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Integrating Accessible Design into the Educational Web Design Process

[Alan Foley](#)

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EDITOR'S NOTE

Living Article Introduction

The content of the Living Article focuses on the accessibility of web design and how it affects people's use of technology. The multiple themes discussed within this article address the following questions: what is accessibility; why is accessibility important in educational web design; and who benefits from accessible web design? The author's intent in writing the article is to provide an introduction to and context of the issues at stake in educational web design.

In answer to these questions, we hope to receive responses in the form of anecdotal evidence, relevant research in this area, and commentary on the topic from various points of view. As we begin to compile these responses, they initially will be reviewed (to ensure that they are indeed responses to the article) and then posted intact in a manner similar to bulletin board type postings. They will later be edited into the article and cited using links to the entire response. In this way, the article will evolve. We plan to maintain all versions of the article in an archive (linked from the most current version of the article) so that the process itself can be examined.

We hope that you will find the information presented both useful and thought provoking. We also hope that you will share the thoughts that the article has provoked with us. We look forward to the collaboration.

How to Respond to this Living Article

We encourage responses to any and all elements of this article. Our goal is to create a living document that will reflect numerous points of view that are based

on personal opinion, experience, and anecdotal evidence, as well as rigorous educational research. Obviously, we are hoping to generate some answers to the questions that we have posed. However, that does not preclude the possibility that this article may generate additional questions. The exciting thing about this living document is that we really don't know where this will lead. That is up to you. We are anxiously waiting for your responses.

Responses may be sent in the body of an email message or as an attachment and should include your name and professional affiliation (work setting, title, etc.) as well as complete reference information for any material that you may cite in your response. Be sure to include any relevant Internet links so that we can include those as additional sources of information for our readers. If sending an attachment, please describe the type and version of software used to create the attachment and include contact information so that we may get in touch with you if there are any problems in reading the attachment. Send all responses to Meridian_mail@ncsu.edu with the words "Living Article-A. Foley" in the subject line of the message.

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Introduction

The way we think about how people use computers informs our attitudes toward how we design web sites. We often tend to think of those who use the websites we design as passive users in the process rather than active participants in a generative exchange. A productive starting point for thinking about this is Brenda Laurel's (1993) work that moves considerations of how people interact with technology away from the notion of mere "computer users." Laurel views computers as theatre - an experience that varies from viewer to viewer and that is dependent on varying experience, attitudes, and ideas. Laurel suggests that humans working with computers are not merely "users," but human agents. The potential that a person has, not as merely a computer user, but as a person acting with agency to shape her own experience adds endless possibility to the conception and mediation of identity and agency. This notion that there is agency possible when using computers is an important one, because just as the possibility for agency exists, so does the possibility for domination and unequal power relations. Considering computer users as agents shaping their experience offers hope for those trying to utilize computers and the Internet as ways to ameliorate some of the less-than-desirable effects of the information revolution. This notion of the agent also forces web designers to think about the people who will be using their web site – what experiences, background, learning styles, and abilities they bring to the experience. Web designers often do not make these considerations for a variety of reasons.

The rapid growth of the Internet has changed the ways people communicate, teach, and learn, while at the same time increasing the isolation of those who do not have access to information technologies. As methods of teaching with Internet technologies continue to proliferate and more educational materials are placed online, it is important that educators consider the social, political, and

pedagogic implications of disability and difference and the Internet. What most discussions about accessibility in education fail to recognize is that access is not about the “limitations” of the individual, rather it is about society’s inability to accommodate difference (Charlton, 1998). Similarly, educators who might be aware of learning style and difference in a classroom setting often lose that awareness in an online environment¹.

Educators often do not consider the broader implications of accessibility for two general reasons. Schools have, historically, delegated the issue of disability to Special Education. This separation within schools has created an environment where most teachers do not think of disability as a larger issue. This tendency runs aground when education goes online. Additionally, the notion of accessibility is ill defined and is often only thought of in terms of specific disabilities, not benefit for the larger community.

As an educational technologist, a continuing concern of mine is the teaching of and use of technologies like the Internet in socially just and inclusive ways. It is at the intersection of educational technology and efforts for social justice where web accessibility comes into play. Accessible web design ties in with many of the notions of the progressive tradition of education. The progressive tradition in education, while initially conceived to facilitate the education of democratically engaged citizens, has broad implications for the teaching of technology. One of these implications is respect for diversity. This requires that each individual be recognized for her or his own abilities, interests, ideas, needs, and identity. The progressive tradition also necessitates a critical and socially engaged dialogue with concerns for issues of social justice, equality, and access to learning. These concepts are even more vital online. When education is taken out of the classroom – out of the traditional school environment, a whole new range of possibilities and limitations occur.

