

Toshiba L Burns-Johnson. Are Government Websites Achieving Universal Accessibility?: An Analysis of State Department of Health and Human Services' Websites. A Master's Paper for the M.S. in I.S. degree. April 2007. 112 pages. Advisor: Deborah Barreau

Research reports that the search for health information is the fourth most popular activity being done on the web (Pew Internet & American Life Project, 2004). However, for disabled persons, barriers experienced when interfacing with the Internet may cause healthcare websites to be inaccessible to them. This study explores the level of accessibility of healthcare websites and the relationship between accessibility and usability by determining how compliant state department of health and human services websites are with accessibility and usability guidelines. A content analysis of each state's department of health and human services website was conducted. Results revealed that state department of health and human services websites are not very compliant with accessibility guidelines, are somewhat compliant with usability guidelines, and overall are not very accessible. The findings also indicate that there is a significant moderate relationship between accessibility and usability which suggests that the two concepts are interconnected.

Headings:

Website Design

Website Accessibility

Website Usability

Guidelines

Section 508

Are Government Websites Achieving Universal Accessibility?:
An Analysis of State Department of Health and Human Services' Websites

by
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A Master's paper submitted to the faculty
of the School of Information and Library Science
of the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements
for the degree of Master of Science in
Information Science.

Chapel Hill, North Carolina

April 2007

Approved by

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ACKNOWLEDGEMENTS

Several people in my life have been instrumental in making this project a success. First, I thank God for giving me the opportunity to come to the SILS program and for aligning me with people who have made this a successful and wonderful experience for me. Thank you God for the anointing you've placed on my life and for loving me before I learned to love myself. And, God, thank you for loving me still.

Thanks to Dr. Barreau for helping me find this topic, giving me the encouragement I needed during moments when I wanted to panic, and for being very supportive and caring throughout this process.

Thank you to my husband, Ernest, for being my rock, my soft place to fall, and for helping me find the confidence to push forward and be the best that I can be. Ernest, I couldn't have accomplished this without you and I want you to know that I appreciate the sacrifices you have made to make this a reality. I love you.

Thank you to my best friend, LaSylvia, who always has an ear to hear and shoulder for me to cry on. I appreciate the advice and guidance you have provided throughout this process. LaSylvia, you are wise beyond your years. I truly value your friendship and support.

Finally, thank you to Jonas, Julia, Cathy, Tobi, Kristin, and Tammy. I have appreciated your support and encouragement throughout this entire process. Thank you for allowing me to share this part of my life with you.

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INTRODUCTION

We live in an age in which information is being generated at a rampant rate and the World Wide Web acts as an electronic conduit for the dissemination of this information. This medium provides users with access to an endless variety of information including news, research, healthcare information, crime statistics, and multimedia. The Web has become a centralized entity in most parts of society with 73% of adults in the United States reporting using the Internet in 2006 compared with only 20% of adults reporting internet use in 1996 (Madden, 2006).

The Web can be an enormous resource for people with disabilities. It can add to their independence by allowing them the ability to access information that is important to them without having to depend on others for assistance. For the purposes of this study, a disability is defined as any physical, mental, or sensory impairment that limits how a person interacts with his or her environment. According to the U.S. Census (2005), disabled persons account for 20% of the population which equates to approximately 60 million people.

Although the Web aspires to provide universal access, disabled persons can experience barriers when interfacing with the Internet. If for instance, meaningful “ALT” tags are not included for images on a website, then technology (i.e., screen readers) that is used to increase accessibility for blind persons will not be able to provide access to all available information on the site (World Wide Web Consortium, 1999). This creates a

situation where disabled persons are prevented from having access to the same content as an able-bodied user. In order for disabled persons to fully utilize the Internet, barriers to access must be overcome.

Fortunately, standards and laws have been implemented to try and remove these barriers for disabled persons. In 1998, an amendment to Section 508 of the U.S. Rehabilitation Act was enacted which required that disabled persons have access to all technology (including websites) that is developed, procured, maintained or used by the federal government (Section 508, 2006). For the purposes of this study, accessibility is defined as “the development of information systems flexible enough to accommodate the needs of the broadest range of users regardless of age, disability or technology” (Tanaka, Bim, & Viera da Rocha, 2005, p. 140).

Following this Act, in 1999, the World Wide Web Consortium’s Web Accessibility Initiative (WAI) introduced the Web Content Accessibility Guidelines 1.0 (WCAG). These guidelines were created to address limitations in current Internet applications by establishing standards for website design that will accommodate the needs of disabled persons.

Another set of guidelines addresses usability issues. Usability can be defined as how easy it is for users to use the different features of a website. Compared to the few accessibility guidelines that exist, numerous usability guidelines have been created (Harpel-Burke, 2005; Bailey et al., 2006; Zaphiris, Ghiawadwala, & Mughal, 2005). Unlike accessibility guidelines, laws have not been created that require websites to adhere to usability guidelines. However, because studies have illustrated that usability and accessibility are interconnected, both sets of guidelines play a pivotal role during the

website design process to ensure that websites are usable and accessible (Federici et al., 2005; Tanaka, Bim, & Viera da Rocha, 2005).

Unfortunately, although these laws and guidelines exist, many websites still are not meeting minimum accessibility requirements (Becker, 2004; O'Grady, 2005). Even more troubling are studies that indicate that federal government sites are not fully accessible even though it is required by law (Ellison, 2004; West, 2001). This includes the U.S. Department of Health and Human Services' website which recently was redesigned so it could be more accessible to users (Ellison, 2004; Theofanos & Mulligan, 2004).

Studies indicated that other healthcare sites are also not complying with accessibility guidelines (Mancini, Zedda, & Barbaro, 2005; O'Grady, 2005). This is alarming especially when considering that seventy-nine percent (79%) of the adults, who reported using the Internet, also reported that they used the Internet to look for health and medical information (Pew Internet & American Life Project, 2004). Of the 65 activities they reported completing online between 2003 and 2006, finding health information was ranked fourth and was only exceeded by activities such as checking email, using search engines, and finding driving directions (Pew Internet & American Life Project, 2003-2006). Health topics searched online include finding information on specific diseases, medical problems, medical treatments, diet and nutrition, fitness, prescriptions, health insurance, and finding information on particular doctors and hospitals (Fox, 2005).

Several studies also echoed the importance of retrieving health information online for various user populations. Becker (2004) noted that the Internet is a valuable resource for people who are limited in mobility due to physical location, health issues, and

disabilities. Similarly, Klemm and Nolan (1998) reported that cancer patients often become too ill to travel and often turn to the Internet for support and information.

If the noncompliance of healthcare sites is pervasive, then these groups of people, potentially, are unable to access critical information. The purpose of this study is to start the process of determining how widespread the accessibility issues are by evaluating how compliant state department of health and human services' websites are with established accessibility and usability guidelines. This study also hopes to contribute to the debate about the relationship between accessibility and usability by exploring whether there is a relationship between a site's level of compliance with accessibility guidelines and a site's level of compliance with usability guidelines.

To date, no research has been found that focuses on evaluating how compliant state department of health and human services websites are with established guidelines. Usability and accessibility studies have evaluated state government websites including some related to health, but this data is often aggregated with other data making it difficult to paint a clear picture of the condition of state department of health and human services' websites. It is important to start painting this picture so action can be taken to make healthcare sites more accessible to those who need the information most.

The next section of this paper will present general information about usability and accessibility guidelines; discuss the relationship between usability and accessibility; highlight the perspectives of researchers and designers who support and oppose using guidelines to evaluate a website; and, explore the current state of compliance of government and healthcare websites.

LITERATURE REVIEW

Guidelines are standards or recommendations that have been created for web designers to ensure consistency and accessibility across websites. There are two types of guidelines – those that focus on usability and those that focus on accessibility. Usability guidelines, such as those proposed by Nielsen and Tahir (Harpel-Burke, 2005) and the National Institute on Aging (2002) are designed to ensure that websites are usable. Usability guidelines address issues related to ease of navigation, the learning curve of a site (how difficult it is for users to learn the website), and site layout.

Accessibility Guidelines

Accessibility guidelines – such as the Web Content Accessibility Guidelines 1.0 (WCAG) developed by the World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI) and those proposed by Section 508 of the U.S. Rehabilitation Act – are designed to address issues related to user's having access to all features of a site regardless of disability, language spoken, or access to technology. Included are 14 guidelines divided into three categories – priority 1, priority 2, and priority 3. Developers *must* comply with priority 1 guidelines, *should* comply with priority 2 guidelines, and *may* comply with priority 3 guidelines (World Wide Web Consortium, 1999).

While usability guidelines are optional recommendations to which web designers may adhere, federal government websites are legally obligated to be in compliance with the guidelines established in Section 508 of the U.S. Rehabilitation Act. Adherence to WCAG's priority 1 guidelines and the last five Section 508 guidelines is considered to be in compliance with this law (Section 508, 2006). Although Section 508 laws only apply to federal websites, several states have established their own laws, policies, or guidelines that recommend that sites comply with the Section 508 guidelines or priority 1 of the WCAG 1.0 guidelines ("Information Technology", 2006).

Relationship Between Accessibility and Usability

Even though usability guidelines are optional, many researchers have acknowledged the interdependence between usability and accessibility and tend to adhere to both sets of guidelines. Federici et al. (2005) noted that there are two perspectives on the interaction between accessibility and usability. There are those who view accessibility and usability as two distinct concepts and those who believe that accessibility and usability interact and are inherently connected. To test the relationship, Federici et al. devised an experiment based on the assumption that the two concepts are completely separate. To measure accessibility, they used automatic and manual methods to determine if the selected web page complied with the WCAG 1.0 guidelines. To measure usability, the researchers had 19 disabled users participate in usability testing. The researchers found that it was very difficult to segment the observed data into either accessibility issues or usability issues because there was no distinct line of demarcation

between the two concepts. The researchers ultimately concluded that an integrated model of accessibility and usability should be utilized when accessing websites.

When Tanaka, Bim, and Viera da Rocha (2005) conducted usability and accessibility evaluations of a recently redesigned piece of software, they reached similar conclusions. To assess usability, the researchers had four evaluators evaluate the software based on a set of Nielsen's heuristics. To measure accessibility, the researchers conducted user tests in which they had nine disabled people complete tasks using the software. The heuristic evaluation identified 48 problems and the user study identified 21 problems. Only five problems were found in both the heuristic evaluation and the user study. These findings suggest that even though an interconnection exists between usability and accessibility, an assessment that utilizes both evaluation strategies may reveal overlapping issues and issues that are distinctly related to either usability or accessibility.

Both of these studies lend support to the idea that usability and accessibility are related. The degree of this relationship is difficult to determine, but the Tanaka, Bim, and Viera da Rocha (2005) study sheds doubt on the notion that they are either completely distinct or completely integrated. More research needs to be conducted to determine the degree of this relationship, but for now, it is important to note the necessity of using both methodologies when evaluating websites. Not including both strategies can cause designers to obtain an incomplete picture of the usability and accessibility issues their systems present to users.

Although these studies have shown that there is an interaction between usability and accessibility, some studies have chosen to evaluate sites based on only one set of

guidelines. O'Grady (2005) examined 40 Canadian consumer-oriented healthcare websites which were randomly selected for inclusion in the study. O'Grady used Bobby, a tool used to automatically assess compliance with WCAG 1.0 priority 1 accessibility guidelines, to determine if the sites were in compliance. The study found that only 40% of the sites were deemed accessible.

Becker (2004) used the usability guidelines established by the National Institute on Aging and the National Library of Medicine to assess the homepage of 125 websites to determine if they presented any usability issues for older adults. These websites included online newspapers, health sites, and 50 state government websites. The study found that many of the sampled sites presented barriers to older adults. Some of these barriers include readability issues due to small font sizes and the inability of the user to resize text, navigation issues which resulted from a reliance on pull-down menus, and language barriers which resulted because only 12% of the sites offered a translated version of the text. Of the three types of sites evaluated, state government sites had the highest level of compliance with these guidelines.

Given the findings presented earlier, both of these studies risk overlooking potential usability and accessibility issues. This could mean that sites deemed as compliant are actually noncompliant because they pose accessibility issues that either accessibility guidelines or usability guidelines alone cannot identify. As previous studies found, a more holistic picture of the issues presented by a system can be found by integrating both types of guidelines.

Opposition to Using Guidelines

Just as there are two perspectives on the relationship between usability and accessibility – disconnected versus interconnected – there are also two camps in relation to the usage of guidelines in general – those who support using guidelines and those who oppose their use. Those who oppose using guidelines often state that the recommendations are based on anecdotal information rather than on empirical research and that guidelines are too broad which makes it difficult to determine how to implement them (Bailey et al., 2006). Guidelines are also criticized for being created without any indication of the amount of empirical support that exists for each recommendation which makes it difficult for designers to determine which criteria are essential to website usability and accessibility and which ones are mere suggestions (Bailey et al., 2006).

Some of these concerns can be illustrated in the Zaphiris, Ghiawadwala, and Mughal (2005) study. These researchers reviewed over 100 papers on issues related to aging and human computer interaction and created 52 guidelines for web designers that would make their sites more usable for older adults. The researchers conducted a card sorting exercise and a focus group to determine how the guidelines grouped together, if there was any overlap, and if there were any missing guidelines. This resulted in reducing the set of 52 guidelines to 38 and grouping them into 11 distinct categories. Then the researchers completed a heuristic evaluation using both sets of guidelines and found that the smaller set was more robust because results across participants were more consistent.

This study exemplifies an issue related to usability guidelines - anyone can create them based on any set of parameters. This creates a situation where there are many guidelines for the same population and, possibly, inconsistencies between the recommendations. The researchers do not explain why they are proposing a new set of guidelines for older adults when a researched-based set of guidelines was already proposed by the National Institute on Aging (2002). Also, some of the recommendations included in Zaphiris et al.'s set of guidelines are only validated by one study and there is no indication of the level of importance of each recommendation. It is encouraging that there is a lot of excitement in the web community regarding guideline creation, but systems need to be instituted to control the entities that are producing these guidelines and researchers should strive to create one set of guidelines that will accommodate the needs of most users.

