who are Deaf and How to Address those Challenges

In some ways, individuals with hearing impairments do not have as much trouble accessing content on the Web as individuals with visual disabilities. Most Web content is either textual or visual, neither of which requires sound. However, with the increase in the use of sound, video, plug-ins, and multimedia programs on the Web, more and more content is excluding individuals who are deaf. News sites often include video or audio clips of television broadcasts. The solution is straightforward, although it can also be labor-intensive: provide synchronized captions and/or transcripts for the audio portion of the content. The technology exists to provide either closed or open captioning for Web-based multimedia in the same way that it is provided for television shows or movies. Unfortunately, websites that make use of this technology are few and far between. The problem is especially salient in circumstances where video is the only format used to present critical information, such as in Web-based distance education courses that utilize videos of lectures or presentations. Although it is possible for some people who are deaf to read others' lips when having a conversation in person, it is essentially impossible to read the lips of a person in a Web video. The video size is usually too small, and the resolution too poor.

In addition, even if these technological barriers were overcome, the person in the video would have to continually face the camera and clearly enunciate each word visually. This is impractical in nearly all cases. Perhaps the greatest barrier to the idea of reading lips over the Web is the fact that not all people who are deaf have learned how to read lips. The use of sign language over the Web is a possibility, but it meets with some of the same problems: small video size, poor resolution, and the fact that not all deaf people use sign language. Sign language may certainly be used in some circumstances, but it is often more appropriate in addition to captions or transcripts, rather than in the place of such text-based alternatives.

Challenges of interface and navigation with deafness:

- Audio is unusable.

Deaf-Blindness Facts

- More than 10,000 children alone are deaf-blind.

Web Challenges for those who are Deaf-Blind and How to Address those Challenges

For those who are both deaf and blind, screen readers convert text into Braille, through a refreshable Braille device attached to the computer. Many of the same issues that apply to individuals who are blind also apply to those who are deaf-blind, with the exception that none of the content can be auditory. All of the content must be in a text format so that it can be converted to Braille. Because of the time-intensive nature of reading websites in Braille, Web developers should consider simplifying their pages as much as possible, so that deaf-blind individuals are not required to read extraneous or irrelevant content. Users that are deaf-blind CAN access the content on your Web page. To make your pages accessible to them, make sure that your pages are accessible to both deaf and blind users.

Motor Impairments

Facts

- The number of people worldwide with a disabling motor limitation is approximately 120 million.
- In the United States, those with spinal cord injuries are between 150,000 and 175,000, with an increase of 7,000-8,000 a year.
- Approximately 500,000 Americans are affected by Multiple Sclerosis.
- Between 500,000 - 700,000 Americans have some degree of Cerebral Palsy; approximately 15,000 babies each year are born with Cerebral Palsy with another 500 developing it in early life.

Web Challenges for those with Motor Impairments and How to Address those Challenges

There is a broad range of mobility impairments, ranging from minor conditions that may not affect Internet usage at all, to more profound disabilities that restrict voluntary movement almost entirely. Some people with mobility impairments are able to use the keyboard and mouse, although with some difficulty. These individuals may not have fine motor control, so clicking on small links (such as single letters of the alphabet) may be difficult. Others use assistive devices to access the keyboard, such as a mouth stick or a head wand. These methods are slower than those of individuals with full dexterity, but are nevertheless fully functional. Still others are limited to "puff-and-sip" switches (such as those installed on some wheelchairs) or other limited-functionality switches.

These devices emulate the functionality of the standard keyboard, to one degree or another, so keyboard access to websites is paramount. If a mouse is required to

access a certain link or function, that Web page is inaccessible to these individuals. Because of the extra physical effort that some individuals with mobility impairments must put forth, they may become fatigued quickly. Individuals using a head wand, for example, may tire of making the necessary head movements to press the tab key to navigate from link to link. This is especially true when long lists of links - such as a site's main navigational links - precede the main content of a page. The individual must make the same repetitive head movement 10, 20, or 30 times before arriving at the desired link. One way to avoid causing this kind of fatigue is to provide a way for the end-user to skip over long lists of links.

Challenges of interface and navigation with motor impairments:

- Users may not be able to use the mouse.
- Users may not be able to control the mouse or the keyboard well.
- Users may be using voice activated software.
- Users may become fatigued when using "puff-and-sip" or similar adaptive technologies.

Cognitive Impairments

Facts

- Approximately four million Americans have cognitive disabilities.
- 2.8 million students are currently receiving special education services for learning disabilities in the U.S. in our K-12 system today.
- 5.3 million Americans are living today with a Traumatic Brain Injuries-related disability.
- One in 10 persons over 65 and nearly half of those over 85 has Alzheimer's disease. A small percentage of people in their 30s and 40s develop the disease.
- It is estimated that more than 22 million individuals worldwide will have Alzheimer's by 2025.