It is important to note that accessible web design benefits all. By ensuring that content is accessible to a variety of individuals, many unintended obstacles are removed from the process for all. While accessibility most specifically refers to making web pages accessible to individuals with disabilities, the principles that guide accessible design are broadly applicable. When we place information on the web, we drastically increase the potential audience for that information.

There are multiple themes discussed within this article. These themes address the questions: what is accessibility; why is accessibility important in educational web design; and who benefits from accessible web design? Toward this end, several definitions of accessibility are offered in order to broaden awareness of web accessibility for issues, the legal and social mandates for web accessibility are discussed, and the broader implications for accessibility are discussed. This article deals primarily with the issue of accessibility, but issues of accessibility overlap in places with issues of usability. Because of this overlap, usability issues will be discussed but only as they pertain to accessibility. This article is not a technical “how-to.” Granted, some technical information is given, but the intent here is to provide an introduction to and context of the issues at stake in educational web design. There are links to additional information at the end of this article.

What is Accessibility (and Usability)?

The challenge for designers of web-based educational materials is to create materials that are engaging, appropriate, and accessible. The first two terms immediately resonate with educators, and the third term, “accessible,” probably does as well, but the exact meaning might be amorphous. Strictly defined, accessible has the following definitions:

1. Easy to enter or reach physically
2. Able to be appreciated or understood without specialist knowledge
3. Able to be obtained, used, or experienced without difficulty
4. Not aloof and not difficult to talk to or meet with
5. Susceptible to or likely to be influenced by something
6. Able to be referred to from another possible world, so that the truth value of statements about it can be given (Encarta world English dictionary, 1999)

Immediately, one might think accessibility refers to access to the technology with which to utilize various educational media. This is an important and relevant interpretation of the term. It is in this definition of accessibility that we must consider the issues of the “Digital Divide”: race and ethnicity, gender bias, and other areas where inequity exists in regard to access to resources. This reading of the term accessible is a crucial component in the progressive tradition of education, but is also applicable to other conditions that technology necessitates.

Traditionally educators have accommodated individual needs without changing courses (Bowe, 2000). Components of a standard curriculum are modified in some way to make them accessible to an individual with a disability. This is often referred to as accessibility – making materials accessible to those with disabilities. Conversely, usability generally refers to the functionality of a site for a broad group of people. Most current legal and technical guidelines for web accessibility (e.g. the W3C WCAG and Section 508 – discussed below) focus primarily on making web content accessible to individuals with disabilities. This is an important facet of web design. For the purposes of the article, these guidelines and definitions will be used as starting points for discussion on making accessibility an integral part of educational web design.

Accessibility concomitantly describes several processes: the ability of the user to access information electronically; the efforts made by the designer to enable a page to function with the assistive devices and multiple technologies; and an understanding of the nature of difference that might span the audience of a particular web site. Usually, efforts toward accessibility will greatly increase the usability of a site as well.

For the user, the challenge of accessibility is to identify the tools that will provide the most convenient access to web-based and other electronic information. For the designer, the challenge of accessibility is to remove the obstacles that prevent these tools from functioning properly. In many cases, these challenges are relatively simple to overcome; others require a bit more thought and effort.

An important component of understanding accessibility is understanding how disability is defined and what technologies individuals with disabilities use. Disabilities are broad and difficult to categorize. A 1997 report by the U.S. Census Bureau² categorized 19.6% of the U.S. population as having some sort

of disability. Within that group are individuals with visual impairments, hearing impairments, cognitive impairments and motor impairments. Each category describes a much wider range of conditions. For example, vision impairments include limited vision, color blindness, and blindness. These categories may also describe temporary disabilities. For example someone with a broken wrist may have difficulty using a mouse, but still needs access to the Web to meet the day-to-day requirements of their job. At the same time, statistics about individuals with disabilities may be misleading. As we get older, most of us will face a disability of some kind. While on the whole, nearly 20% of the U.S. population has a disability; these numbers get higher as the population ages (see Table 1). For example, almost 75% of the population over 80 years old has a disability. Thus, accessibility is about more than just opening doors, it is also about keeping them open. Accessibility allows us to maintain a level of independence that age and disability would likely otherwise make difficult. For K-12 educators, issues of age might seem irrelevant, but ignoring them excludes the parents, grandparents, teachers, and other adults who participate in a child's educational process.