Others who discourage the usage of guidelines for evaluating the usability of sites state that when guidelines are used in conjunction with heuristic evaluations, the results are inconsistent between evaluators. In the study completed by Tanaka, Bim, and Viera da Rocha (2005), the inconsistency of issues identified across evaluators can be seen. The researchers noted that of the forty-eight problems identified by the four software evaluators, only twelve were identified by two or more evaluators and only one problem was discovered by all four evaluators. These results could have been achieved partly because of the inexperience of the evaluators. The researchers mentioned that three of the evaluators were not familiar with heuristic evaluation. Perhaps with sufficient training more consistency could have been achieved.

Support for Using Guidelines

Despite the issues raised by those who oppose the use of usability guidelines, in a survey conducted in 2002 “heuristic evaluation was reported to be the most used usability evaluation method” (Law & Hvannberg, 2004). Those who support the use of guidelines often state that it takes less time, money, and effort to use heuristic evaluation compared to user testing (Tanaka, Bim, & Viera da Rocha, 2005). Also, supporters of using guidelines to evaluate websites believe that consistency among sites may increase the comfort levels of users because they are familiar with the website’s structure or environment.

Harpel-Burke (2005) evaluated 80 academic libraries of medium-sized universities according to the 40 guidelines for homepage design proposed by Nielsen and Tahir. These guidelines are ranked as essential, strong, or default. Harpel-Burke selected a total of 14 of the 40 guidelines based on their rating as essential. The guidelines selected covered search, navigation, design, and general features. The findings from this study were then compared with findings from a study focused on business homepages conducted by Nielsen and Tahir. Findings indicated that the majority of the library websites conformed to these guidelines. Also, that the library and business websites were similar in their implementation of most of the recommendations with the exception of how search capabilities were implemented, the use of animation, and differentiating between visited and non-visited links.

Because the library websites were consistent with Nielsen and Tahir’s criteria and were comparable to business sites, the author concluded that the libraries’ websites provided a comfortable and familiar environment for users; thus, increasing usability.

Although these websites conformed to the guidelines, the researcher did not conduct any tests of accessibility; so although the environment may be comfortable for able-bodied users, it could still be unusable for disabled persons. Another criticism of this study is that it was based on Nielsen and Tahir's guidelines which have been criticized for not being based on empirical research (Law & Hvannberg, 2004).

Compliance of Government Sites

Since the federal government is mandated to be in compliance with Section 508 accessibility guidelines and several states have instituted their own policies, many researchers have conducted studies to determine whether the governments' websites are in compliance. Unfortunately, those studies' findings indicate that state and federal government sites are not living up to the standards they set forth. West (2001) assessed 1,680 federal and state government websites. These websites were evaluated for the presence of 32 different features which basically consists of various measures of content, accessibility features included for disabled persons, security, and electronic services. The findings from this study were compared with a similar study completed in 2000. Overall, the study found that sites made considerable strides in providing electronic services to users. Unfortunately, few sites were found to be compliant with accessibility guidelines and few sites implemented other measures to make their sites accessible to disabled persons.

Similar results were noted in a study that assessed 50 U.S. Federal Government website's compliance with the guidelines established by Section 508 of the US Rehabilitation Act (Ellison, 2004). This study utilized Bobby 5.0 which is the first

version of this software to provide the option of evaluating sites using the Section 508 guidelines. This study also cross checked the findings produced by Bobby with those reported by Cynthia Says, another tool that tests compliance with Section 508 standards. According to Bobby, only 22% of the sites were in compliance. Cynthia Says approved the same 11 sites that Bobby approved and 10 additional sites, resulting in 42% of the 50 federal homepages being deemed as compliant.

Because Ellison (2004) did not conduct any manual testing of accessibility, the lack of compliance of the federal homepages could be much worse than is presented. Many studies have noted the limitations of relying on automatic tools to evaluate a site's compliance with accessibility guidelines because elements like color cannot be assessed by these tools. The condition of federal websites could also be poorer than noted because usability issues that could impact accessibility were not evaluated.

U.S. Department of Health and Human Services' Website Redesign

In addition to laws that govern website accessibility, President Bush instituted the E-Government Act of 2002, which requires agencies to shift from paper-based citizen-government interactions to more electronic interactions. It also states that websites are required to be more user-centered and should consider how users will interact with the information instead of having information organized bureaucratically (Executive Office of the President of the United States, 2003).

In response to this Act, the U.S. Department of Health and Human Services' initiated a website redesign (Theofanos and Mulligan, 2004). The U.S. Department of Health and Human Services utilized a number of methods to institute the redesign. They

viewed activity logs, involved users in a card sorting exercise, conducted interviews and conducted user tests to measure both accessibility and usability of the site. They also utilized the usability guidelines that were created by the National Cancer Institute. It is not clear to what extent they adhered to these guidelines because the guidelines are just briefly mentioned in the paper. Tests revealed that the redesigned site was more usable because users were able to complete tasks 92% of the time compared to only 41% of the time with the previous interface.

Although the designers took care to address accessibility and usability issues, an evaluation of the site in 2003 revealed that it was not in compliance with Section 508 standards (Ellison, 2004). In fact, according to this study, the site failed both the Bobby and Cynthia Says tests of compliance (Ellison, 2004). This is particularly alarming because the study that reported these findings was criticized for only using automatic tools to determine accessibility. This means that the inclusion of usability measures or manual testing of compliance with guidelines could reveal that the U.S. Department of Health and Human Services' website has more accessibility barriers than are represented in Ellison's (2004) findings.

This finding is particularly disconcerting when combined with other studies that have focused on evaluating healthcare sites and those sites were also found to be noncompliant. Mancini, Zedda, and Barbaro (2005) used a combination of automated tools and manual testing to assess the compliance of 170 Italian Local Health Authorities websites' homepages with WCAG's priority 1 checkpoints. They checked each website twice – before the Stanca Law on accessibility was passed and about a year after it was passed. They found that 76% of the websites failed to comply with these guidelines.

Similarly, in the O'Grady (2005) study mentioned earlier, 60% of Canadian consumer-oriented healthcare sites also did not comply with the WCAG's priority 1 checkpoints.

The condition of healthcare sites is of concern because the search for health information is the fourth most popular activity being done on the web (Pew Internet & American Life Project, 2004). And, people with disabilities, debilitating illnesses, and those who are homebound often rely on the internet for social support and to find the latest information about treatment options. Internet-based health information is a highly demanded resource that has the potential to improve individual's lives. Until healthcare sites become compliant with established guidelines, these websites are merely creating additional barriers to information for disabled persons, who may need the information most.

Summary of Literature Review

This review of the literature has emphasized several points. First, it showed that even though the degree of the relationship between accessibility and usability appears to be indeterminate, studies that include both accessibility and usability measures provide a more holistic picture of the barriers presented by a particular system. Second, it revealed that although laws and guidelines have been implemented to reduce web-based barriers to information access for disabled persons, many government sites are doing a poor job of complying with these mandates. Furthermore, this literature review highlighted that despite the demand for web-based health information, many healthcare websites are inaccessible to disabled persons because these websites are not capable of accommodating their accessibility needs. Last, this literature review revealed that there

are pros and cons of using guidelines to assess websites. On the one hand, guidelines are seen as very efficient and cost effective. On the other hand, many designers and researchers complain that guidelines are not empirically based and the importance of each guideline is not clear.

In order to start determining how pervasive the inaccessibility of healthcare websites is and to explore the relationship between accessibility and usability, this study utilizes both usability and accessibility guidelines to evaluate each state's department of health and human services' website. To minimize the number of disadvantages associated with using usability guidelines, this study uses an empirically based set of guidelines which indicates the strength of the evidence associated with each guideline and the relative importance of each guideline. This study hopes to reveal the condition of state department of health and human services' websites so those websites can be improved, thus moving government websites one step closer to achieving universal accessibility.

MATERIALS AND METHODS

Site Selection

A content analysis of each state's department of health and human services' website was conducted to determine how compliant these websites are with accessibility and usability guidelines and to explore the relationship between accessibility and usability. There are 50 states and; thus, 50 websites. This study conducted a census based on the list of websites provided on PandemicFlu.gov (2006).

PandemicFlu.gov is maintained by the U.S. Department of Health and Human Services and provides information about how federal and state agencies are planning and preparing for avian and pandemic flu outbreaks. This website provides contact information (i.e., web address, etc.) for state departments of agriculture, wildlife, and public health which are the entities responsible for providing information to and supporting the community through such an outbreak.

This study only included states (not U.S. territories) and the websites listed under public health. Several of the web addresses provided on PandemicFlu.gov were inactive or redirected to a new address. For the sites that redirected, the redirected page was included in this study. For inactive web addresses, a Google search was conducted and the page that appeared with the state's department's title was included in this study. (See Appendix A for the full list of websites included in this study.)

Project Scope

The purpose of this study was to measure how the functionality, design, and different features of each state's department of health and human services' website conform to accessibility and usability guidelines. This study did not assess the web design or evaluation process nor did this study focus on the semantics, relevance, importance, accuracy, or usefulness of content. This study was limited to assessing the homepage and, for some guidelines an additional internal page was used to assess compliance. (See Appendix C, question 18 for details of how the internal page was selected.) Many studies have used only homepages to evaluate the accessibility and usability of sites (Beaudin, 2001; Ellison, 2004; Harpel-Burke, 2005; Mancini, Zedda, and Barbaro, 2005). These studies often assume that the condition of the homepage will be representative of the condition of the remainder of the site.

Guidelines

Two sets of guidelines were used throughout the content analysis process – the Section 508 accessibility guidelines and the Research-Based Web Design & Usability Guidelines. The Section 508 accessibility guidelines consist of 16 mandates with which federal government websites are legally required to comply (Section 508, 2006). These guidelines were selected, because a number of states have passed laws or suggest that websites comply with Section 508 or its counterpart the Web Content Accessibility Guidelines 1.0 (WCAG) developed by the World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI). Thirteen of the Section 508 guidelines will be both

manually and automatically evaluated in this study because automatic tools are unable to thoroughly check for compliance with these guidelines.

The Research-Based Web Design & Usability Guidelines consist of 209 guidelines that cover topics ranging from conceptualizing a website to accessibility to placement, format, and functionality of items, to evaluating the end product. This set of usability guidelines were selected for inclusion in this study because they are based on empirical evidence and they provide a relative importance score for each guideline. The relative importance score which ranges from 1-least important to 5-most important was provided by the guideline developers and is based on scores assigned to each guideline by web design experts (Bailey et al., 2006). These guidelines were also selected because they were specifically designed to guide the U.S. Department of Health and Human Services website's redesign and evaluation (Bailey et al., 2006). And, given that this study evaluated state level department of health and human services' websites, it seemed appropriate to use a set of guidelines designed for a site with a similar purpose.

In this study, only a subset (97) of the 209 guidelines was used to evaluate how compliant websites are with the guidelines. Guidelines were excluded from this study for the following reasons: The guidelines...

- required an understanding and an evaluation of the importance of content which is beyond the scope of this project;
- received relative importance ratings that were less than 3 and this study wanted to focus on guidelines that would have the biggest impact on the accessibility and usability of a site; or,

- focused on steps to take during the design and evaluation process and evaluating these processes is beyond the scope of this project.

Sites were evaluated on guidelines 3:1-3:11, but they were later excluded during the analysis process because these guidelines repeated the Section 508 Accessibility guidelines. Allowing guidelines related to accessibility to impact a site's usability score would have made it difficult to explore the relationship between accessibility and usability. (See Appendix B for a full list of the guidelines that were not included in this study.)

Variables and Measurement

There were three dependent variables in this study - level of compliance to usability guidelines, level of compliance to accessibility guidelines, and level of overall accessibility. Compliance is defined as the degree to which an information system's design is in accordance with suggestions set forth by established usability and accessibility guidelines. This study resulted in two compliance scores – accessibility and usability. The calculation of these scores was modeled after Beaudin's (2001) study.

Level of compliance to accessibility guidelines was determined by how well a website conformed to the Section 508 accessibility guidelines. A site received one point for each guideline to which it conformed. A site received a maximum of 14 points – one point for being deemed compliant by automatic tools and one point for each of the 13 manually assessed guidelines. The maximum number of points differed for each site because guidelines which were not applicable to the site were not factored into the

maximum. Sites received a percentage which represents the number of guidelines to which the site conformed divided by the maximum number of points multiplied by 100.

$$\text{percentage} = (\text{number conformed} / \text{maximum points}) * 100$$

The compliance score was determined by the percentage earned. Sites that earned a percentage that was lower than the mean received a 0, percentages that were within +1 standard deviation from the mean received a 1, and sites with percentages greater than +1 standard deviation from the mean received a 2. These compliance scores translated into three levels of compliance – not very compliant, somewhat compliant, and very compliant, respectively. (See Figure 1 below.)

Figure 1: Calculation of Level of Compliance

Criteria	Level of compliance
percentage < mean	Not very compliant
mean <= percentage <= +1 standard deviation	Somewhat compliant
percentage > +1 standard deviation	Very compliant

Level of compliance to usability guidelines was determined by how well sites conform to the Research-Based Web Design & Usability Guidelines. The method of calculating the level of compliance to the usability guidelines was similar to the process of calculating a website's accessibility guidelines compliance score. The only difference was that the points were weighted which means that instead of receiving one point for conforming to a guideline, the site received the relative importance score associated with the guideline. For this study, the maximum number of points a site could receive was 361.

Accessibility is defined as “the development of information systems flexible enough to accommodate the needs of the broadest range of users regardless of age,

disability or technology” (Tanaka, Bim, & Viera da Rocha, 2005, p. 140). Because studies suggest that there is a relationship between accessibility and usability, compliance to both sets of guidelines was used to determine a site’s level of overall accessibility. Sites that were very compliant to both guidelines, received an overall accessibility score of 2. Sites that were very compliant to one and somewhat compliant to the other or somewhat compliant to both sets of guidelines, received an overall accessibility score of 1. Sites that were not very compliant to either guideline, received an overall accessibility score of 0. (See Figure 2 below.) These scores translated into the following levels of overall accessibility, respectively: very accessible, somewhat accessible, and not very accessible.

Figure 2: Calculation of Level of Overall Accessibility

		Level of Compliance to Usability Guidelines		
		Not very compliant	Somewhat compliant	Very compliant
Level of Compliance to Accessibility Guidelines	Not very compliant	0	0	0
	Somewhat compliant	0	1	1
	Very compliant	0	1	2



Level of Overall Accessibility

Materials

A number of materials were used to assist with determining the level of compliance and the level of accessibility of state department of health and human services’ websites. These materials have been divided into two categories – technology and software and instruments.