Web Challenges for those with Cognitive Impairments and How to Address those Challenges

There are many types of cognitive impairments. Some of the more obvious ones include Downs Syndrome, Alzheimer's Disease, and the like. Less obvious cognitive impairments include reading disorders and learning disorders. The truth is that all of us have experienced moments of cognitive impairment at one time or another. For example, how well are you able to navigate through a highly technical, poorly organized website while engaged in an important phone call? Chances are that you would have difficulty with one of the two tasks because of the cognitive overload that you would be experiencing in that moment. Everyone benefits from well-designed websites, regardless of cognitive capabilities. In this context, "well-designed" can be defined as having a simple and intuitive interface, clearly worded text, and a consistent navigational scheme between pages.

Individuals with cognitive impairments also often benefit from graphics or icons that supplement the text. The graphics and icons should aid in the understanding of a page or a link. Purely decorative graphics may not help these individuals.

It is important here to address an apparent conflict between the needs of individuals with visual impairments (who benefit from text rather than graphics) and those with cognitive impairments (who benefit from graphics and icons). There is no need to interpret these needs as mutually exclusive. Those using screen readers are not harmed by the use of images, as long as alternative text is provided. Those with cognitive disabilities will not be harmed by the presence of the alternative text supplied for images. It is possible, and desirable, to create Web pages that cater to both of these audiences, without alienating non-disabled audiences.

Challenges of interface and navigation with cognitive impairments:

- Users may become confused at complex layouts or inconsistent navigational schemes.
- Users may have difficulty focusing on or comprehending lengthy sections of text.
- One method of input may not be sufficient.

Miscellaneous Category of Disabilities - Seizure disorders and Age-related disorders

Facts

- Approximately 2 million Americans have a seizure disorder.

Seizure Disorders

Accommodating people with seizure disorders is one of the easiest of all Web accessibility tasks. There is only one consideration: do not create pages that flicker at a rate that is likely to cause seizures. This rate has been defined at 2 Hz to 55 Hz. Some banner ads, designed to grab the attention of prospective customers, flash or flicker at rates that may indeed induce seizures in those susceptible to those with photoepilepsy. The solution is simple: don't do it!

Facts

- In the last 10 years the number of people over 65 grew by more than 12%, comprising about 13% of the population today.
- One third of elderly persons have a severe disability.
- 71.5% of those over 80 have a disability, 53.5% have a severe disability.
- 49% of elderly persons have arthritis, 30% have hearing impairments, and 17% have cataracts.

Age-related Processes

Another population experiencing difficulties with the Web are those with age-related disabilities. These are those who have restrictions caused by age. Typically they are a blend of the loss of vision, hearing and motor skills. Attending to the information presented earlier will take care of the needs of the elderly. If we do this now, accessible sites will be standard when we are old and frail.

6) Techniques for Accessible Web Design – Whether you are just beginning with Web page creation or are experienced in HTML, you will gain a greater understanding of how to create accessible HTML content. These guidelines can be incorporated with editing tools such as FrontPage and Dreamweaver as well as with courseware such as WebCT and Blackboard.

Follow these easy guidelines when developing and revising your Web pages to ensure that they are accessible to a diverse audience. The tutorial is based on the W3C, Web Accessibility Initiative guidelines and Section 508 standards for Web content. You may refer to the exact Web standards written to comply with Section 508 of the Rehabilitation Act at <http://www.access-board.gov/sec508/guide/1194.22.htm>

General Page Design

Designing a well-organized website helps visitors navigate through the information presented.

- Maintain a simple, consistent page layout throughout your site.
A consistent design and look makes it easier for visitors to locate the specific information they seek. For example, a feature presented on every page, such as a standard navigation menu or logo for the site should always appear in the same place. A carefully planned organizational scheme will help everyone use your site. A clear, consistent presentation will especially assist people with visual impairments or learning disabilities who have difficulty following disorganized presentations.
- Keep backgrounds simple. Make sure there is enough color contrast.
People with low-vision or color-blindness, or those using black and white monitors, can have difficulty reading information at sites with busy backgrounds and dark colors. Some background images and colors obscure text and make reading difficult. Make sure that there is enough contrast between your text and the background of the page. Choose background, text and link colors carefully, and always test your site by viewing it at different resolutions and color depths. For example, you can change your monitor settings to a resolution of 640x480 and 16 colors for one test, and change to 1024x768 and 24 bit color for another.
- Use standard HTML.
Hypertext Markup Language (HTML) is the standard code used to create websites. HTML was designed to be a universal format outside the bounds of

proprietary software and computer operating systems. The code works via tags that tell a Web browser where to find and how to display information. While nonstandard tags exist, using standard HTML as defined by the W3C will ensure that your content can be accessed by all browsers used by visitors to your site. Avoid tags, features and plug-ins that are available to only one brand or version of a browser.