Table 1

Prevalence of Disability by Age: 1997

	Total	Number w/Disability	Percent w/Disability
All ages	267,665,000	52,596,000	19.60%
Under 15 years	59,606,000	4,661,000	7.80%
15 to 24 years	33,961,000	3,430,000	10.10%
25 to 44 years	83,887,000	11,200,000	13.40%
45 to 54 years	33,620,000	7,585,000	22.60%
55 to 64 years	21,591,000	7,708,000	35.70%
65 years and over	32,064,000	17,480,000	54.50%



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Users with disabilities frequently rely on hardware and software to successfully interact with web content. These tools, otherwise known as assistive technologies, range from screen readers to touch screens and head pointers

Blind users of the Web frequently use software called a screen reader to read the contents of a web page out loud. Screen readers allow users to hear the contents of a web page rather than read them. However, a screen reader can only read text, not images or animations. Thus, it is important that images and animations have text descriptions associated with them for a screen reader to use. This text is called alternative text, or "alt" text. Two common screen readers are JAWS from Freedom Scientific³ and Home Page Reader from IBM⁴.

Touch screens and head pointers replace the functionality of a mouse for users with mobility issues. These tools allow users with little or no use of their hands to interact with the computer. A user operates a stick or other implement to activate links, complete forms or write e-mail on the keyboard or touch screen. In these cases, it is very important that essential components of the page work without a mouse. Rollovers, dropdown menus and interactive simulations are all examples of elements that are typically dependent on the mouse for user interaction. Testing a page for use without a mouse is quite simple. In Internet Explorer, pressing the Tab key moves the focus of the browser between links on the page. Pressing the Enter key activates links much like clicking a mouse. Testing a page with these two keystrokes provides a quick and easy test of a page's reliance on (or independence from) a mouse.

In addition to the efforts of users and designers to make web content accessible, there are several standards on which to base web design.

Accessibility Standards

Accessibility standards help web designers identify and address accessibility issues. The World Wide Web Consortium's (W3C) Web Content Accessibility Guidelines⁵ (WCAG) were the first major effort to establish guidelines for design. This standard consists of 14 guidelines, each with three levels of checkpoints. Priority One checkpoints are those that the web developer must satisfy to insure that the page itself is accessible. Priority Two checkpoints are those that the web developer should satisfy to ensure that certain groups will be able to access information on the web page. Priority Three checkpoints are those the web developer may do to ensure that all content on the page is completely accessible. The WCAG is not a legal mandate, but rather a comprehensive set of guidelines to ensure accessibility.

In addition to the WCAG guidelines, there are emerging legal mandates for accessibility. Currently, there is no direct legal mandate for K-12 or university web sites, but there is strong precedent. Indeed, many states and universities are developing their own standards based on the WCAG. In the United States Section 508 of the Federal Rehabilitation Act⁶ sets standards for web pages designed or maintained by federal agencies. The regulations referred to as Section 508 are actually an amendment to the Workforce Rehabilitation Act of 1973. Section 508 requires that electronic and information technology that is developed or purchased by the federal government is accessible by people with disabilities.

Section 508 does not directly apply to the private sector. While many institutions have adopted the standard outlined in Section 508 as part of their accessibility policy, they are not required to do so under the current law. However, there is widespread expectation that similar laws may be passed in the future regarding the publication of web sites in organizations that receive federal funds. Predicting future legislation is a tricky endeavor at best, though it seems inevitable that accessibility policy will be more broad-based some point in the future.

Why is Accessibility Important?

Accessibility represents an important step toward independence for individuals with disabilities and it also guarantees broader access for all users of the web. Accessible web pages provide access to a broader range of employment and educational opportunities by providing individuals with other means of communicating via distance or face-to-face. Accessible web pages allow users with disabilities to participate in day-to-day activities many of us take for granted, such as reading a newspaper or buying a gift for a loved one.

As with many improvements intended for individuals with disabilities, the enhancements of accessible design offer benefits for all users of the Web. Anyone who has pushed a shopping cart out of a grocery store can attest to the value of automatic doors and ramps cut into curbs. Similarly, accessible Web design creates pages that are often easier to read, easier to navigate and faster to download. This allows for a larger participating audience of more people in more situations.