Technology and Software

- **Computer:** An IBM, T43 laptop with a Windows XP operating system was used to view the websites. The screen resolution was set to 1024 X 768.
- **Internet:** Connections to the internet were done through a digital subscriber line (DSL). DSL is considered to be a very high-speed internet connection. Sites were viewed through both Mozilla Firefox and Microsoft Internet Explorer.
- **Bobby:** To measure how compliant a website's homepage is with accessibility guidelines, the web-based version of Watchfire Bobby called WebXACT (will be referred to as Bobby) was used. Bobby tests single pages of web content to determine how accessible they are according to various guidelines including Section 508. Bobby performs over 90 accessibility checks ranging from readability by screen readers, the provision of text equivalents for all images, animated elements, audio and video displays (Watchfire, 2006).
- **Vischeck:** Because Bobby cannot assess the appropriateness of color and this is required by the accessibility guidelines, each website was run through Vischeck. Vischeck is a web-based tool that shows how websites will appear to someone who is colorblind. It tests for three types of colorblindness, including deuteranope and protanope (forms of red/green color deficit) and tritanope (blue/yellow deficit). This study determined how accessible websites were to users who have deuteranope because the red/green color deficit is the most common form of colorblindness (Beaudin, 2001; Vischeck, 2006).
- **Microsoft FrontPage:** Select usability guidelines suggested that web designers be cognizant of their site's download time. To determine how long it takes a site to

download, Microsoft FrontPage 2003's estimated time to download feature was utilized. "Microsoft FrontPage is an HTML editor and website administration tool from Microsoft for the Windows operating system" (Wikipedia, 2006). "Web developers typically use this feature [estimated time to download] to evaluate the impact on download time when adding or removing web objects to a page. Within the FrontPage development environment, the feature allows the developer to select a connection speed for a specified webpage" (Becker, 2004, p. 396). For this study, a high-speed connection (128 Kbps) was selected because statistics indicate that the majority of internet users have some form of high-speed internet access (Bailey et al., 2006).

Instruments

The primary instruments for this study included the codebook and accompanying code form. The codebook, included in Appendix C, provided the coder with instructions for what to look for in a website, how to respond to each question, and how to calculate the levels of compliance and accessibility. The code form consists of four parts – Part A: Background Information, Part B: Accessibility Guidelines, Part C: Usability Guidelines, and Part D: Overall Accessibility. (See Appendix D.)

Part A collects background information, such as state, web address of homepage, web address of internal page, date, time begin, and time end. For Parts B and C, the relevant guidelines were converted into "Yes/No" questions where "Yes" is always a positive attribute and "No" is always a negative attribute. A choice of not applicable is available for sites to which the guideline does not apply. An example of guidelines that

would not apply to all sites would be those related to multimedia. Sites are not required to have multimedia, but if multimedia is present there are guidelines to which the site should comply.

Part B, specifically, measures a site's compliance with Section 508 guidelines. First, the coder is asked to run the site through Bobby and record the score. Then the coder is asked to complete several manual checks to answer the next 13 questions. Next, the coder is required to calculate a percentage and then enter the guideline compliance score based on the percentage. Then the coder records the errors reported by Bobby in question 15.

Part C measures a site's compliance with the Research-Based Web Design & Usability Guidelines. This section has 97 questions that assess various website features ranging from navigation to layout to color selection. This section also requires the coder to calculate a percentage and a usability guideline compliance score. In Part D, the coder calculates an overall accessibility score which is based solely on the usability and accessibility guideline compliance scores.

Procedures

The 50 websites were coded in alphabetical order from January 2007 – April 2007. A maximum of six websites were coded in one day to minimize coding errors due to coder fatigue. Because of the instability of the web, local copies of the home and secondary pages were created to increase the reliability of this study's findings. After a site was coded, scores for each question were entered into Microsoft Excel.

After 26 of the sites were coded, the codebook was updated and two students from the University of North Carolina at Chapel Hill's School of Information and Library Science were recruited to use the codebook to evaluate the level of accessibility and usability of Alabama's state department of health and human services website. To accomplish this task, a blind coding process was utilized "to avoid the coder equivalent of what is termed demand characteristic – the tendency of participants in a study to try to give the researcher what he or she wants" (Neuendorf, 2002, p. 142). Although blind coding was utilized, students were expected to have an understanding of basic web design concepts.

After the students coded the website, a rough analysis revealed that there were a number of discrepancies between the researcher's and the students' coding. A closer look revealed that one of the student coders selected the wrong secondary page; and thus, arrived at a lower percentage for level of compliance to usability guidelines. After speaking with the second student coder, she revealed that she utilized her knowledge instead of relying on the codebook while evaluating the site. The researcher also learned that the website had been updated since she had evaluated it in January 2007. To resolve these issues, both students and the researcher recoded their responses using the correct secondary page, the updated website, and following the instructions provided in the codebook.

Then coders' responses were entered into SPSS and Cohen's Kappa was calculated to determine the level of agreement. Pairwise calculations were completed and then the scores were averaged to obtain an overall level of agreement. The students and the researcher met to discuss the remaining disagreements and communicated until

they reached consensus on all of the questions. This process took approximately 4 hours to complete and students were paid \$40 to compensate for their time. After this process, the codebook was updated and the 26 sites that had been coded were recoded as needed and the remaining sites were coded with the updated codebook.

Once all of the sites were coded, the data was imported into SPSS and analyzed. Frequencies and percentages were generated for each question across all 50 sites. The Spearman's rho correlation test was done to determine if there was a linear relationship between the level of compliance to accessibility guidelines and level of compliance to usability guidelines scores. The Pearson R correlation test was run to determine if there was a linear relationship between the percentages sites' earned for compliance to usability and accessibility guidelines. Qualitative data was analyzed in Microsoft Excel to find common errors reported by Bobby and to determine the frequency of their occurrence.

RESULTS

Inter-rater reliability

Inter-rater reliability was established based on how coders responded to the 14 accessibility questions and the 97 usability questions. Two sets of inter-rater reliability scores were calculated for both accessibility and usability compliance – round 1 and round 2. Round 1 represents the level of agreement achieved with student coders either coding the incorrect secondary page or not following the codebook and the researcher having coded an earlier version of the site. Round 2 represents the level of agreement achieved after the aforementioned issues were resolved.

Accessibility Compliance

On average, there was a very high level of agreement among coders for both rounds of the coding process with coders reaching 100% agreement in round 2. (See Figure 3 below.)

Figure 3: Accessibility Compliance - Level of Agreement

Pair	Round 1	Round 2
Researcher * Student 1	K = .788, $p < .00$	K = 1.000, $p < .00$
Researcher * Student 2	K = .788, $p < .00$	K = 1.000, $p < .00$
Student 1 * Student 2	K = 1.000, $p < .00$	K = 1.000, $p < .00$
Average	K = .859, $p < .00$	K = 1.000, $p < .00$

Usability Compliance

On average, in round 1 coders achieved a moderate level of agreement with $K=.618, p<.000$. After all of the issues were resolved, the level of agreement increased and coders obtained a high level of agreement with $K=.805, p<.00$. (See Figure 4 below.)

Figure 4: Usability Compliance - Level of Agreement

Pair	Round 1	Round 2
Researcher * Student 1	$K = .658, p<.00$	$K = .829, p<.00$
Researcher * Student 2	$K = .630, p<.00$	$K = .787, p<.00$
Student 1 * Student 2	$K = .566, p<.00$	$K = .798, p<.00$
Average	$K = .618, p<.00$	$K = .805, p<.00$

Compliance with Accessibility Guidelines

Of the 14 questions used to evaluate sites' compliance with the Section 508 Accessibility guidelines, on average only 8 of those questions were applicable to the sites included in this study. None of the homepages or secondary pages included data tables, were created using frames, or required a timed response; thus, there are no results to report for questions related to these features. Both automatic and manual tests were conducted to measure a site's compliance with accessibility guidelines. Those findings are reported in the following sections.

Automatic Testing Results

Bobby was the automatic tool used to test whether the sites were compliant with the Section 508 Accessibility guidelines. Of the 49 sites that were able to be validated with Bobby, the majority of these sites (80%, 39 sites) were not compliant. One site was unable to be validated because Bobby identified the web address as a server redirect and

no alternative addresses were identified. Across all 39 sites, a total of six distinct errors were identified. The three errors that were most often identified include:

- Explicitly associate form controls and their labels with the LABEL element;
- Make sure there is a link to download accessible plug-ins; and,
- Provide alternative text for all images.

Although only six distinct errors were identified, the frequency of their occurrence was 407 with “provide alternative text for all images” being the most frequent error occurring 333 times. (See Figure 5 below for all errors and their frequency of occurrence.)

Figure 5: Bobby Errors

Error	Number of Sites	Frequency of Occurrence
Explicitly associate form controls and their labels with the LABEL element	28	31
Make sure there is a link to download accessible plug-ins	25	25
Provide alternative text for all images	22	333
Provide alternative text for all image map hot-spot areas	4	15
Provide alternative text for each APPLETS	1	2
Include a document title	1	1
Total	81	407

Manual Testing Results

Select website features were also manually checked for compliance with Section 508 Accessibility guidelines because Bobby could not adequately validate these features.

These features include:

- **Text Equivalents for Images, Multimedia, and Scripting Languages:**

Generally, the majority of sites that contained these elements did not provide text equivalents for them. Specifically, 64% (32 sites) of the sites did not provide

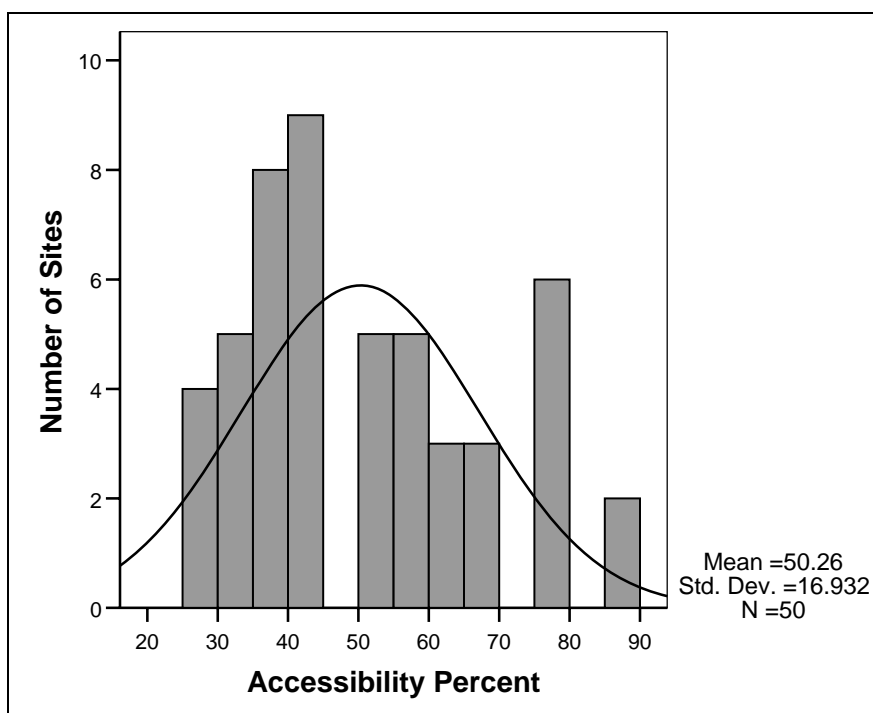
meaningful text equivalents for images. Common errors included omitting the “ALT” tag or including information in the “ALT” tag that did not identify the image such as an empty string. Only 7 (14%) of the 50 sites included multimedia on the home or secondary page and neither of these sites provided a text equivalent of the multimedia presentation. Nearly half (48%, 24 sites) of the sites used JavaScript to create page elements; however, only 9 of those sites included text equivalents for that content.

- **Forms:** Of the 47 sites that contained form elements on the homepage, 30 (64%) of the site’s form elements were not accessible to persons using assistive technologies. Common errors included not associating a LABEL element with the form control and not including instructions within the LABEL element.
- **Color:** The majority of sites (90%, 45 sites) were navigable even if users had deuteranope, a form of red/green color deficit. Vischeck was unable to process four sites and only one site failed this checkpoint.
- **Style Sheet:** The majority of sites (86%, 43 sites) were readable without requiring the Cascading Style Sheet (CSS). Four sites did not use CSS and only three sites failed this checkpoint.
- **Screen Flicker:** All of the sites avoided creating page elements that caused the screen to flicker.
- **Text-Only Page:** Only 10% (5 sites) of the sites provided text-only equivalent pages.
- **Skip Navigation:** Only 26% (13 sites) of the sites allowed users to skip repetitive navigation links.

Level of Compliance with Accessibility Guidelines

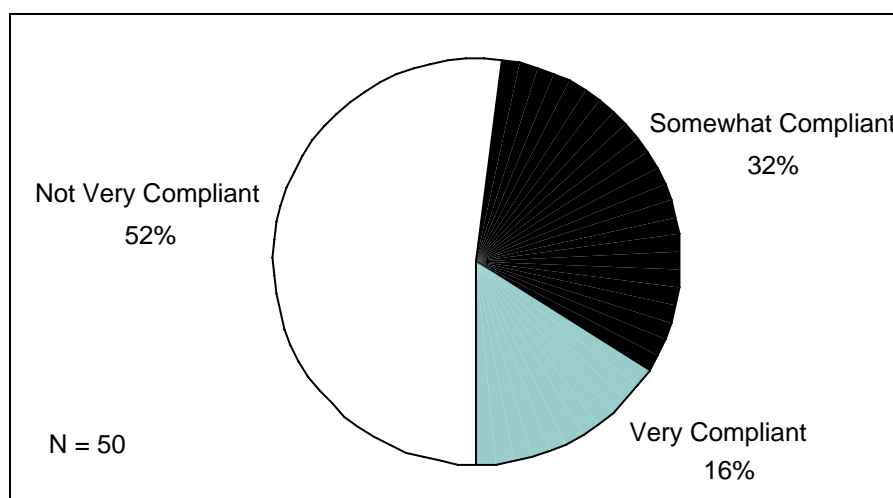
The mean percentage received for compliance to the Section 508 Accessibility guidelines was 50% with a standard deviation of 17. The percentages ranged from 25%-88%. (See Figure 6 below.) Arkansas', Maryland's, and Nebraska's department of health and human services' websites received the lowest percentage (25%) while New York's and Maine's received the highest percentage (88%). (See Appendix E to review percentages received by all state's department of health and human services websites.)