- Design large buttons.
Small buttons marking links can be difficult targets for visitors with mobility impairments that result in restricted hand movements. Larger buttons can make it easier for all visitors to select the links on your page. Test how your buttons appear and operate with a variety of monitor sizes and screen resolutions.
- Caption video and transcribe other audio.
Multimedia formats that include audio can present barriers to people with hearing impairments as well as to people with less sophisticated computer systems. Provide captions and transcriptions for these resources so visitors who cannot hear have an alternative method for accessing the information.
- Make links descriptive so that they are understood out of context.
Visitors who use screen reading software can adjust their software to read only the links on a page. For this reason, links should provide enough information when read out of context. Use a more descriptive phrase than "click here" as a link or next to a graphic used as a link. For example, read the following HTML code surrounding the link:

```
<A HREF="/.about.htm"> Click here </A> for information about our company.
```

will present "Click here" as the link (you don't want to do this). However,

```
<A HREF=".about.htm">Information about our company.</A>
```

will display "Information about our company." as the link text, (which is a good, descriptive link).

- Include a note about accessibility. Notify site visitors that you are concerned about accessibility by including a Web access symbol on your page (see Resources list). Include a statement about accessibility and encourage them to notify you with their accessibility concerns. An example could be the following statement: "The pages of this website form a living document and are regularly updated. We strive to make them universally accessible. You will notice that we minimize the use of graphics and photos, and provide descriptions of them when they are included. Video clips are open-captioned, providing access to users who can't hear the audio. Suggestions for increasing

the accessibility of these pages are welcome. (Contact phone number and/or email)."

Graphical and Audio Features

People who are blind or even those with low-vision cannot view the graphical features of your website, such as pictures. Many people with visual impairments use speech output programs with nonstandard browsers (such as pwWebSpeak or Lynx). Or, they may use graphical browsers and turn off the feature that loads images. Speech output programs literally read all the text on the screen. Include text alternatives to make the content in graphical features accessible. Described below are guidelines for providing alternative text for various types of visual features.

- Include appropriate ALT or LONGDESC attributes for images or graphical elements on your page.

The ALT attribute works with HTML image tags to give alternative text descriptive information for graphical elements of a Web page. The alternative text helps visitors understand what is on the page if they are not viewing the graphic. This could be because they are blind and using a text-based browser or a graphical browser with the image loading feature turned off. The text in the following example shows what an ALT attribute looks like in HTML:

```
<IMG SRC="oatlogo.jpg" ALIGN=MIDDLE ALT="[ABLE Tech logo]">
```



When a sighted visitor views the page with a graphical browser, he will see a picture of the Oklahoma ABLE Tech logo. When someone who is blind visits, his voice output program will read [ABLE Tech logo]. This gives him a clear idea of what is on the page. In addition, any visitor coming to the site using a text-based browser will understand that there is an ABLE Tech logo there instead of the more ambiguous "image," the default result when no ALT attribute is used. ALT attributes should be short (less than 5 words) since browsers sometimes have difficulty displaying lengthy ALT text. On a Web page, the ALT text pops up when the cursor is placed on it.

A WYSIWG editing tool such as FrontPage and Dreamweaver have property windows that also allow you to type in the ALT Text in a box. This information can be found in the editing tool help guide or manual.

When using text to describe complex graphs or charts, or to transcribe sound files containing speech or lyrics, summarize the information next to the element, or consider using the LONGDESC attribute, which provides for more detailed text than ALT. Lengthy descriptions can also be linked to an external document or immediately follow the graphic or sound element by

using the letter "D" to link to another document that contains the lengthy description.

- Include menu alternatives for image maps to ensure that the embedded links are accessible.

In an image map (also called ISMAP), a part of a picture can be clicked to activate a link to another page. For example, on a map of the United States, a visitor might click on an image of the State of Oklahoma to find information about the state. If the Web page developer has not included an alternative menu, visitors using text-based browsers can be totally blocked from the site, or sent on a wild goose chase clicking unlabeled links. The following example does not include an alternative menu for the image map.

```
<HTML>
<TITLE> Our library Page</TITLE>
<BODY>
<A HREF="home.map">
<IMG SRC="images/home.jpg"ismap </A>
<BODY>
<HTML>
```

When viewed through a graphical browser such as Netscape Navigator or Internet Explorer, a beautiful picture of a floor map of a library appears. The visitor can choose selected areas of the library to view. When a visitor using a text-based browser visits the site, this is what he sees:

Our Library Page
[ISMAP]

At this point the visitor is stuck, because text-based browsers will not interpret the hypertext links embedded in the image map. His only option is to back out of the site. A visitor who uses a text-based browser, perhaps because he is blind, can't get to your information unless an alternative is provided. The accessibility of an image map depends on the software used as a website's server. Check with your system administrator to find out about the capabilities of your Web server software. Some server software will automatically render text links for image maps while other versions will not. Providing text alternatives to image-based links will ensure image maps are available to the widest audience.