Accessible design is based on the premise that pages must work with browsers other than Netscape Navigator or Internet Explorer. A page must be accessible whether using a screen reader, refreshable Braille display or a head pointer. At the same time, this often makes the same pages available to other Internet devices such as WAP-enabled phones or hand held PDAs.

The following examples illustrate how accessible design benefits all.

Hearing Impairment

For users with hearing impairments, auditory content needs to be provided as text. Most people are familiar with captioning. With the growing availability of video on the web, surprisingly little of this content is captioned. This severely restricts the ability of people with hearing impairments to take advantage of video delivered over the web.

A student with a hearing impairment is working on a history project on civil rights speeches. The student is using the Internet for research on this topic and locates a site that contains a library of key civil rights speeches. On this particular site, all the speeches are only stored in an audio file format, such as .wav or real media. Because of the singular format of the speeches, the student is unable to utilize any of the information on this site. The information is only available in an audio format. A solution to this problem would be including a text transcript of the speeches. The student could then read the text.

From a more general perspective, this solution makes the site more usable - a better and more functional site for all. The inclusion of a text transcription helps those individuals who might have difficulty understanding the audio such as students for whom English is a second language. The presentation of material in multiple formats benefits students who learn better by reading rather than by hearing, or want to more closely study specific aspects of the text. The inclusion of different technology (text and audio) benefits those students who don't have the technological resources to access the audio. These resources include necessary bandwidth, a computer with a soundcard, speakers (or headphones if they are in a library), and the necessary plug-in software to make the audio work. On a related note, many computers that are placed in classrooms are administratively locked to prevent the installation of software (usually games or file sharing software like Morpheus). This lockdown often also collaterally prohibits the installation of needed plug-ins such as RealPlayer, Shockwave, QuickTime, and HyperStudio. Finally, the inclusion of text-based version of the speeches opens the site up to referencing by search engines. The automated tools that scan the Internet for content cannot (at this writing) transcribe audio, but they do scan text. This broadens the audience for the site and makes the content more accessible for everyone.



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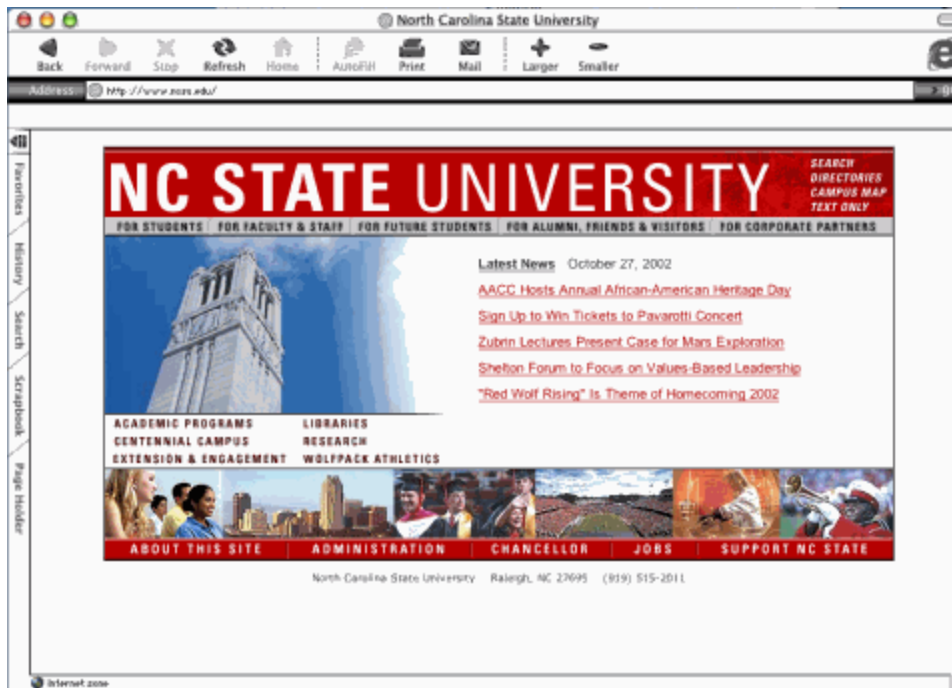
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Visual Impairment