Figure 6: Accessibility Percents – Frequency Distribution



The percentages received were translated into a level of compliance score using the mean and standard deviation. Websites with percentages less than the mean (less than 50%) received a 0; with percentages in the range of +1 standard deviation of the mean (between 50%-67%) received a score of 1; and with percentages greater than +1 standard deviation from the mean (greater than 67%) received a 2. These scores correspond to the following levels: not very compliant, somewhat compliant, and very compliant, respectively. The majority of the sites (52%, 26 sites) were not very compliant with the Section 508 Accessibility guidelines. (See Figure 7 below.)

Figure 7: Level of Compliance with Accessibility Guidelines



Compliance with Usability Guidelines

Of the 97 questions used to evaluate sites' compliance with the Research-Based Web Design & Usability Guidelines, on average approximately 82 of those questions were applicable to any given site. None of the homepages or secondary pages included monitoring information, required users to compare information, contained data values in graphics, or required a timed response; thus, there are no results to report for questions related to these features. The usability component of this study evaluated websites on 14 different features. (See Figure 8 below.) This section will highlight the findings for each.

Figure 8: Website Usability Features Evaluated

Feature	Number of Questions
1. Design process and evaluation	1
2. Optimizing the user experience	11
3. Hardware and software	5
4. Homepage design	6
5. Page layout	11
6. Navigation	7
7. Scrolling and paging	1
8. Headings and titles	2
9. Links	11
10. Text appearance	7
11. Lists	5
12. Forms	17
13. Images	7
14. Search	6
Total	97

1. Design Process and Evaluation

The question used to assess this feature focused on the user's ability to locate the website within the top 30 searches. To check for compliance with this guideline, a Boolean search for the name of the state and the term health was conducted using Google. If the name of the state's department of health and human services appeared in the top 30 search results, the site was considered to be compliant with this guideline. Almost all of the sites (96%, 48 sites) complied with this guideline.

2. Optimizing the User Experience

Nearly all of the sites complied with guidelines related to not displaying unsolicited windows or graphics (100%), reducing the user's workload (98%, 49 sites), formatting information to encourage online reading (100%), and not requiring users to multitask while reading (98%, 49 sites). Other features related to optimizing the user experience did not have such high compliance. These features include:

- **Printing:** Eighty percent (80%, 40 sites) of sites printed properly, but only 7% (14 sites) provided printing options such as print a text version or print current page.
- **Credibility:** A number of websites (84%, 42) had difficulty establishing credibility. According to the guidelines, for a website to be credible, it has to provide information about the site or author, be recently updated, and provide a set of frequently asked questions. The majority of sites did not indicate when they were last updated and a few sites neglected to include a set of frequently asked questions.

- **Page Download:** Only 16 sites (32%) loaded in under 11 seconds with a 128 Kbps connection speed.
- **Feedback When Users Must Wait:** 12 of the 50 sites required users to wait when downloading documents or multimedia. Only 5 of those sites informed users that there was going to be a long download time and only 2 of those sites provided feedback while users were waiting.

3. Hardware and Software

The guidelines within this section were concerned with ensuring that websites are designed with consideration for constraints imposed by users' hardware, software, and Internet connection speed (Bailey et al., 2006). The majority of sites were designed for common browsers (98%, 49 sites), accounted for browser differences (98%, 49 sites), were designed for popular operating systems (100%), and considered commonly used screen resolutions (100%). Sites experienced difficulty with being designed for user's typical connection speed. As previously mentioned, only 16 sites (32%) loaded in under 11 seconds with a 128 Kbps connection speed. Other sites' download time at the same connection speed ranged from 11 seconds – 90 seconds. (See Appendix F for a list of each site's download time.)

4. Homepage Design

Most websites were compliant with guidelines associated with homepage design. In fact, 100% of sites complied with the following guidelines: create a positive first impression of the site, communicate the purpose of the website, use short and concise

prose text, and make the homepage look like a homepage. Ninety-eight percent (98%, 49 sites) of sites enabled access to the homepage from the secondary page and 90% (45 sites) presented important information above the fold.

5. Page Layout

Ninety-two percent (92%) to 100% of sites complied with the following guidelines related to page layout:

- Avoid having cluttered displays (100%);
- Consistently place important items throughout the site (92%, 46 sites);
- Align important items at the top center (96%, 48 sites);
- Establish level of importance of information (96%, 48 sites);
- Avoid creating pages that are crowded with information (100%);
- Align items on the page (96%, 48 sites);
- Use a flexible layout (100%);
- Avoid using scroll stoppers (100%);
- Set pages to appropriate lengths (96%, 48 sites); and,
- Use white space moderately (100%).

6. Navigation

All of the sites in this study provided navigational options and differentiated those elements from other elements on the page. The majority (92%, 46 sites) of sites informed users of their location within the site by using, for example, breadcrumbs, highlighting of navigation bar, or “div” titles. Only five sites had tabs on the homepage and those tabs

were presented effectively and labeled appropriately. A total of 16 sites had either a long homepage or secondary page and 7 of those sites failed to include links or anchor tags that would allow users to navigate to different parts of the page. The biggest divide within the navigation area was compliance with the guideline that recommends that primary navigation menus be placed in the left panel. The sites (44%, 22 sites) that did not comply with this guideline tended to utilize horizontal navigation and placed it in the top panel.

7. Scrolling and Paging

All of the sites avoided having users scroll horizontally by implementing a flexible or fluid layout.

8. Headings and Titles

A little more than half (52%, 26 sites) of the sites provided descriptive page titles. Common errors identified in sites that failed to comply with this guideline included omitting the state's name or abbreviation from the title or using the same title on both the home and secondary pages. Forty percent (40%, 20 sites) of sites did not use HTML headings (i.e., H1, H2, etc.) to differentiate heading levels. Instead, these sites often used CSS to identify personalized headers that were assigned to different classes. Of the 30 sites that did utilize HTML headers, only 8 of those sites used them in appropriate HTML order.

9. Links

In general, sites had difficulty implementing links appropriately. Specifically, a large number of sites **failed** to comply with the following guidelines:

- Use meaningful link labels (40%, 20 sites);
- Match link names with their destination pages (56%, 28 sites);
- Avoid having elements that appear to be clickable that are not (54%, 27 sites);
- Use ONLY text for links (92%, 46 sites);
- Designate used links (86%, 43 sites);
- Provide consistent clickability cues (54%, 27 sites);
- Avoid having text links wrap to a second line (90%, 45 sites); and,
- Distinguish between internal and external links (86%, 43 sites).

Similarly, of the 42 sites that had embedded links, 20 (48%) of those sites' had embedded links that were not descriptive. Twenty-six percent (26%) of the sites used mouse over for navigation. And, of the 12 sites that contained image maps, only half of them had image maps with clickable regions that were obvious to the user.

10. Text Appearance

In contrast to the previous section, the majority of sites complied with guidelines related to text appearance. Specifically, sites used black text on plain, high-contrast background (100%); common items were formatted consistently (90%, 45 sites); mixed-case was used for prose text (100%); visual consistency was maintained (90%, 45 sites);

bold text was used sparingly (94%, 47 sites); and, sites used a familiar font (100%). Half of the sites, however, did not use a font that was at least 12-point.

11. Lists

Compliance with guidelines related to list format was also high. The majority of sites ordered elements to maximize user performance (100%), formatted lists to ease scanning (98%, 49 sites), used vertical lists instead of horizontal lists (96%, 48 sites), included a heading for each list (92%, 46 sites), and implemented static menus (100%).

12. Forms

Forms were considered to be any data entry fields (i.e., Search boxes) that were either on the homepage, directly linked to the homepage, or on an Advanced Search page. The 17 guidelines related to forms assessed the quality of a form's:

- **Data entry fields:**
 - 15 sites had data entry fields that were required, but 5 of those sites failed to distinguish between those fields and optional ones.
 - Of the 46 sites that had multiple data entry fields, 96% (44 sites) of the sites labeled the fields consistently.
 - None of the sites had data entry fields that were case sensitive, but six sites (12%) did fail to have case insensitive URLs.
 - 100% of sites minimized data entry and allowed users to see their entered data.
 - Of the 21 sites that had long data items, 91% (19 sites) of those sites partitioned those items into smaller data entry fields.

- All of the 39 sites that had more than one data entry field on a single page avoided requiring the user to repeatedly shift between different data entry modes.
- **Option Groups:**
 - Of the 37 sites that asked users to select one option from a group, only 5 of those sites used radio buttons.
 - Of the 9 sites that asked users to select more than one option from a group, 8 of those sites used checkboxes to enable multiple selections.
 - All of the sites (36 sites) that used list boxes displayed as many items as possible before requiring the user to scroll through the list.
 - 31 of the 50 websites had an opportunity to display default values and each of these sites capitalized on that opportunity.
- **Pushbuttons:** All of the sites (19 sites) that had multiple pushbuttons prioritized those buttons.
- **Labels:**
 - 90% of sites labeled pushbuttons clearly. Sites that failed this guideline included symbols on their pushbuttons instead of text.
 - 98% of sites labeled data entry fields clearly and physically positioned labels close to their data entry fields.
 - All of the sites (26 sites) that had data entry fields that required units of measurements, clearly labeled those measurements.
- **Error Checking:** The majority of the sites (80%, 40 sites) anticipated user errors.

13. Images

Most of the sites that included images complied with the related guidelines. Specifically, the two sites that included background images used simple ones that did not impact the readability of the site. Of the 46 sites that had clickable images, 87% (40 sites) of those sites clearly labeled those images. Eighty-eight percent (88%, 44 sites) of the sites included the logo in a consistent place on each page and 90% (45 sites) of the sites did not include large images above the fold. Consistent with other findings related to page load time, the majority of pages with images did not load in under 11 seconds (34 sites, 68%).

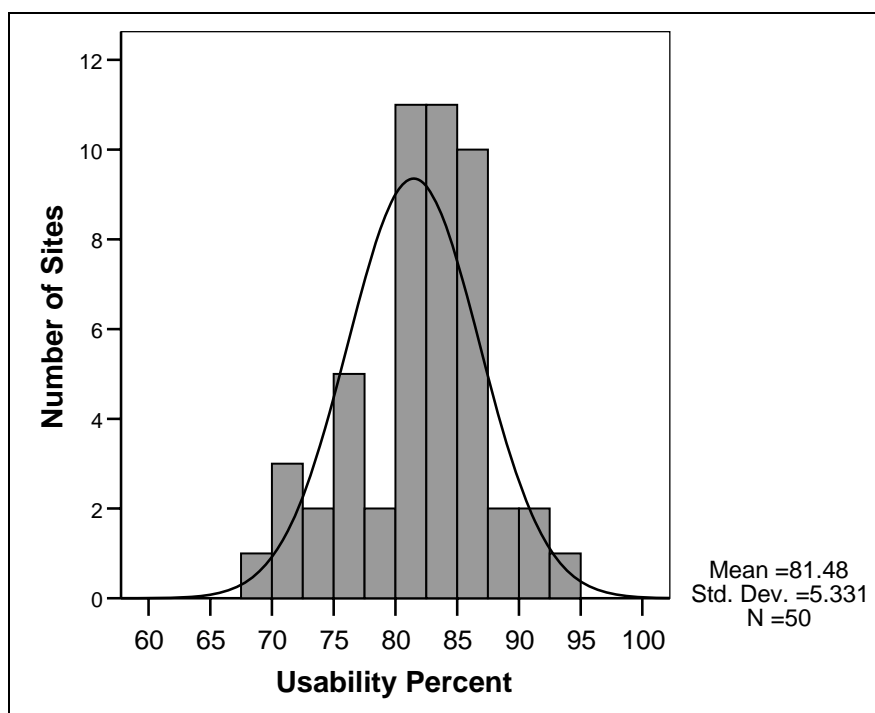
14. Search

Ninety-eight percent (98%, 49) of sites provided users with a search option. Two of those sites' search feature was not functioning properly when they were evaluated. Of the 49 sites that provided a search option, 90% (44 sites) of them included it on each page; all of them notified users of multiple search options; and, 86% (42 sites) of them included hints to help users improve search performance. Of the 47 sites that had a working search engine, 98% (46 sites) of them appeared to be designed to search the entire site; all of them allowed for simple searches; and, 83% (39 sites) of them ensured that upper- and lowercase search terms were equivalent.

Level of Compliance with Usability Guidelines

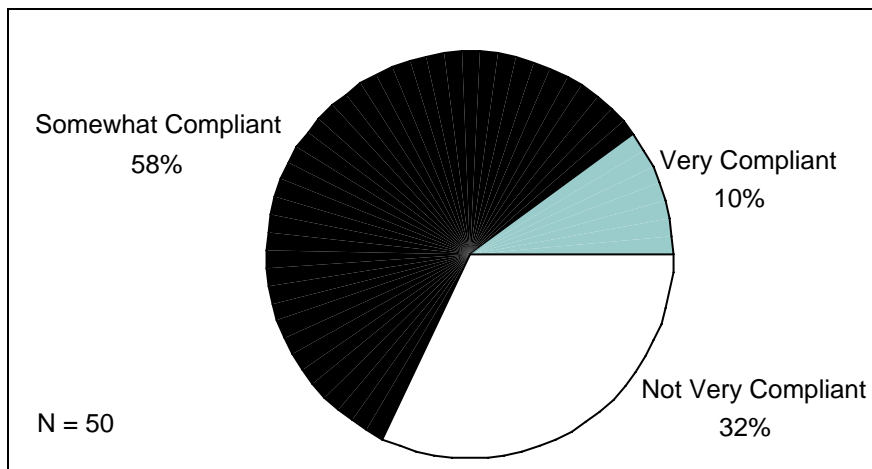
The mean percentage received for compliance to the Research-Based Web Design & Usability Guidelines was 81% with a standard deviation of 5. The percentages ranged from 68%-93%. (See Figure 9 below.) Nevada's department of health and human services' websites received the lowest percentage (68%) while North Dakota's received the highest percentage (93%). (See Appendix G to review percentages received by all state's department of health and human services websites.)