- Include descriptive captions for pictures and transcriptions of manuscript images.

Providing ALT text for an image is sufficient for logos and graphics that contain little information content. However, if the graphics provide more extensive information, adding captions and transcriptions is important for those who cannot see your page because they are using a text-based browser or they have turned off the graphics loading feature of their browser. This

includes people who are blind. If you are not sure how critical a particular image is to the content of a page, temporarily remove it and consider the impact of its loss. If you present information in an image format, such as a scanned-in image of a page of a manuscript, be sure to also provide a transcription of the manuscript in a straight text format. This alternative is useful for many visitors, including those with visual impairments and those with learning disabilities who may have difficulty reading the original document.

- Use a NULL value for unimportant graphics.
Some graphical elements may add no content to a page and can be bypassed from viewing by using an ALT attribute with no text. By using just two quotation marks with no content, you can reduce the amount of distracting text when a page is viewed with graphics capabilities turned off or with a text-based browser. For example, the HTML for a divider bar could be:

```
<IMG SRC="/purplebar.gif" ALIGN MIDDLE ALT="">
```

Sighted visitors will see the divider bar, while those visiting via a text browser will see/hear nothing.

- Provide audio description and captions or transcripts of video.
If your multimedia resources provided on your site include video, people who can not see will be unable to use this information unless it is provided in an alternative format. A synchronized text transcription provided with the video will give a visitor who cannot see, or who doesn't have the appropriate viewing software, access to the information in your video clip. Their screen reader will read aloud the text transcription. It is also important to describe what is happening in the movie for users who may not be able to see what is happening. An alternative to the synchronized text track would be a transcript of the video providing both descriptions of what is happening and also the audio transcript.

Captions on a video and transcripts also provide access to the content for those who cannot hear. (Resources below for captioning video and audio description for video) Always provide a text version of any stand-alone audio files. If the clip is short, you can place the text in the link or in the ALT tag of an image associated with the link. If the file is long, you may want to consider linking to a page that contains the transcript. If you use sound to enhance a page, provide text to describe the sound. This is especially important if you embed sounds that are played automatically. You should always give the user the ability to turn the sound off.

Apple's QuickTime allows you to provide captions which can be synchronized with the movie. For more information, view Apple's QuickTime and SMIL (<http://www.apple.com/quicktime/authoring/qtsmil.html>). The World Wide Web Consortium has developed a standard for synchronizing media used in

multimedia files. This standard is known as Synchronized Multimedia Integration Language (<http://www.w3.org/TR/REC-smil/>). Many companies have developed products which allow you to develop multimedia for the Web. Most of these products produce files that are played using Real Networks G2 player. A list of development tools is provided by Streaming Media World (<http://smw.internet.com/smil/tools/authoring.html>).

- Consider other options for making graphical features accessible.
Some Web designers make an image accessible by placing a hyperlink "D" (for description) immediately before or after an image that links to another page with an image description. At the end of each description another hyperlink returns the user to the original page. This method should be used with caution as it can add unnecessary navigational complexity to the site.
Example:



D) The linked page contains the following: “A globe, marked with a grid, tilts at an angle. A keyhole is cut into its surface. This image is used to denote that a website contains accessibility features to accommodate the needs of users with disabilities.” The graphic is linked to the following website: <http://ncam.wgbh.org/>

Some organizations with graphic-intensive Web pages provide a separate text version of their site to ensure accessibility. This adds maintenance time and complexity because two versions of a site must be updated simultaneously. It also segregates site visitors according to the type of equipment they use to access the Web. As much as possible, design a single version of your site so that it is accessible to all visitors.

Special Features

- Use tables and frames sparingly and consider alternatives.
Most screen reader programs read from left to right, jumbling the meaning of information in tables. Some blind visitors can interpret tabular information, but it is best to look for other ways to present the information to ensure that visitors with visual impairments can reach your data. In the same vein, frames can be difficult for text-based screen reading software to access. Evaluate whether frames are truly necessary at your site. When frames are used, ensure that frames are labeled with the TITLE attribute, provide a text alternative with NOFRAMES, and use the TARGET = "_top" attribute to ensure useful Uniform Resource Location (URL) addressing is provided for each interior frame.
- Provide alternatives for forms and databases.
Some combinations of browsers and screen readers encounter errors with nonstandard or complex forms. Always test forms and databases with a text-

based browser. Include an e-mail address and other contact information for those who cannot use your forms or database.