When we talk about visual impairment, we tend to think of blindness or low-vision. Both of these are important issues to consider when designing a web site, and lack of accessibility features such as alt text or alternative formats can render a site unusable to some. For people who are blind there are two significant challenges presented by the web (though there can be more). An accessible site should provide text descriptions of visual elements, such as images. Blind web users have no means of interpreting images if the designer does not provide a text description¹. These descriptions generally come in the form of alt tags. Structure of the site is also important. An accessible site is well structured. The page reads linearly when read by a screen reader, and content is organized in a way that makes sense. Listening to a page using a screen reader has been compared to reading a page through a soda straw². The user can only see one word at a time and cannot see anything else around it. Using heading elements and being thoughtful about the text used as a hyperlink are two important ways designers can help users more easily make sense of the page. For designers, there are several tests to see how a screen reader might read a page. The best, of course, would be to utilize a screen reader, but unlike regular web browsers, screen readers are expensive. IBM's Homepage Reader (a browser with screen reader functions that only works with web content) costs about \$150 and JAWS (a full-featured system-based screen reader which works with most computer applications) costs about \$1200. A designer can get a fairly good idea of how a page will be read by using a text-based browser such as Lynx. There are web-based versions of Lynx-viewers⁸ that make the process fairly easy. Using a text-based browser can help the designer determine if the content on the page is accessible by showing the linear structure of the page as well as showing what the alt text of images is. Images 1 and 2 illustrate the NCSU web page as viewed using Internet Explorer and using Lynxview online.

Image 1



In this example all the text that is represented by images in Image 3 is accurately represented in text form in Image 4. It should also be noted that there is no real description on the page, which could be confusing to any user.

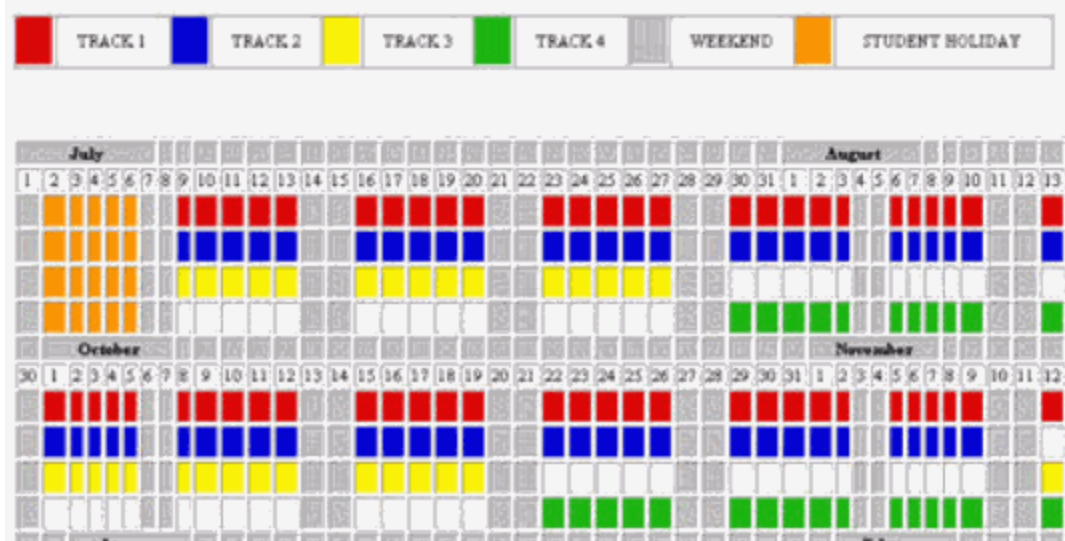
Image 2



Visual impairment is not limited to blindness though and designers often do not think about the broader range of visual impairments that people might have. These include (but certainly are not limited to) near/far sightedness, astigmatism, and color-blindness. Color blindness is a fairly common condition – roughly 1 in 20 people have some form of color blindness. Men are more