Figure 9: Usability Percents – Frequency Distribution



The percentages received were translated into a level of compliance score using the mean and standard deviation. Websites with percentages less than the mean (less than 81%) received a 0; with percentages in the range of +1 standard deviation of the mean (between 81%-86%) received a score of 1; and with percentages greater than +1 standard deviation from the mean (greater than 86%) received a 2. These scores correspond to the following levels: not very compliant, somewhat compliant, and very compliant, respectively. The majority of the sites (58%, 29 sites) were found to be somewhat compliant with the Research-Based Web Design & Usability Guidelines. Only 5 (10%) sites were very compliant with the guidelines. (See Figure 10 below.)

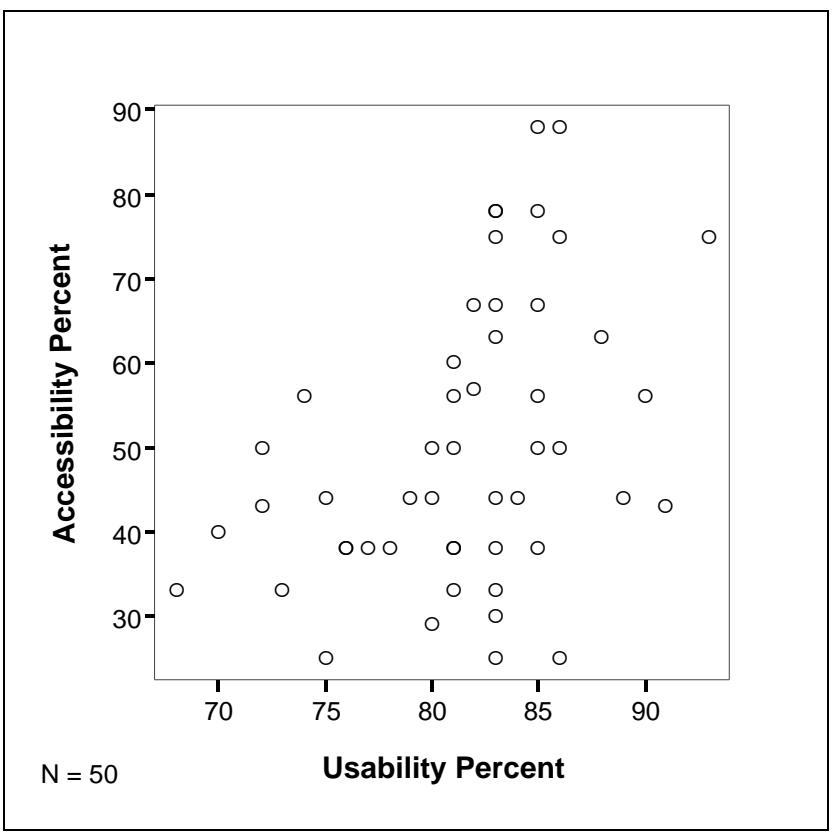
Figure 10: Level of Compliance with Usability Guidelines



Relationship Between Accessibility and Usability

To determine if there is a linear relationship between accessibility and usability, Pearson's r was calculated for the accessibility and usability percentages obtained and Spearman's ρ was calculated for the accessibility and usability level of compliance scores obtained. A significant relationship was found between both the accessibility and usability percentages with $r = .408$; $p < .01$ and the level of compliance scores with $r_s = .381$; $p < .01$. These findings indicate that there is a moderately positive linear relationship between accessibility and usability. The relationship between the percentages obtained is depicted in Figure 11 below.

Figure 11: Scatterplot of Accessibility and Usability Percents

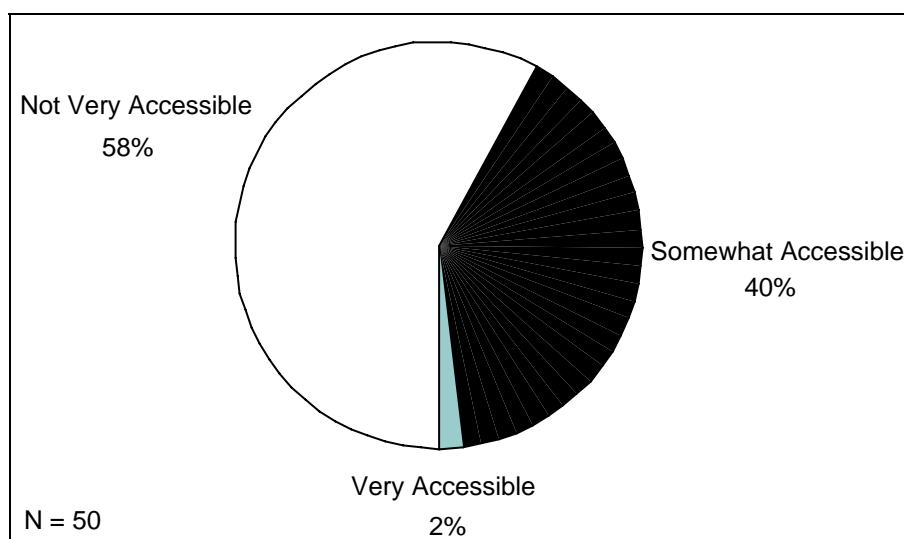


Level of Overall Accessibility

Given that there is a positive linear relationship between level of compliance to accessibility and usability guidelines, both sets of scores were utilized to calculate a site's level of overall accessibility. Sites that were not very compliant on one or both measures received a 0, very compliant on both measures received a 2, and all other score combinations received a 1. These scores translated into the following levels of overall accessibility: not very accessible, very accessible, and somewhat accessible, respectively.

The majority of the state department of health and human services' websites were not very accessible (58%, 29 sites). Forty percent (40%, 20 sites) were somewhat accessible and North Dakota was the only site that was very accessible. (See Figure 12 below. Also, see Appendix H to review each site's compliance and overall accessibility scores.)

Figure 12: Level of Overall Accessibility



DISCUSSION

The purpose of this study was to discover how widespread the issue of inaccessible healthcare websites is and to explore the relationship between accessibility and usability by determining how compliant state department of health and human services websites are with accessibility and usability guidelines. This study revealed that despite the laws, policies, and recommendations states have implemented regarding website accessibility, state department of health and human services websites are not conforming to those requirements. Fifty-two percent (52%) of the sites included in this study were not very compliant with Section 508 Accessibility guidelines and the vast majority (80%) of the sites failed automatic tests for compliance. Sixteen of the sites were somewhat compliant with these guidelines; however, the range of percentages this level of compliance represents is 50%-67%. This suggests that sites complied with only half to approximately two-thirds of the guidelines. These findings, however grave, are consistent with studies that reported that federal, state, and healthcare sites in general do not comply with Section 508 Accessibility guidelines.

Sites, in this study, commonly failed to provide meaningful “ALT” tags for images, text equivalents for JavaScript, text-only pages, and skip navigation links. This is alarming because failing to implement these features will make elements of the website inaccessible to users who rely on screen readers. This finding is also disconcerting

because these features are relatively easy to implement technologically which could imply that there is a breakdown in communication between lawmakers, disabled persons, and website designers. Perhaps this widespread noncompliance is a result of lack of awareness rather than lack of ability.

Compliance with Accessibility Guidelines

As a whole, state department of health and human services websites were more compliant with the Research-Based Web Design and Usability Guidelines than with the Section 508 Accessibility guidelines. The mean usability guideline compliance percentage was 81% compared with 50% for accessibility guideline compliance. The compliance to usability guidelines percentage distribution was also narrower than the compliance to accessibility guidelines percentage distribution with standard deviations of 5 and 17, respectively. This could indicate that designers are more familiar with usability guidelines than accessibility guidelines or that designing sites for able-bodied users is a higher priority than achieving universal accessibility.

The majority of the state department of health and human services websites were either somewhat (58%) or very compliant (10%) with usability guidelines. However, thirty-two percent (32%) of the sites were not very compliant with usability guidelines. Surprisingly, sites usually failed guidelines related to creating usable links. Frequent errors included:

- Using generic link names (i.e., more, click here, etc.) instead of using meaningful names that indicate the destination of the link;
- Having link names that do not match the heading of the destination page;

- Not clearly differentiating between clickable text and images and unclickable ones;
- Not designating used links or distinguishing between internal and external links; and,
- Allowing text links to wrap to multiple lines.

Consequently, many of the aforementioned errors not only impact usability, but they also affect accessibility. Users reliant on screen readers often use HTML headers and links to help them scan websites with their ears. Some of these errors make it difficult for disabled persons to find the information they seek. For example, when link names are not labeled the same as the heading or title of the destination page, disabled users may overlook pertinent information because they are unable to make the connection between the link name and the page header.

Other usability guidelines the sites frequently neglected to comply with included: establishing credibility, ensuring pages download in under 11 seconds, providing printing options (i.e., print the entire site, print a text-only version, etc.), using HTML headers in appropriate order, and using at least a 12-point font.

Relationship Between Accessibility and Usability

This study's findings suggest that there is a significant positive linear relationship between accessibility and usability. Although the relationship is significant, the strength of the relationship is moderate. Together these findings cast doubt on research that puts forward the idea that accessibility and usability are either completely separate or completely integrated. The significance of the relationship implies that there is some overlap between these two concepts. The correlation coefficient indicates that as

accessibility increases, usability increases or vice versa. The small value of the correlation coefficient means that the strength of the relationship is moderate which indicates that factors other than accessibility and usability play a role in determining the level of accessibility or usability of a website.

These findings represent the intermediate position between completely separate and completely integrated. That is, accessibility and usability appear to be interconnected and have some distinct components. Given that this moderate relationship does exist, systems designers should assess systems using both accessibility and usability criteria because, as indicated in previous research, it is difficult to tease out which issues solely impact accessibility or usability and which issues affect both. Research can only conclusively say that the interplay between these two concepts does affect a system's level of accessibility and usability.

Overall Accessibility

Consistent with earlier findings, the majority (58%) of state department of health and human services websites are not very accessible to disabled persons. Forty percent (40%) of the sites were found to be somewhat accessible, but considering the low accessibility compliance percentages, sites in this category could still subject disabled persons to a large number of accessibility issues. Only one site, North Dakota's, was very accessible and its accessibility compliance percentage was only 75%.

Although sites are not very accessible overall, there has been some improvement in disability access on the Web. Specifically, none of the sites in this study used frames to display information. While visual users can scan the contents of multiple frames at

once, some assistive technologies (i.e., screen readers) interpret and read each frame as a separate page. This can make those web pages unintelligible to visually impaired users. Shifting away from frame layout increases website accessibility because this eliminates one barrier with which disabled persons are faced.

Also, the majority of websites included Cascading Style Sheets (CSS) to create the “look and feel” of the site. This is important to making websites more accessible because the separation of presentation and content makes it easier for screen readers to interpret the HTML code; and thus, easier for visually impaired users to understand that information. Utilizing style sheets also gives the user more control over elements such as font face, size, and color by allowing the user to create their own style sheet specifying criteria that best accommodates their accessibility needs.

Even though none of the sites’ homepages contained data tables, 47 sites (94%) did use tables for layout. Using tables for layout can pose accessibility issues for disabled users because of the incongruence between the table’s function and its semantic meaning. Tables are intended to display tabular data; thus, screen readers read each row of the table from left to right. When tables are used for layout, the screen reader still interprets it as a data table and the content may be incoherent when read in this manner.

On the surface, state department of health and human services website’s reliance on tables for layout appears to overshadow the aforementioned progress. However, the fact that these sites’ designers frequently used CSS, “div” tags, and summary attributes in conjunction with tables suggests that designers may be aware of the accessibility issues surrounding table layout usage. Maybe, designers need more training regarding how to use “div” tags and CSS effectively so they can abandon using tables for layout.

CONCLUSION

There appears to be a gap between user's demand for web-based health information and the web community's ability to supply that demand. Given that state department of health and human services websites are not complying with established accessibility guidelines, it can be inferred that these sites are inaccessible to, and unable to meet the needs of, disabled persons. This finding is disconcerting because a large proportion of the population is being denied access to much needed information because state department of health and human services websites are not capable of accommodating their accessibility needs. Additional research needs to be conducted to determine why these sites are not in compliance. Are the guidelines too vague? Or, do web designers need additional support or training to learn how to use the guidelines to implement a fully accessible website?

The pervasiveness of the noncompliance of various websites that represent varied domains suggests that maybe the Section 508 Accessibility guidelines need to be re-evaluated. Perhaps this is not a sufficient medium through which to deliver this critical information. Further research should explore how many web design classes teach designers how to implement accessibility features and determine if those designers' websites comply with accessibility guidelines. Possibly integrating the topic into the web design learning process will be more effective than creating a set of heuristics or laws.

In the literature, there is a debate about the relationship between accessibility and usability. This study concludes that they are moderately related and that both measures are needed to identify the majority of the barriers presented by a system. It is interesting to note that within the Research-Based Web Design & Usability Guidelines, the Section 508 guidelines are threaded throughout. This may imply that the designers of this set of usability guidelines recognize that accessibility plays a role in determining how usable a site will be for its users. It also raises the question of whether two separate guidelines are necessary or if one integrated set of guidelines will be sufficient.

Study Limitations

The limitations of this study are associated with its external validity, content validity, exclusion of user-testing and treatment of tables.

- **External Validity:** This study only reviewed the homepages and select secondary pages of each state's department of health and human services website and then generalized those findings to the website as whole. Many researchers support this generalization because they suggest that the internal pages are usually equivalent to or worse than the site's homepage in terms of accessibility and usability. However, it is possible for homepages to have a design that is distinct from the remainder of the site which implies that other pages could be more or less accessible or usable than the homepage. To resolve this limitation, future research could replicate this study and evaluate a site in its entirety.
- **Content Validity:** This study may have limited content validity because 112 guidelines related to usability were excluded from this study which could

misrepresent a site's level of compliance with the usability guidelines. Also, the researcher's decision not to assess content in this study impacts content validity because users' primary purpose for utilizing these sites is to gather information and if that information is not accurate, relevant, or understandable, then a site can comply with all other guidelines and still be completely unusable to users. To resolve this issue, future research could replicate this study and evaluate the site's content, design process, and evaluation process.