- Provide alternatives for content in applets and plug-ins.
As future versions of software develop, applets (such as programs created with JavaScript) and plug-ins (such as Adobe Acrobat) may provide accessibility features. However, many of these programs are currently not accessible to people using text-based browsers. To ensure that people with visual and hearing impairments can access your information, provide the content from these programs in alternative, text-based formats. When using JavaScript, make sure to employ the built-in accessibility features within the Java Developer's Kit. (Java accessibility resources at <http://www.sun.com/access/>).

Website Test

Test your website with a variety of Web browsers, and always test your pages with at least one text-based browser and with multi-media browsers with graphics and sound-loading features turned off. This way you will see your Web resources from the many perspectives of your users. Also view the resources at your site using a variety of computer platforms, monitor sizes, and screen resolutions. Make sure you can access all of the features of your website with the keyboard alone; this test simulates the experience of Web users who cannot use a mouse. Make use of accessibility testing sites and software such as:

- A-Prompt <http://aprompt.snow.utoronto.ca/>
- Bobby <http://www.cast.org/bobby/>
- HTML Tidy <http://www.w3.org/People/Raggett/tidy/>
- Trace Center <http://www.trace.wisc.edu>
- The Wave http://www.temple.edu/inst_disabilities/piat/wave/
- W3C HTML Validation <http://validator.w3.org/>
- W3C Link Checker <http://validator.w3.org/checklink>
- W3C CSS Validator <http://jigsaw.w3.org/css-validator/>

Resources for Accessible Web Page Design and for Electronic and Information Technology

1. [A-Prompt](http://aprompt.snow.utoronto.ca/), developed by the University of Toronto and The Trace Research and Development Center, is a tool for Web authors that works with existing HTML editors. <http://aprompt.snow.utoronto.ca/>
2. [Access at Adobe](http://access.adobe.com/) <http://access.adobe.com/>
3. [The Access Board](http://www.access-board.gov/) is an independent Federal agency devoted to accessibility for people with disabilities <http://www.access-board.gov/>
4. ADA accessibility requirements apply to Internet Web pages. (1996). The Law Reporter, 10(6), 1053-1084.
5. [AWARE Accessible Web Authoring Resources and Education Center](http://aware.hwg.org/), <http://aware.hwg.org/>

6. [AccessIT - National Center on Accessible Information Technology in Education](#) University of Washington serves to increase the access of individuals with disabilities to information technology in educational institutions at all academic levels nationwide and is located at the University of Washington in Seattle. <http://www.washington.edu/accessit/>
7. [Americans with Disabilities Act of 1990](#)
<http://www.usdoj.gov/crt/ada/adahom1.htm>
8. [Audio Description Resources:](#)
 - Descriptive Video Service <http://DVS.wgbh.org/>
 - VITAC (Vital Access) <http://www.vitac.com/>
 - WGBH Descriptive Video Service <http://main.wgbh.org/wgbh/access/dvs/>
9. [Bobby WorldWide](#) is a Web-based tool that analyzes Web pages for their accessibility to people with disabilities using both the Section 508 guidelines and the Web Content Accessibility Guidelines (WCAG) from the Web Access Initiative. The HTML validation program is designed to test accessibility and highlight nonstandard and incorrect HTML. Type the URL of your page, and a program checks it and gives you feedback on accessibility problems. The downloadable version of Bobby WorldWide is now available for a fee.
www.cast.org/bobby/
10. [Captioning Resources:](#) (see also Web Video Captioning below)
 - Access to Rich Media <http://ncam.wgbh.org/richmedia/>
 - Media Access Generator <http://ncam.wgbh.org/webaccess/magpie/>
 - Multimedia & Virtual Reality Access <http://trace.wisc.edu/world/web/#multivr>
 - Association of Late-Deafened Adults <http://www.alda.org/>
 - Caption Center <http://captioncenter.wgbh.org/>
 - Caption Perfect <http://members.aol.com/captioning/>
 - Captionmax, Inc <http://www.captionmax.com/>
 - Gallaudet University <http://www.gallaudet.edu/>
 - National Captioning Institute <http://www.ncicap.org/>
 - National Court Reporters Association <http://www.ncraonline.org/>
 - Self Help for Hard of Hearing People <http://www.shhh.org/>
 - VITAC (Vital Access) <http://www.vitac.com/>
11. The [Center on Information Technology Accommodation](#) discusses accessibility of technology and Web resources
http://www.gsa.gov/Portal/content/offerings_content.jsp?contentOID=22804&contentType=1004&PMKC=1&S=1
12. [Distance Education: Access Guidelines for Students with Disabilities August 1999](#) <http://www.htctu.fhda.edu/dlguidelines/final%20dl%20guidelines.htm>
13. [DO-IT \(Disabilities, Opportunities, Internetworking and Technology\)](#) hosts a rich collection of resources, including links to Internet resources for accessible Web design. <http://www.washington.edu/doi/>
14. [DO-IT Faculty Room](#) is a space for faculty and administrators at postsecondary institutions to learn how to create classroom environments and activities that