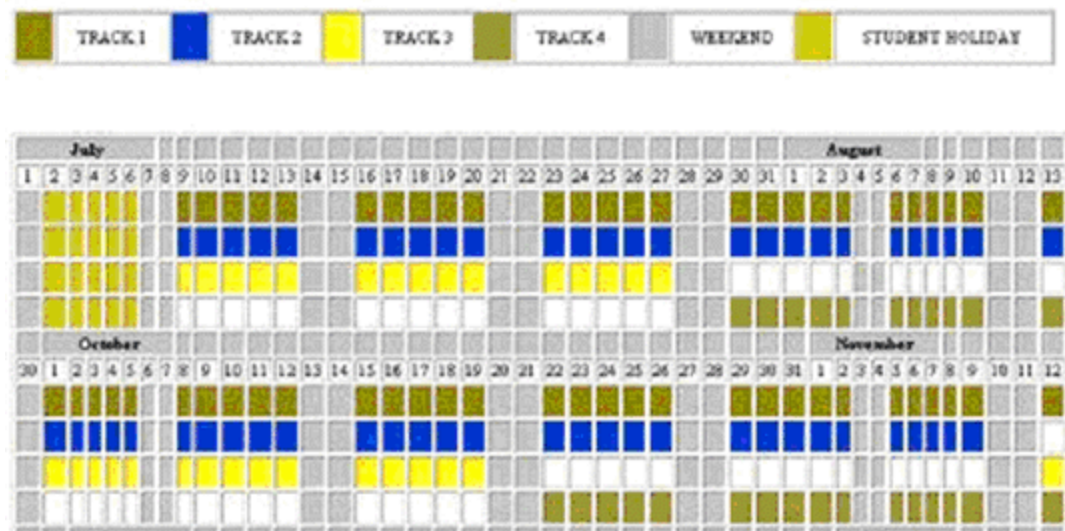
inclined than women to have color blindness – about 10% of men have color-blindness. While not a particularly serious condition, color-blindness can affect how a person interacts with information on the Internet. For example, a father with color-blindness is searching for information about his daughter’s class schedule at a year-round school. Students at the school are broken up into four tracks, which have alternating schedules at the school. The daughter is in track four. The school calendar is on the web. Each track is assigned a color (Image 3).

Image 3



The father has deuteranope color blindness, a form of red/green color deficit. When he views the calendar on the web, there is little contrast between the items marked red and those marked green (Image 4). The images that are used in this example were generated from a web page using an online tool called Vischeck⁹.

Image 4



In this situation, the use of color to solely convey information makes it difficult to determine which track is which. A simple fix¹⁰ for this problem would be to also put the number of the track in the colored table cell (Image 5).

Image 5

July																														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
									1	1	1	1	1			1	1	1	1	1										
									2	2	2	2	2			2	2	2	2	2										
									3	3	3	3	3			3	3	3	3	3										
October																														

For people with low vision, it is important to use text on the page, rather than images of text. This makes it easier for users with low vision to increase the font size on the page. Designers often use images to control the formatting of the text by creating images that represent text (e.g. the text “NC STATE UNIVERSITY” in Image 1). The use of Cascading Style Sheets (CSS) can be used to help control formatting and still allow users to modify text to meet their specific needs. A simpler strategy is to simply be sure that all text is relatively rather than absolutely sized (using the heading tags and relative sizes as opposed to pixel sizes).

Making a page accessible for individuals with visual impairments also benefits the larger community. Relying on color alone to relay information locks information up in a singular format. It is not easily read or printed out. Making font sizes and page layouts fluid benefit those users who wish to enlarge the text. People with nearsightedness or even people who spend large amounts of time looking at computer screens appreciate the ability to make what is on the screen easier to see. Ensuring that images have appropriate alt text ensures that pages will convey the same meaning with out images or on text browsers. These solutions are relatively simple, yet drastically broaden the accessibility and usability of a page.

URL: <http://www.ncsu.edu/meridian/win2003/accessibility/3.html>

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Motor Impairments

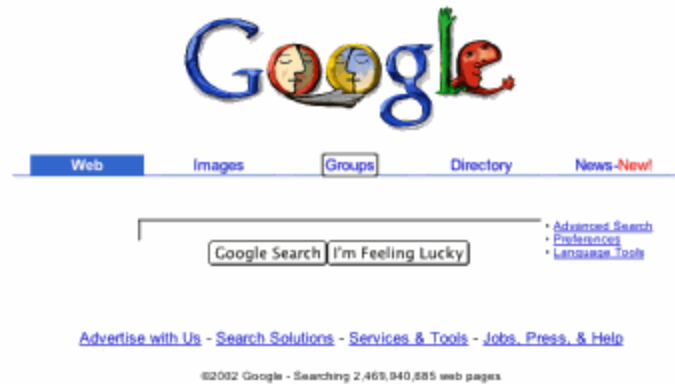
Whether we realize it or not, we all are likely to experience some form of motor impairment in our lives. Motor impairment can be temporary, such as a broken arm or sore back, or can be longer-term. This category includes a range of issues specifically including people with limited to no use of their hands. In these cases, people will rely on the keyboard or alternative pointing devices to interact with the computer. For a person with limited use of their hands due to carpal tunnel syndrome, they may simply rely on the keyboard rather than use the mouse to interact with the page. People with no use of their hands may also use the keyboard, but in conjunction with a tool such as a mouthstick to press keys. For these individuals, it is not possible to press more than one key at a time. They will use a mode in the operating system known as sticky keys. This allows the user to press a modifier key such as the shift key once and it will remain depressed until the next key is pressed.