- **Exclusion of User-Testing:** The researcher's decision to not conduct user-testing could contribute to some accessibility and usability issues being undetected because they are user-specific. To resolve this issue, future research could replicate this study and include a user-testing component.
- **Treatment of Tables:** Finally, 2 of the Section 508 Accessibility guidelines pertain to data tables. None of the sites in this study included data tables on the homepage; however, 47 sites (94%) used tables for layout. The researcher's decision not to penalize sites for using tables for layout could mean that sites are less accessible than the findings indicate.

Despite the limitations associated with this study's methodology, this study is extremely valuable to Internet users, the web community, assistive technology developers, and guideline developers. This is the first study to use both the Section 508 Accessibility guidelines and the Research-Based Web Design & Usability Guidelines to determine the level of accessibility of a website. Previous research frequently relied on only accessibility metrics to measure the accessibility of a website. Those studies'

omission of usability metrics could cause them to overlook usability issues that impact accessibility. Including both sets of guidelines ensured that the broadest range of issues would be revealed.

This study is also the first to determine how compliant sites are with the latest version of the Research-Based Web Design & Usability Guidelines. Extensive use of these guidelines highlighted its strengths and weaknesses. Its strengths lie in the fact that the guidelines are empirically based and the relative importance of each guideline is indicated. These features assist designers in determining which guidelines to implement and which to ignore.

The weaknesses of these guidelines lie in the fact that there are 209 guidelines; and, some are redundant, vague, or associated with literature that seems irrelevant to the guideline. To improve these guidelines, recommendations such as “Create a Positive First Impression of Your Site” should include concrete and practical design suggestions. It was difficult to evaluate sites based on a subjective measure. Also, guidelines that are redundant should be eliminated. For example, “Minimize Page Download Time” and “Design for User’s Typical Connection Speed” should be combined into one guideline because they both assess download time. Given that there are so many guidelines, it is important to streamline them and make them as clear and concrete as possible to avoid burdening the designer.

Other suggestions, recommendations, or areas for improvement that emerged throughout the course of this study include the following:

- **Assistive Technology developers should consider designing tools that will compensate for the shortcomings of website design.** Specifically, assistive

technology should provide users with a text-only version of a web page; automatically identify navigation and allow users to skip repetitive navigation; and, better differentiate between tables used for layout and data tables. Also, assistive technology should take advantage of voice recognition software and create alternatives to multimedia for users with disabilities. If assistive technology is able to remove these barriers then website accessibility will be less dependent on the sites' design.

- **Implementation of Section 508 Accessibility guidelines should be incorporated into web design courses.** Although many of the accessibility guidelines are easy to implement many sites failed to comply with these guidelines. This could indicate that web designers are not aware of the accessibility guidelines, do not know how to implement them effectively, or, believe that designing sites for disabled persons is a lower priority. Teaching web designers about these issues will resolve many of them, and hopefully, impress how important it is to accommodate this population's accessibility needs.
- **Guideline developers may want to explore the advantages and disadvantages of having separate usability and accessibility guidelines.** Because web designers are inundated with usability guidelines, they could possibly be overlooking the accessibility guidelines. Integrating the two may increase compliance with accessibility guidelines.

- **Website designers may benefit from exploring the websites included below.**

These websites explain the importance of creating accessible websites; describe how to implement various features to make them accessible to users with disabilities; and, provides a checklist so designers can quickly determine if their sites have passed or failed each Section 508 Accessibility guideline.

- <http://web508.gsfc.nasa.gov/developing/index.html>
- <http://www.webaim.org/intro/>
- <http://www.webaim.org/standards/508/508checklist.pdf>

As the baby boomer generation ages, the number of disabled Internet users will increase because disabilities such as visual impairments, cognitive impairments, and limited mobility often are the result of the natural aging process. It is important to create systems now that will accommodate these disabilities and, in turn, alleviate barriers to Internet access in the future. This study has contributed to alleviating future barriers by identifying the level of overall accessibility of state department of health and human services' websites so those sites' designers can remove those barriers to access. This study is only a starting place to creating accessible systems, but with the improvement of each website, the web community moves one step closer to achieving universal accessibility.

APPENDICES

Appendix A: List of Websites

Below is a list of the state department of health and human services websites included in this study. The sites were selected from <http://www.pandemicflu.gov/plan/states/statecontacts.html>. Note: Wyoming's website was not listed, so the researcher conducted a Google search to identify the web address.

States	Department Name	Websites
Alabama	Alabama Department of Public Health	http://www.adph.org
Alaska	Alaska Division of Public Health	http://health.hss.state.ak.us/
Arizona	Arizona Department of Health Services	http://www.hs.state.az.us/
Arkansas	Arkansas Department of Health	http://www.healthyarkansas.com/
California	California Department of Health Services	http://www.dhs.ca.gov/
Colorado	Colorado Department of Public Health & Environment	http://www.cdph.state.co.us/
Connecticut	Connecticut Department of Public Health	http://www.dph.state.ct.us/
Delaware	Delaware Health and Social Services	http://www.dhss.delaware.gov/dhss/
Florida	Florida Department of Health	http://www.doh.state.fl.us/
Georgia	Georgia Department of Human Resources	http://health.state.ga.us/
Hawaii	Hawaii Department of Health	http://www.state.hi.us/health
Idaho	Idaho Department of Health and Welfare	http://www.healthandwelfare.idaho.gov/
Illinois	Illinois Department of Public Health	http://www.idph.state.il.us/
Indiana	Indiana State Department of Health	http://www.in.gov/isdh/

States	Department Name	Websites
Iowa	Iowa Department of Public Health	http://www.idph.state.ia.us/
Kansas	Kansas Department of Health & Environment	http://www.kdhe.state.ks.us/
Kentucky	Kentucky Department for Health Services	http://publichealth.state.ky.us/
Louisiana	Louisiana Department of Health & Hospitals	http://www.oph.dhh.state.la.us/
Maine	Maine Department of Human Services	http://www.state.me.us/dhs/boh
Maryland	Maryland Department of Health & Mental Hygiene	http://www.dhmh.state.md.us/
Massachusetts	Massachusetts Department of Public Health	http://www.state.ma.us/dph/dphhome.htm
Michigan	Michigan Department of Community Health	http://www.michigan.gov/mdch
Minnesota	Minnesota Department of Health	http://www.health.state.mn.us/
Mississippi	Mississippi Department of Health	http://www.msdh.state.ms.us/
Missouri	Missouri Department of Health and Senior Services	http://www.dhss.mo.gov/
Montana	Montana Department of Public Health & Human Services	http://www.dphhs.state.mt.us/
Nebraska	Nebraska Health and Human Services System	http://www.hhs.state.ne.us/
Nevada	Nevada State Health Division	http://health2k.state.nv.us/
New Hampshire	New Hampshire Department of Health & Human Services	http://www.dhhs.state.nh.us/
New Jersey	New Jersey Department of Health & Senior Services	http://www.state.nj.us/health
New Mexico	New Mexico Department of Health	http://www.health.state.nm.us/
New York	New York State Department of Health	http://www.health.state.ny.us/
North Carolina	North Carolina Department of Health & Human Services	http://www.ncdhhs.gov/

States	Department Name	Websites
North Dakota	North Dakota Department of Health	http://www.ndhealth.gov/
Ohio	Ohio Department of Health	http://www.odh.state.oh.us/
Oklahoma	Oklahoma State Department of Health	http://www.health.ok.gov/
Oregon	Oregon Department of Health Services	http://www.oregon.gov/dhs
Pennsylvania	Pennsylvania Department of Health	http://www.health.state.pa.us/
Rhode Island	Rhode Island Department of Health	http://www.health.ri.gov/
South Carolina	South Carolina Department of Health & Environmental Control	http://www.scdhec.net/
South Dakota	South Dakota Department of Health	http://www.state.sd.us/doh
Tennessee	Tennessee Department of Health	http://state.tn.us/health/
Texas	Texas Department of State Health Services	http://www.dshs.state.tx.us/
Utah	Utah Department of Health	http://health.utah.gov/
Vermont	Vermont Department of Health	http://healthvermont.gov/
Virginia	Virginia State Health Department	http://www.vdh.state.va.us/
Washington	Washington State Department of Health	http://www.doh.wa.gov/
West Virginia	West Virginia Bureau for Public Health	http://www.wvdhhr.org/bph
Wisconsin	Wisconsin Division of Public Health	http://dhfs.wisconsin.gov/
Wyoming	Wyoming Department of Health	http://wdh.state.wy.us/main/index.asp

Appendix B: Omitted Usability Guidelines

Number	Guideline
1:1	Provide Useful Content
1:2	Establish User Requirements
1:3	Understand and Meet User's Expectations
1:4	Involve Users in Establishing User Requirements
1:5	Set and State Goals
1:6	Focus on Performance Before Preference
1:7	Consider Many User Interface Issues
1:9	Set Usability Goals
1:10	Use Parallel Design
1:11	Use Personas
2:3	Standardize Task Sequences
2:5	Design for Working Memory Limitations
2:8	Display Information in a Directly Usable Format
2:14	Use Users' Terminology in Help Documentation
2:16	Provide Assistance to Users
3:1	Comply with Section 508
3:2	Design Forms for Users Using Assistive Technologies
3:3	Do Not Use Color Alone to Convey Information
3:4	Enable Users to Skip Repetitive Navigation Links
3:5	Provide Text Equivalents for Non-Text Elements
3:6	Test Plug-Ins and Applets for Accessibility
3:7	Ensure that Scripts Allow Accessibility
3:8	Provide Equivalent Pages
3:9	Provide Client-Side Image Maps
3:10	Synchronize Multimedia Elements
3:11	Do Not Require Style Sheets
3:12	Provide Frame Titles
3:13	Avoid Screen Flicker
5:2	Show All Major Options on the Homepage
5:8	Announce Changes to a Web Site
5:9	Attend to Homepage Panel Width
6:12	Choose Appropriate Line Lengths
6:13	Use Frames when Functions Must Remain Accessible
7:8	Keep Navigation-Only Pages Short
7:9	Use Appropriate Menu Types
7:10	Use Site Maps
7:11	Use 'Glosses' to Assist Navigation
7:12	Breadcrumb Navigation
8:2	Facilitate Rapid Scrolling While Reading
8:3	Use Scrolling Pages for Reading Comprehension
8:4	Use Paging Rather than Scrolling
8:5	Scroll Fewer Screenfuls

Number	Guideline
9:1	Use Clear Category Labels
9:3	Use Descriptive Headings Liberally
9:4	Use Unique and Descriptive Headings
9:5	Highlight Critical Data
9:5	Use Descriptive Row and Column Headings
9:8	Provide Users with Good Ways to Reduce Options
10:2	Link to Related Content
10:5	Repeat Important Links
10:14	Link to Supportive Information
11:6	Use Attention-Attracting Features when Appropriate
11:9	Color-Coding and Instructions
11:10	Emphasize Importance
11:11	Highlighting Information
12:2	Place Important Items at Top of the List
12:7	Start Numbered Lists at One
12:8	Use Appropriate List Style
12:9	Capitalize First Letter of First Word in Lists
13:10	Use Familiar Widgets
13:19	Place Cursor in First Data Entry Field
13:20	Ensure that Double-Clicking Will Not Cause Problems
13:21	Use Open Lists to Select One from Many
13:22	Use Data Entry Fields to Speed Performance
13:23	Use a Minimum of Two Radio Buttons
13:24	Provide Auto-Tabbing Functionality
13:25	Minimize Use of the Shift Key
14:4	Use Video, Animation, and Audio Meaningfully
14:6	Graphics Should Not Look Like Banner Ads
14:8	Ensure Web Site Images Convey Intended Messages
14:9	Limit the Use of Images
14:12	Introduce Animation
14:13	Emulate Real-World Objects
14:14	Use Thumbnail Images to Preview Larger Images
14:15	Use Images to Facilitate Learning
14:16	Using Photographs of People
15:1	Make Action Sequences Clear
15:2	Avoid Jargon
15:3	Use Familiar Words
15:4	Define Acronyms and Abbreviations
15:5	Use Abbreviations Sparingly
15:6	Use Mixed Case with Prose
15:7	Limit the Number of Words and Sentences
15:8	Limit Prose Text on Navigation Pages
15:9	Use Active Voice
15:10	Write Instructions in the Affirmative

Number	Guideline
15:11	Make First Sentences Descriptive
16:1	Organize Information Clearly
16:2	Facilitate Scanning
16:3	Ensure that Necessary Information is Displayed
16:4	Group Related Elements
16:5	Minimize the Number of Clicks or Pages
16:6	Design Quantitative Content for Quick Understanding
16:7	Display Only Necessary Information
16:8	Format Information for Multiple Audiences
16:9	Use Color for Grouping
17:1	Ensure Usable Search Results
17:5	Design Search Around Users' Terms
17:9	Provide Search Templates
18:1	Use an Iterative Design Approach
18:2	Solicit Test Participants' Comments
18:3	Evaluate Web Sites Before and After Making Changes
18:4	Prioritize Tasks
18:5	Distinguish Between Frequency and Severity
18:6	Select the Right Number of Participants
18:7	Use the Appropriate Prototyping Technology
18:8	Use Inspection Evaluation Results Cautiously
18:9	Recognize the 'Evaluator Effect'
18:10	Apply Automatic Evaluation Methods
18:11	Use Cognitive Walkthroughs Cautiously
18:12	Choosing Laboratory vs. Remote Testing
18:13	Use Severity Ratings Cautiously

Appendix C: Codebook

Unit of Data Collection: The homepage of the website.

Section A: Background Information

State: Indicate the state, whose department of health and human services is represented by the site.

Homepage Address: Indicate the web address of the homepage you are evaluating.

Second Page Address: In question 22 of Section C, you will have to identify an internal page to answer that question. This page will also be used in additional questions. Once the site has been identified, please include the web address here.

Date: Indicate the date you complete the evaluation.

Time Begin: Indicate the time you began evaluating the site.

Time End: Indicate the time you finished evaluating the site.

Section B: Accessibility Guidelines

Explanation of layout:

- Questions to evaluate the site on appear in the first column
- The second column labeled (0, 1, N/A) is where you put the score received for each question.

Explanation of questions:

Note: Many of these questions and explanations were either directly taken or modified from questions provided in Appendix B of Danielle Beaudin's (2001) master's thesis.