maximize the learning of all students, including those with disabilities. It includes six primary areas that address issues faced by postsecondary educators: accommodation strategies, rights and responsibilities, faculty resources, interactive faculty presentations, DO-IT Prof, and resources for staff and administrators. <http://www.washington.edu/doi/Faculty/>

15. [EASI's](#) (Equal Access to Software and Information) offers online courses on Web accessibility and certificate programs in IT accessibility. A certificate program is available for librarians to meet recent ALA policy requiring accessible libraries for people with disabilities. <http://www.isc.rit.edu/%7Eeasi/>
16. [Effective Color Contrast and Partial Sight](#) http://www.lighthouse.org/color_contrast.htm
17. [Federal Information Technology Accessibility Initiative](#), "508 Universe" <http://www.section508.gov/>
18. [HiSoftware](#) <http://www.hisoftware.com/access/msaccessdays.html>
19. [HTML Writer's Guild](#) offers online course, Accessible Web Design. <http://www.hwg.org/>
20. [The Information Technology Technical and Training Center \(ITTATC\)](#) Technical Assistance and Web Accessibility Course <http://www.ittatc.org/>
21. [International Center for Disability Resources on the Internet](#) <http://www.icdri.org/>
22. [Jakob Nielsen's useit.com](#). Website with some articles on usability and design. <http://www.useit.com/>
23. [Java accessibility resources](#) are discussed at Sun Microsystems' Enabling Technologies Program. <http://www.sun.com/access/>
24. [JAVA Accessibility Program](#) Trace R&D Center <http://trace.wisc.edu/world/java/index.html?java>
25. [Java Accessibility Helper by Sun](#) reports on any of a fairly large list of known and potential problems, but does not guarantee that the application is fully accessible, let alone fully compliant with Section 508. This tool helps identify a great many accessibility problems as well as a host of problems that likely impact 508 compliance, and Sun recommends that all Java application and applet developers use this tool to help them write accessible graphical user interfaces using the Java platform. You can download an Early Access edition of this tool (it is not yet final) from the Sun Java developer website. <http://developer.java.sun.com/developer/earlyAccess/jaccesshelper/>
26. [Microsoft Introduction to Accessible Web Pages](#) <http://msdn.microsoft.com/library/default.asp?url=/nhp/Default.asp?contentid=28000544>
27. [The National Center for Accessible Media \(NCAM\)](#) promotes the use of a Web Access symbol and provides examples of accessible pages. NCAM also contains valuable resources on providing captions to streamed video resources. <http://ncam.wgbh.org/>
28. [NCSA Mosaic Access Page](#) <http://bucky.aa.uic.edu/>
29. [Opening Doors to IT, Section 508](#), Main federal website supporting Section 508. <http://www.section508.gov/>