Making a site accessible for individuals with motor impairments means making sure that a site is device independent. Device independence, insures that content on the site can be accessed through multiple means, not just by using a mouse. For example, a middle school principal has developed Multiple Sclerosis (MS). MS is a chronic disease that affects more than 400,000 people in North America. The disease usually starts between the ages of 20 and 40 and affects more women than men. Persons with MS experience symptoms that include poor muscle coordination and weakness/fatigue. As a result of her MS, the principal is not able to effectively use a mouse – the combination of grasping the mouse and accurately pointing is difficult. Since her school uses web-based student information systems, the principal needs to be able to navigate the web. She is able to navigate the web pages she needs by using the keyboard on her computers. Utilizing the Tab and Return keys, she is able to move around in a

page and select and follow links.

Fortunately for web designers, designing for device independence is fairly easy. Most browsers now support tabbing between links and form fields. In fact, it takes some degree of effort to make a page inaccessible (i.e. changing the logical tab order of form fields). Most pages naturally conform to keyboard functionality. When tabbing through links on a page in Internet Explorer, the current link will be highlighted (Image 6).

Image 6



While providing increased access for individuals with motor impairments, all users benefit from the added functionality. Individuals who spend a great deal of time working on a compute often learn keyboard shortcuts that save time and effort.

Cognitive Impairments

The area of cognitive impairments is perhaps the most diverse and the largest category of disabilities and one that we often disregard. It is also in this area that difference in learning style might be a factor. Cognitive impairments can include issues such as seizure disorders, learning disabilities and developmental disabilities. Designing to make web sites access across cognitive ability really means making pages broadly comprehensible and accounting for multiple ways of learning/accessing information.

In these cases, pages made up of long blocks of unbroken text, may be difficult to read. Blinking or animated elements should be avoided to make the contents easier to read. In addition, it is often helpful for people with cognitive disabilities to provide illustrations or animations of central concepts to enhance understanding. Navigation should be standard and consistent as well.

Certainly some consideration should be given to the intended audience of a particular web site. It is possible that a specific site might be intended for a certain audience with expert knowledge, but this assumption cannot supercede the probability of difference or disability within that population. An interesting example illustrates this point.

A college accounting professor is conducting research on particular accounting methodologies. This professor has a reading disability and to content through a screen reader (such as JAWS). A source on the web posts scanned copies (images or inaccessible PDFs) of several accounting forms in question. The images don't have an alternative means of expressing the content of the image, either in alt text or a longer text description. As a result, the screen reader skips the images of the forms and the professor does not know the forms even exist. What makes this example interesting is that an accommodation that might have been intended for one type of impairment (alternative image formats for individuals with visual impairments), benefits another (an individual with a reading disability). This drives to the point of what makes accessible design so beneficial – it is often more broadly usable. These materials benefit a larger audience because: material is presented in multiple ways, there are multiple ways for students (web site viewers) to interact with and respond to information on the site, and there are multiple ways for meaning to be found in the information.

Conclusion

Web accessibility is an important and timely issue. Accessible web design is important because it insures that some will not be left out of educational processes because of lack of information or resources. At the same time, accessible web design strengthens the usability of web sites making them better for everyone. Central to the notion of web accessibility is a consideration of the people using the web site – those who, following Brenda Laurel's reading of computers, should be considered active agents in the process. By considering users as agents, we increase the chances of building increased functionality into the design process.