1. Is the homepage Section 508 compliant?

- a. Yes, the page passed Section 508 compliance. **(1)**
- b. No, the page did not pass Section 508 compliance. **(0)**

(To determine if the homepage passes Section 508 compliance, copy the link of the homepage into the Page URL box on this site <http://webxact.watchfire.com/>, click Accessibility Options and select Section 508 and press go. When it is complete, click on the Accessibility tab, if a green check mark appears in the Status column next to Section 508, then this site is Section 508 compliant. If a red circle with an X in the middle appears, then the site did not pass Section 508 compliance.)

2. Are meaningful text equivalents provided for every non-text element?

- a. Yes, the page has meaningful text equivalents. **(1)**
- b. No, the page does not have meaningful text equivalents. **(0)**
- c. N/A, there are no non-text elements on the page. **(N/A)**

(Because Bobby cannot determine if ALT text is meaningful, you have to manually check. First, look at the output for Bobby, if any of the error messages state that alternative ALT tags need to be provided, then the answer to this question is No. However, if no such error exists, this question is answered by holding one's mouse over the image to read the ALT tag that appears (have to use internet explorer). If the textual description contained in the ALT describes the image, it is considered meaningful for the purposes of this question. While some ALT tags may be better written than others, it is not the intention of this question to grade the level of meaningfulness – simply, to report if descriptive text is provided. If the ALT tags are only the name of the image, for example, 5566.gif, the ALT tags are to be considered not meaningful. If the site uses both meaningful and non-meaningful tags, it should be rated with “B.” If the site does not provide a single graphical image, this question is not applicable. If all of the non-text elements have meaningful ALT tags, it should be rated with “A”. *Note: spacer images are permitted to have an empty ALT tag, ex. ALT= ” ”*).

3. Are equivalent alternatives for any multimedia presentation provided and synchronized with the presentation?

- a. Yes, the page has equivalent alternatives for multimedia presentations. **(1)**
- b. No, the page does not have equivalent alternatives for multimedia presentations. **(0)**
- c. N/A, there are no multimedia elements on the page. **(N/A)**

(For the purposes of this question, multimedia content is considered to be audio or video output linked to the homepage of the site. For this question, if the homepage lists a link to speeches, broadcasts, web cast, video, audio or radio, the link should be clicked to see what multimedia is being used to represent these things. Although this page is ONE layer below the homepage, it is considered within the scope of the study as the initial link is on the homepage. Therefore the multimedia can either be on the homepage or directly linked to the homepage (one layer deep). If the page provides textual equivalents (such as an HTML document or text captioning) for all of its multimedia content, the answer is yes. If it provides textual equivalents for only some of its contents, “B” should be selected. If the page provides multimedia content but does not provide any textual equivalents to any of the multimedia content, “B” is the appropriate response. Finally, if the page does not provide any multimedia content, “C” is the appropriate response.)

4. Is the page navigable even if users do not have the ability to identify specific colors or differentiate between colors?

- a. Yes, the page uses color appropriately. **(1)**
- b. No, the page does not use color appropriately. **(0)**

(BOBBY is not able to test pages for the appropriate use of color. The purpose of the test is to determine whether or not the page can be navigated in light of its use of color. This question does not attempt to evaluate the aesthetics of the use of color on the pages. There are two stages to answering this question. First, the homepages are viewed through Vischeck's Color Vision Simulator – <http://www.vischeck.com/vischeck/vischeckURL.php> - to test to see if the page is navigable to colorblind people. On Vischeck's website under *Select the type of color vision to simulate*, select deuteranope, enter the site's URL and click *Run Vischeck*. When the simulator is complete, click on "Deuteranope Simulation" to view the output. Finally, the sites are viewed with the monitor display set to high contrast to see if there is enough contrast between the background color and the text color for users, especially those with vision problems, to navigate the page. *Click Control Panel, then Accessibility Options, then Display and finally, check Use High Contrast*. If the site passes both of these tests, it is considered to be using color appropriately. If it fails any one of the categories, it is considered to use color inappropriately. *Note: Sometimes images will not come through the simulator, this is okay. This check point is more concerned about color.*)

5. Are documents readable without requiring an associated style sheet?

- a. Yes, the page is readable without the style sheet. **(1)**
- b. No, the page is not readable without the style sheet. **(0)**
- c. N/A, the page does not use a style sheet. **(N/A)**

(To determine if a page is using a style sheet, the source code must be examined for the occurrence of either internal or external style sheets. References to these will be included in the header portion of the HTML document between style tags. If a CSS style sheet exists, open the page in Mozilla Firefox, click CSS (3rd item on last toolbar), then click Edit CSS. A section should appear to the left of the webpage. Delete all of the CSS provided (there may be more than one tab). If the page is readable, meaning that there are appropriate line breaks and spacing, then "A" is the appropriate response. If text appears all jumbled together with no line breaks or spacing, then "B" is the appropriate answer. If the site does not have a style sheet, then "N/A" is the appropriate response.)

6. Are row and column headers identified for data tables?

- a. Yes (**1**)
- b. No (**0**)
- c. N/A, the page does not contain any tables. (**N/A**)

(In order for visually impaired individuals to understand the meaning of data in tabular format, page authors must identify row and column headers with the <thead> tags. To determine the answer to this question, the page must be viewed to see if any tabular data is present. If there is such a table on the page, the source code must be checked for use of <thead> tags on all relevant rows and columns. If this is present in ALL cases, the answer to the question is “yes.” If the page has a table but does not use the appropriate tag or usually is only some of the time, the answer is “no.” N/A refers to pages that do not contain data in table format.)

7. If a table has two or more rows or columns that serve as headers, is structural markup used to identify their hierarchy and relationship.

- a. Yes. (**1**)
- b. No. (**0**)
- c. N/A. The page does not contain a table with two or more rows or columns serving as headers. (**N/A**)

(To answer this question, the page must be viewed to see if any tabular data exists that has multiple column or row headers. If there is such a table on the page, the source code must be checked for use of THEAD, TFOOT, and TBODY to group rows and/or COL and COLGROUP to group columns. Also, to adequately describe the complex relationships among data, the code must include "axis" and "scope" attributes. Scope specifies the set of data cells to be associated with the current header cell and must have one of the following values: "row", "col", "rowgroup" or "colgroup". If this is present in ALL cases, the answer to the question is “A”. If the page has a table with two or more rows or columns serving as headers but does not use the appropriate tag or only use them some of the time, the answer is “B”. If the site does not contain a table with two or more rows or columns serving as headers, the answer is “C”.

8. Are frames titled with text that facilitates frame identification and navigation?

- a. Yes. (**1**)
- b. No. (**0**)
- c. N/A. The page does not use frames. (**N/A**)

(Many screen readers and other assistive devices have difficulties with frames. Frames that are not titled make navigation for many disabled users extremely difficult. To determine if a page is using untitled frames, run the site through BOBBY. BOBBY will evaluate whether or not the site is using frames, and if the frames are titled. BOBBY, however, cannot determine if the title describes the frame. The frame title must be evaluated to determine if it provides a meaningful description for the frame it is naming. If the site does have frames and does provide a meaningful title, the response is “yes.” If the site uses frames but either does not title them or provides a meaningless (a

meaningless title is one that does not represent the content in the frame) title, the answer is “no.” If the site does not use frames, the answer is N/A.)

- 9. Are pages designed to avoid causing the screen to flicker?**
- Yes. **(1)**
 - No. **(0)**

(Pages that flicker or blink could cause seizures in certain populations. If the page is designed to flicker or blink, the answer to this question is “No.” This can be determined by simply viewing the page. If it flickers or blinks on all browsers it is displayed on, it is “No.” If the page does not flicker or blink, the answer is “Yes.”)

- 10. Is a text-only page provided?**
- Yes. **(1)**
 - No. **(0)**

- 11. Does the site provide text equivalents for content or interface elements that are created with a scripting language?**
- Yes. **(1)**
 - No. **(0)**
 - N/A, the page does not use a scripting language. **(N/A)**

(To determine if a page is using a scripting language, the source code must be examined. Scripting language will usually be included in the header portion of the HTML document between script tags and elements will refer to it in the body tag. If scripting language exists, check to see if there is a text explanation of the content created by the script. If yes, then “A” is the appropriate response. If no, then “B” is the appropriate answer. If the site does not use a scripting language, then “N/A” is the appropriate response.)

- 12. Are form elements accessible to persons using assistive technology?**
- Yes. **(1)**
 - No. **(0)**
 - N/A, the page does not have form elements. **(N/A)**

(Bobby can determine whether form labels and their controls are linked. Look through the errors and see if any form errors appear. If yes, then the appropriate response to this question is “B”. If no errors are identified by Bobby, then view the web page for the following: are labels close to form elements; are all text and instructions included within the labels as opposed to between form fields; and, can the user see the information they enter? If one answers yes to each of these questions, then the appropriate response is “A”. If either of the questions is answered no, then the appropriate response is “B”. If there are no form elements on the page, then the appropriate response is “N/A”.)

13. Does the site allow users to skip repetitive navigation links?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, the page does not provide navigation. **(N/A)**

(For users using assistive technologies, it is important for them to have the ability to skip navigation to avoid having to listen to it repeatedly. To determine if the site supports skip navigation, view the source code and see if a skip, skip to content, skip navigation, jump to content, etc. link is provided. If yes, then the appropriate response is “A”. If no, then the appropriate response is “B”. If the site does not have navigation, then the appropriate response is “N/A”.)

14. If a timed response is required, are users alerted of this and given sufficient time to indicate that more time is required?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, the page does not have any time response elements. **(N/A)**

(If users are performing a task and they are asked to respond in a specific amount of time, do the at least a minute to respond. If yes, the appropriate response is “A”. If no, the appropriate response is “B”. If the site does not have any time response elements, the appropriate response is “N/A”.)

15. Include descriptions of errors identified by Watchfire Bobby.

(If a site does not pass Section 508 compliance, Bobby will include errors that caused the site to fail. Here, briefly describe the errors identified by Bobby. Do not list the warnings. Include the frequency for repetitive errors.)

Calculation of Percentage:

To calculate the percentage, do the following:

- Determine the total possible score: Add one for every question you said was applicable to the site. Note, do not add one for items rated N/A.
- Determine the actual score: Add the values you included in column two.
- Calculate the percentage: Divide the actual score by the total possible score and multiply by 100. $((\text{Actual/Possible}) * 100)$

Calculation of Compliance Score:

To calculate how compliant the site is with accessibility guidelines, do the following:

- If the site received a percentage that is greater than +1 standard deviation from the mean, then the site is very compliant and the score = 2.
- If the site received a percentage that is within +1 standard deviation from the mean, then the site is somewhat compliant and the score = 1.
- If the site received a percentage that is less than the mean, then the site is not very compliant and the score = 0.

Section C: Usability Guidelines

Explanation of layout:

- Questions to evaluate the site on appear in the first column
- The second column labeled (0, 1, N/A) is where you put the score received for each question.
- The third column indicates the relative importance rating associated with each guideline according to the Research-Based Web Design & Usability Guidelines (Bailey et al., 2006)
- In the fourth column, labeled Total, do the following:
 - If the website received a one on the question, include the value from column three.
 - If the website received a zero, include a zero in the total column.
 - If the question was not applicable to this site (N/A), write N/A in the total column.

Explanation of questions:

1. Can the site be found within the top 30 searches?

- a. Yes. **(1)**
- b. No. **(0)**

(Although, it is difficult to pick what search terms users will use, this study choose the state's name and "health" as search terms. To determine if a site is within the top 30, enter the state's name and the word health (ex. Texas and Health). Include this entire phrase in Google's search engine at www.google.com. If the title of the state's department of health and human services appears within the top 30 search results, then the appropriate response is "A". If not, choose "B".)

2. Does the site avoid displaying unsolicited windows or graphics?

- a. Yes. **(1)**
- b. No. **(0)**

(If while interacting with the homepage, one receives unsolicited pop-up windows, then the answer to this question is "B". If no unsolicited windows open, then the answer is "A".)

3. Is the website credible?

- a. Yes. **(1)**
- b. No. **(0)**

(To answer this question, first answer the following questions: Does the website provide a set of frequently asked questions? Does the website provide information about the site or author? Has the site been recently updated? If you can answer yes to the above questions, then the appropriate response is "A". If you answer no to any of the questions or if you cannot answer a question, then the answer is "B".)

4. Does the website reduce the user's workload?

- a. Yes. (1)
- b. No. (0)

(Are there tasks on the homepage that you have to complete that would be more efficient for a computer to complete? If yes, then the appropriate answer is "B". If no, then the appropriate answer is "A".)

5. Is there minimal page download time?

- a. Yes. (1)
- b. No. (0)

("The National Cancer Institute (NCI) Web usability guidelines state that users wait about 10 seconds for a page to download before losing interest" (Becker, 2004). To determine if pages load in under 10 seconds, Microsoft FrontPage 2003 *estimated time to download* feature will be utilized. Open Microsoft FrontPage 2003. To set the connection speed and minimum download time, go to the Tools menu, select Options and click the Reports View tab. Under "Assume connection speed of", select 128 Kbps and under "Slow pages take at least _____ seconds to download", select 11. Now, go to View menu, select Reports, then select Problems and then select Slow Pages. If the site's homepage appears in the window, select "B" else select "A". *Note: You have to save a local copy of the homepage to use this feature. Please save a copy of the homepage to Desktop/Reliability.*)

6. Does the page warn of 'time outs'?

- a. Yes. (1)
- b. No. (0)
- c. N/A. The page does not have a timeout feature. (N/A)

(If the page has a timeout feature, does it warn users before it times out and give them the opportunity to request additional time. If yes, the appropriate answer is "A". If no, the appropriate answer is "B". If the site does not have a timeout feature, select "C".)

7. Is the information formatted to encourage online reading?

- a. Yes. (1)
- b. No. (0)

(Does the page require a lot of scrolling? Is the text really long? If yes, then this is more appropriate for a print environment than an electronic one so, the appropriate response is "B". If text is short, has a lot of white spacing, and requires little scrolling, this is supportive of online reading and the appropriate response is "A".)

8. Does the site provide feedback when users must wait?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, if the site does not utilize processing time to complete a task.