30. [Section 508 Standards of the Access Board](http://www.access-board.gov/sec508/508standards.htm) <http://www.access-board.gov/sec508/508standards.htm>
31. [Section 508 Federal Agency Coordinators](http://www.section508.gov/index.cfm?FuseAction=Content&ID=84) <http://www.section508.gov/index.cfm?FuseAction=Content&ID=84>
32. [The Trace Research and Development Center](http://www.trace.wisc.edu/) provides resources for the design of accessible Web pages including applet and plug-in features. <http://www.trace.wisc.edu/>
33. [UCLA's Disabilities and Computing Program; Web Accessibility Program](http://www.dcp.ucla.edu/resources/accessibility.htm) <http://www.dcp.ucla.edu/resources/accessibility.htm>
34. [University of Washington, Making UW Websites Accessible for Everyone](http://www.washington.edu/computing/accessible/index.html) <http://www.washington.edu/computing/accessible/index.html>
35. [The WAVE](http://www.temple.edu/inst_disabilities/piat/wave/) free Web-based tool to help users check accessibility. http://www.temple.edu/inst_disabilities/piat/wave/
36. [WebABLE](http://www.webable.com/) is a general source of information on disability issues with many links. <http://www.webable.com/>
37. [WebAIM -Web Accessibility In Mind](http://www.webaim.org/). Its goal is to improve accessibility to online learning opportunities for all people; in particular to improve accessibility for individuals with disabilities who currently may have a difficult time getting access to postsecondary online learning opportunities. <http://www.webaim.org/>
38. [WebAIM Section 508 Web Accessibility Checklist for HTML and Scripts, Plug-ins, and Java with helpful guidelines to comply with Section 508.](http://www.webaim.org/standards/508/excerpts) <http://www.webaim.org/standards/508/excerpts>
39. [WebAIM, Section 508 excerpts pertaining to internet only - software and web based.](http://www.webaim.org/standards/508/excerpts) This also contains a chart that compares 508 with WCAG guidelines. <http://www.webaim.org/standards/508/excerpts>
40. [World Wide Web Consortium \(W3C\) Web Accessibility Initiative](http://www.w3.org/WAI/) outlines the strategies and tools for creating websites that are highly usable. <http://www.w3.org/WAI/>
41. [W3C, WAI - Getting Started: Making a WebSite Accessible](http://www.w3.org/WAI/gettingstarted) <http://www.w3.org/WAI/gettingstarted>
42. [W3C, WAI - Evaluation, Repair, and Transformation Tools for Web Content Accessibility](http://www.w3.org/WAI/ER/existingtools.html) <http://www.w3.org/WAI/ER/existingtools.html>
43. [W3C, WCAG Checklist of Checkpoints](http://www.w3.org/TR/WCAG10/full-checklist.html) <http://www.w3.org/TR/WCAG10/full-checklist.html>

Web Video Captioning

- [Creating Video Products that are Accessible to People with Sensory Impairments](http://www.washington.edu/doit/Brochures/Technology/vid_sensory.html) http://www.washington.edu/doit/Brochures/Technology/vid_sensory.html
- [CPB/WGBH National Center for Accessible Media \(NCAM\)](http://ncam.wgbh.org/) <http://ncam.wgbh.org/>
- [WGBH Descriptive Video Service](http://main.wgbh.org/wgbh/access/dvs/) <http://main.wgbh.org/wgbh/access/dvs/>
- [Trace Center R&D's Multimedia and Virtual Reality Access](http://trace.wisc.edu/world/web/#multvr) <http://trace.wisc.edu/world/web/#multvr>

Legal Requirements and Guidelines Related to Accessible Programs and Services

Americans with Disabilities Act (1990)

The Americans with Disabilities Act (ADA) of 1990 requires that U.S. programs and services be accessible to individuals with disabilities. The Americans with Disabilities Act of 1990 (42 U.S.C. 12131) prohibits discrimination on the basis of disability by public accommodations and requires places of public accommodation and commercial facilities to be designed, constructed, and altered in compliance with the accessibility standards. Title II of the ADA extends this prohibition of discrimination to include all services, programs, and activities provided or made available by State and local governments or any of their instrumentalities or agencies, regardless of the receipt of Federal financial assistance. <http://www.usdoj.gov/crt/ada/pubs/ada.txt> or Access Board link <http://www.access-board.gov/about/ADA.htm>

Americans with Disabilities Act, Title II-§35.150, Existing Facilities

A public entity shall operate each service, program, or activity so that the service, program or activity, when viewed in its entirety, is readily accessible to, and useable by, individuals with disabilities. In choosing among available methods for meeting the requirements of this section, a public entity shall give priority to those methods that offer services, programs, and activities to qualified individuals with disabilities in the most integrated setting appropriate.

A 1996 Department of Justice ruling makes it clear that ADA accessibility requirements apply to Internet resources.

Rehabilitation Act, Section 504 (1973)

Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) prohibits discrimination on the basis of handicap in federally assisted programs and activities. <http://www.dol.gov/dol/oasam/public/regs/statutes/sec504.htm>

Rehabilitation Act, Section 508, As Amended in 1998

Section 508 of the Rehabilitation Act requires Federal departments and agencies to take into consideration accessibility when developing, procuring, or using electronic and information technology. Section 508 also mandated the Access Board (<http://www.access-board.gov>) to develop standards for compliance. The standards were published in the Federal Register on December 21, 2000 and Federal agencies were expected to be in compliance by June 21, 2001.

In 2001 the U.S. Architectural and Transportation Barriers Compliance Board (Access Board) developed standards to which Web pages of Federal agencies must comply. <http://www.access-board.gov/sec508/508standards.htm>.