Accessibility Resources

Articles and Guides:

- Nielson: Beyond Accessibility: Treating Users with Disabilities as People (2001) <http://www.useit.com/alertbox/20011111.html>
- General Concepts, Universal Design Principles and Guidelines http://trace.wisc.edu/world/gen_ud.html
- Vanderheiden: Thirty-Something (Million): Should They Be Exceptions? http://trace.wisc.edu/docs/30_some/30_some.htm
- Section 508 Facts <http://216.218.205.189/sec508/brochure.htm>
- Guide to the Section 508 Standards for Electronic and Information Technology <http://www.access-board.gov/sec508/guide/index.htm>
- How to Create Accessible Adobe PDF Files <http://access.adobe.com/booklet1.html>
- Clark: Flash MX: Clarifying the Concept http://www.alistapart.com/stories/flash_mx_clarifying/
- Kirkpatrick: Flash MX: moving Toward Accessible Rich Media http://www.alistapart.com/stories/flash_mx_moving/
- Schmitt: Accessibility and Authoring Tools <http://www.alistapart.com/stories/tools/>

Guidelines and standards

- W3C WCAG Guidelines
<http://www.w3.org/TR/WCAG10/>
- 508 E & IT Requirements
<http://www.section508.gov/index.cfm?FuseAction=Content&ID=12>
- W3C WCAG Curriculum
<http://www.w3.org/WAI/wcag-curric/overgid.htm>

Other Resources

- SNOW - Special Needs Opportunity Windows
<http://snow.utoronto.ca/access/resources/examples.html>
- Adobe Accessibility Web Site
<http://access.adobe.com/>
- Introduction to the Screen Reader Video
<http://wiscinfo.doit.wisc.edu/ltde/access/ewers.htm>
- Skip Navigation Tutorial
<http://wiscinfo.doit.wisc.edu/ltde/access/skipnav.htm>
- Quick Tips: Quick tips on building more accessible Web pages from Web Accessibility Initiative.
<http://www.w3.org/WAI/References/QuickTips/#QuickTips>
- Jim Thatcher Web Courses on Accessibility
<http://www.jimthatcher.com/webcourse6.htm>
- WebAim-Web Accessibility in Mind: Web accessibility how-to site. Includes a tutorial for building an accessible web site.
<http://www.webaim.org/>
- Designing more Usable Web Sites (Trace Center)
<http://www.trace.wisc.edu/world/web/index.html>

Validation and other Tools

- Adobe Accessibility Site
<http://access.adobe.com>
- Adobe PDF Conversion by Simple Form
http://access.adobe.com/simple_form.html
- Macromedia Dreamweaver Accessibility Kit
<http://www.macromedia.com/macromedia/accessibility/>
- Bobby
<http://www.cast.org/bobby>
- WAVE
http://www.temple.edu/inst_disabilities/piat/wave/
- Web Accessibility Authoring Tools
<http://snow.utoronto.ca/access/tools/index.html?showaccess=1>

References

Bowe, F. (2000). Universal design in education : teaching nontraditional students. Westport, Conn., Bergin & Garvey

Charlton, J. I. (1998). Nothing about us without us : disability oppression

and empowerment. Berkeley, University of California Press.

Encarta world English dictionary (1999). New York: St. Martin's Press.

Laurel, B. (1993). *Computers as theatre*. Reading, Mass.: Addison-Wesley Pub. Co.

Vanderheiden, G (1990). Thirty-something (million): Should they be exceptions? [Online] Madison, WI: Trace Research and Development Center, University of Wisconsin Retrieved from the World Wide Web March 1, 2002: http://trace.wisc.edu/docs/30_some/30_some.htm

Notes

¹ This generally occurs because the technological overhead required just getting content online often obscures any other consideration.

² <http://www.census.gov/hhes/www/disable/sipp/disab97/ds97t1.html>

³ <http://www.freedomscientific.com/>

⁴ <http://www-3.ibm.com/able/hpr.html>

⁵ <http://www.w3.org/TR/WCAG10>

⁶ <http://www.section508.gov>

⁷ An interesting and informative video entitled "Introduction to Screen Readers" produced at the University of Wisconsin-Madison demonstrates both the use of a screen reader and an accessible web video. View it at <http://wiscinfo.doit.wisc.edu/ltde/access/ewers.htm>.

⁸ <http://www.delorie.com/web/lynxview.html>

⁹ <http://www.vischeck.com>

¹⁰ It should be noted that this example is used primarily to illustrate the use of color. There are other accessibility issues would also need to be addressed with this page, specifically the complex nature of the table (Imagine reading this page with a screen reader).

About the Author:

Alan Foley is an assistant professor of Instructional Technology at North Carolina State University in Raleigh, North Carolina, where he teaches graduate courses in the College of Education. Alan holds a Ph.D. in Educational

Technology from the University of Wisconsin-Madison. His current research interests include web accessibility and pedagogy, and the construction of disability and difference in educational media.

Email: alan_foley@ncsu.edu



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