The Assistive Technology Act of 1998 P.L. 105-394 requires that the state agencies of states that accept funding under this Act comply with Section 508. The list of guidelines for accessibility provides a good model even for organizations that are not required to comply.
<http://www.section508.gov/docs/AT1998.html>

Workforce Investment Act of 1998, Section 188 – Nondiscrimination

As clarified in §29 CFR Part 37, requires a recipient to provide both accessible facilities (that is, both program accessibility and architectural accessibility) and reasonable accommodations, as modeled by Title II of the Americans with Disabilities Act.

Implications of Section 508 for Higher Education

Section 508 applies directly to Federal agencies, but its impact is much broader. Some Federal legislation requires compliance to the Section 508 standards as a condition of funding, such as the Assistive Technology Act of 1988, (www.section508.gov/docs/AT1998.html). In general, the degree and manner in which these standards "carry down" with Federal funding is not clear and is being explored in a number of court cases.

- Many state and local government entities and other institutions have voluntarily adopted the Section 508 standards, such as Texas and Arizona. Universities that have adopted the standards include the University of Hawaii and the University of Georgia.
- Since Section 508 was passed, a large effort has been underway throughout the Federal government to make websites accessible. Books, Web tutorials, and classes on accessible Web design have been created. Faced with the threat of losing the Federal government as a customer, many software companies have modified their products to make them more accessible.
- Web publishing programs such as Macromedia DreamWeaver, Microsoft Frontpage, and Adobe GoLive now include features to help design accessible websites.

Detailed Information on Section 508 Technical Standards

Section 508 standards are technical specifications and performance-based requirements, which focus on the functional capabilities covered by technologies. The standards are organized into six sections:

1. Software Applications and Operating Systems
2. Web-based Intranet and Internet Information and Applications
3. Telecommunications Products
4. Video and Multimedia Products
5. Self Contained, Closed Products
6. Desktop and Portable Computers

For further information on Section 508:

- Access Board Fact Sheet on Section 508
<http://www.access-board.gov/508.htm>
- Access Board - Electronic and Information Technology Accessibility Standards. Section 1194.22 is specific to Web-based intranet and internet information. <http://www.access-board.gov/sec508/508standards.htm>
- US General Services Administration official Section 508 Website, Federal Information Technology Accessibility Initiative, <http://www.section508.gov>
- The "508 Universe" serves as a central hub for GSA's Section 508 TRAINING AND INFORMATION resources. <http://todl.anteon.com/508/>
- Summary of the entire Section 508 standards
http://www.section508.gov/final_summary.html

The World Wide Web Consortium (W3C) develops the common protocols used on the Web to insure interoperability to promote universal access (<http://www.w3.org/WAI/>). The W3C's Web Accessibility Initiative (WAI) has proposed guidelines for all Web authors. As Tim Berners-Lee, Director of the W3C puts it: "The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."

Architectural Access

The Americans with Disabilities Access Guidelines (ADAG) provides standards for architectural access. They include, but are not limited to, standards for building access, accessible parking, Braille and raised letter signage, and visual alerting. These are national standards for facility access developed by the Access Board.

Implementation

Written policies and procedures provide a mechanism to insure consistent technology accessibility for all individuals.

Policy Development

Policies should be developed and resources allocated to assure facility and program access. Such policies should include adoption of the standards described in Section II as requirements for a basic floor of access. In addition, procedures should be developed describing how communication access, beyond that provided by the standards in Section II, will be provided by entities when necessary for program access and effective communication. Procedures should be developed to complete the following:

- 1) Architectural barriers should be removed and access features added as necessary for ADAG compliance.
- 2) Basic assistive technology, meeting the recommendations in Section I, should be purchased and installed to assure access to telephony, computer data/sound, print, and aural communication.
- 3) On-going training and/or technical assistance should be provided to staff regarding:

- a) Installation and use of basic assistive technology purchased;
 - b) Procedures and local resources to be used in the arrangement of auxiliary aids and services, such as sign language interpreting, Braille transcription, etc.;
 - c) Response to requests for auxiliary aids and services beyond those provided in Section II; and,
 - d) Guidance on disability etiquette and culture.
- 4) A written plan should be in place describing how the entity will accommodate the program and architectural access needs of persons with disabilities.

Material Development

Promotional materials, in a variety of accessible formats and media, should be developed by entities to market the availability of their accessible technologies and services.



Oklahoma ABLE Tech

Oklahoma State University Seretean Wellness Center
1514 W. Hall of Fame
Stillwater, OK 74078
1-800-257-1705 Voice/TTY
405-744-2487 (Fax)
<http://okabletech.okstate.edu>



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Serving: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas

Address: Independent Living Research Utilization (ILRU)

Suite 1000

2323 South Shepherd

Houston, TX 77019

(713) 520-0232

(800) 949-4232

TTY: (713) 520-5136

<http://www.ilru.org/dbtac/index.html>