(If a site needs to take time to process a task (meaning it does not appear to be instantaneous), the site needs to provide some method of letting the user know how long it will take to process and have some indicator of how much as been completed/remains. If there is an indicator then select "A". If not, select "B". If the site does not have an extended processing time for any task, then select "C".)

9. Does the site inform users of long download times?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, if the site does not have images or documents that have a long download time.

(If a site has images or documents that require a long (more than instantaneous) download time, the site needs to inform the user of the image/document size or estimate time to download. If this is provided, select "A". If not, select "B". If the site does not have any elements that require long download time, then select "N/A".)

10. Do pages print properly?

- a. Yes. **(1)**
- b. No. **(0)**

(Use print preview to view the homepage and see if it would prints properly. Make sure print preview is scaled to 100%. Can you read all of the information or is some of the text cutoff? If none of the text is cutoff, select "A" else select "B".)

11. Does the site avoid requiring users to multitask while reading?

- a. Yes. **(1)**
- b. No. **(0)**

(If users are required to simultaneously complete other tasks while reading, the appropriate answer is "B". If not, select "A".)

12. Does the site provide printing options?

- a. Yes. **(1)**
- b. No. **(0)**

(Does the site offer users a link or tool to print select pages or the entire site? If yes to either question, select "A". If no to both, select "B".)

13. Is the site designed for common browsers?

- a. Yes. **(1)**
- b. No. **(0)**

(According to <http://www.thecounter.com/stats/> the most common web browsers are Microsoft Internet Explorer and Mozilla Firefox. To test that the site is designed for common browsers, view the site in both browsers and see if users are still able to navigate properly. This is not a measure of whether the site looks exactly the same in both browsers, but rather, can tasks be completed with a similar amount of ease. If the sites are generally similar, select “A”. If users lose a lot of capabilities and this affects their ability to use the site, select “B”.)

14. Does the site account for browser differences?

(Repeat the answer indicated in question 13 above.)

15. Is the site designed for popular operating systems?

- a. Yes. **(1)**
- b. No. **(0)**

(According to the Research-Based Web Design & Usability Guidelines (Bailey et al., 2006) the most popular operating systems is Windows XP. So, to measure this guideline, the websites will be viewed on a computer using the Windows XP operating system. If the functionality on the homepage is usable, select “A” else select “B”.)

16. Is the site designed for user’s typical connection speed?

(Repeat the answer indicated for question 5 above.)

17. Is the site designed for commonly used screen resolutions?

- a. Yes. **(1)**
- b. No. **(0)**

(According to the Research-Based Web Design & Usability Guidelines (Bailey et al., 2006) the most common screen resolution is 1024 x 768. So, for this study, all sites will be viewed using a 1024 x 768 resolution. If the functionality and look of the homepage is usable, select “A” else select “B”.)

- 18. Can users access the homepage from any other page on the site?**
- Yes. **(1)**
 - No. **(0)**

(Starting at the top of the homepage, traverse down the left side and click the first available internal link. Note: an internal link will start with the same address as the homepage. Do not select the homepage even if it is in another language. Check this page to determine if there is a link back to the homepage. If yes, select “A” else select “B”. Don’t forget to record this site in the appropriate slot on the first page of the code form.)

- 19. Does the homepage create a positive first impression of the site?**
- Yes. **(1)**
 - No. **(0)**

- 20. Is the purpose of the website communicated?**
- Yes. **(1)**
 - No. **(0)**

(For the population being studied, the purpose of the website can be inferred. Therefore, please select “A”.)

- 21. Is prose text on the homepage short and concise?**
- Yes. **(1)**
 - No. **(0)**

(If there is no prose text on the homepage (i.e, the page only has links), select “A”.)

- 22. Does the homepage look like a homepage?**
- Yes. **(1)**
 - No. **(0)**

(If users can access a site map or index or conduct a search or find important links on the homepage, then select “A” else select “B”.)

- 23. Is the important information on the homepage presented above the fold?**
- Yes. **(1)**
 - No. **(0)**

(If most of the information is presented above the fold, select “A” else select “B”.)

- 24. Does the site avoid having cluttered displays?**

(If the site makes use of white space and the site looks “clean” (meaning there is an appropriate use of space, things are divided into clearly identifiable sections, etc.) then select “A” else select “B”.)

25. Are important items placed consistently throughout the site?

- a. Yes. **(1)**
- b. No. **(0)**

(Some things to consider are navigation, site map link, and logo placement. To answer this question, reuse the link chosen for question 22. If items are consistently placed, select "A" else select "B".)

26. Are important items placed at the top center?

- a. Yes. **(1)**
- b. No. **(0)**

(Are the items you identified in question 25 located at the top or top center of the page? If yes, select "A" else select "B".)

27. If users need to compare information on a site, is that information structured for easy comparison?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there is no information on the homepage that needs to be compared. **(N/A)**

(Is information that needs to be compared in the same section of the page? If yes, select "A". If users have to go to a different section of the page or to a completely different page select "B". If there is no information to compare on the homepage, select "C".)

28. Does the site establish level of importance of information?

- a. Yes. **(1)**
- b. No. **(0)**

(Does the site clearly indicate which information is most important and place that information near the top of the page? Some things to look for are frequent searches, quick links, recent news, etc.)

29. Does the site avoid creating pages that are crowded with items of information?

- a. Yes. **(1)**
- b. No. **(0)**

(If the site uses white space to separate content or presents a somewhat sparse appearance, the appropriate answer is "A" else select "B".)

30. Are items aligned on the page?

- a. Yes. **(1)**
- b. No. **(0)**

(Are page elements either horizontally or vertically aligned? Elements to consider are text blocks, rows, columns, checkboxes, radio buttons, data entry fields, etc. If they are aligned, select “A” else select “B”. If list items are centered or staggered, select “B”.)

31. Does the site use a flexible layout?

- a. Yes. **(1)**
- b. No. **(0)**

(To adequately answer this question, shrink your browser window. Does the page shrink to the width of the browser? Is the page left justified or centered with extra space on the left and/or right sides? If you answered “yes” to either question, select “A” else select “B”.)

32. Does the site avoid using scroll stoppers?

- a. Yes. **(1)**
- b. No. **(0)**

(A scroll stopper occurs when the user scrolls to different portions of the page, but because of how these sections are formatted they falsely believe that they have reached the beginning or end of the page. Some things to look for while you are scrolling include encountering headers that have been shadowed, bordered, etc. or encountering small text similar to what is usually seen at the end of a page. If these elements or other scroll stoppers are present, select “B” else select “A”.)

33. Are pages set to appropriate lengths?

- a. Yes. **(1)**
- b. No. **(0)**

(If the homepage requires a lot of scrolling, then select “B”. A homepage is generally short – maybe a couple of screens. If this is true, select “A”.)

34. Does the site use white space moderately?

- a. Yes. **(1)**
- b. No. **(0)**

(If you answered “A” to both questions 24 and 29, select “A” else select “B”.)

35. Does the site provide navigational options?

- a. Yes. **(1)**
- b. No. **(0)**

(Reuse the page identified in question 22. Is the navigation consistent? Is navigation provided? Do you have access to the back button or some other feature that will direct you back to the homepage? If yes to either of these questions, select “A” else select “B”.)

36. Are navigational elements differentiated from other page elements and grouped together?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. This site does not have navigational elements. **(N/A)**

37. On long pages, does the site provide links or anchor tags to navigate to different parts of the page?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. Neither the homepage or the secondary page are long. **(N/A)**

(If the homepage or secondary page is long, does it have anchor tags that allow users to navigate quickly to different parts of the document? Is yes, select “A” else select “B”.)

38. Does the site let users know their location within the site?

- a. Yes. **(1)**
- b. No. **(0)**

(Use the secondary page you identified in question 22. As you move from the homepage to the secondary page, is there something like frame or div titles, breadcrumbs, or navigation features (i.e., color change, italics, underlining, etc.) that allows users to know where they are in the site? Is yes, select “A” else select “B”. *Note: Changes in the title bar are not considered sufficient for this question.*)

39. Are primary navigation menus placed in the left panel?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. This site does not have navigational elements. **(N/A)**

40. Are tab labels descriptive?

- a. Yes. (1)
- b. No. (0)
- c. N.A. This site does not have tabs. (N/A)

(Do tab labels indicate their function or destination? If yes, select “A” else select “B”. Note this is not an assessment of whether the information found after clicking the tab is reflected by the label. This study is only interested in determining whether the label is descriptive.)

41. Are tabs presented effectively?

- a. Yes. (1)
- b. No. (0)
- c. N.A. This site does not have tabs. (N/A)

(Are tabs presented at the top of the page? Do they look clickable? Are they shaped similar to file folder tabs? If yes to all three questions, select “A” else select “B”.)

42. Does the site avoid horizontal scrolling?

- a. Yes. (1)
- b. No. (0)

43. Does the site provide descriptive page titles?

- a. Yes. (1)
- b. No. (0)

(The title refers to the text that appears in the browser’s title bar. Use the homepage and secondary page identified in question 22. Is the title on each webpage different and meaningful? *Note: To be meaningful, the title of the state or its abbreviation should be included in the title along with information about the page. Including the site’s web address in the title bar is not considered to be meaningful.* If yes select “A” else select “B”.)

44. Are headings used in appropriate HTML order?

- a. Yes. (1)
- b. No. (0)
- c. N/A. The homepage and the secondary page do not use HTML headings. (N/A)

(View the source code for the homepage and the secondary page and check to see if the headers are in order. The easiest way to do this is to search for “<h” and not the order in which the headers appear. Do they represent a hierarchy? Does H1 always come before H2? If yes, select “A”. If headers are out of order or used sporadically (using H3 and not H1 and H2), then select “B”. If the site only uses H1 then select “A”. If the site does not use HTML headers, select “C”.)

45. Does the site use meaningful link labels?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. The homepage does not have any links. **(N/A)**

(If any links are indicated as click here, more, see more, cool, or anything this generic, the appropriate response is “B”. Also, if any links repeat or do not clearly indicate their destination, then the appropriate response is “B”. Only if all links are meaningful would you select “A”. If no links exist on the homepage, select “C”.)

46. Do link names match with their destination pages?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. The selected link did not have a name. **(N/A)**

(For this question, reuse the link you identified in question 22. If this link has a name, does this name match the title or heading on the destination page? *Note: The link name and title must be exact. Ampersands can be translated into AND.* If yes, select “A”. If not, select “B”. If the link does not have a name select “C”.)

47. Does the site avoid using misleading cues to click?

- a. Yes. **(1)**
- b. No. **(0)**

(Are there elements in the site that look clickable (ex. they are underline, blue, raised, are images, etc.), but are not? *Note: What’s clickable for a given site is dependent upon the site. For example, some sites have clickable images. Therefore, if there are images that are not clickable, this would be misleading. However, if none of the images on a site are clickable, then this is not misleading.* If any of these elements exist, select “A” else select “B”.)

48. Does the site use ONLY text for links?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. The homepage does not have any links. **(N/A)**

(If any of the links are images instead of text, select “B”. If all links are text only, select “A”. If there are no links on the page select “C”. *Note: You may have to view the source code to determine if a link is an image or just plain text.*)

49. Does the site designate used links?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. The homepage does not have any links. **(N/A)**

(Does the site change the color, font, text-decoration, etc. of used links to differentiate them from unvisited links? If all links on the homepage differentiate between visited and unvisited select "A". If not, select "B". If there are no links on the homepage select "C".)

50. Does the site provide consistent clickability cues?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. The homepage does not have any clickability cues. **(N/A)**

(Repeat answer indicated for 47 above.)

51. Are embedded links descriptive?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. The homepage does not have any embedded links. **(N/A)**

(Embedded links are links that appear within text. If the text alone is descriptive of its destination, select "A". If the user needs the surrounding text to understand the destination of the link or if the link is generic (i.e., more, click here, etc.), select "B". If the page does not have any embedded links, select "C".)

52. Does the site avoid using mouse over for navigation?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. The homepage does not have any navigational elements. **(N/A)**

(For this question, you will need to look at the website in Microsoft Internet Explorer and Mozilla Firefox. If in either window you are required to mouse over the navigation to get to deeper sub-navigation, then the select "B". If you are never required to mouse over, select "A". If the homepage does not have any navigational elements, select "C".)

53. Are text links of an appropriate length?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. The homepage does not have any links. **(N/A)**

(Do any of the links on the page wrap to a second line? If yes, select "B". If all links are on one line, select "A". If there are no links on the page, select "C".)

54. Does the site indicate internal versus external links?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. The homepage does not have any links or it does not have any external links. **(N/A)**

(If the page has external links, is there text, a special highlighting, etc. that indicates to the user that the link will take them to a location that is not on the current site? If yes, select “A”. If there are no indicators or if all external links do not have indicators, select “B”. If the homepage does not have any links or does not have any external links, select “C”.)

55. Are clickable regions of image maps obvious?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N.A. The homepage does not have any image maps. **(N/A)**

(If the homepage has image maps, are the clickable regions obvious to the user? Some things to look for include images that have embedded navigation that’s obviously navigation or text or highlighting that indicates which portions are clickable. If every part of an image map has an indicator that it is clickable, select “A”. If not, select “B”. If there are no image maps, select “C”.)

56. Does the site use black text on plain, high-contrast backgrounds?

- a. Yes. **(1)**
- b. No. **(0)**

(If the site does not use black text or does not use a non-patterned background or does not have a high-contrast background, select “B” else select “A”. *Note: Links do not have to be black. In cases where the homepage is all links, use the secondary page to answer this question.*)

57. Are common items formatted consistently?

- a. Yes. **(1)**
- b. No. **(0)**

(Reuse the webpage you identified in question 22. Are lists, bullets, text formatting, punctuation (i.e., how structure phone numbers, dates, time, etc.), consistent between pages. If yes, select “A” else select “B”.)

58. Does the site use mixed-case for prose text?

- a. Yes. **(1)**
- b. No. **(0)**

(Note: For this study, it is okay to not use mixed-case for headings or navigational elements. Prose text should be in mixed-case. If the homepage does not have any prose text and the links are mixed case, select “A” else select “B”.)

59. Does the site ensure visual consistency?

- a. Yes. **(1)**
- b. No. **(0)**

(Reuse the webpage you identified in question 22. Is the layout and look (i.e., color scheme, fonts, etc.) consistent between pages? If yes, select “A” else select “B”.)

60. Does the site use bold text sparingly?

- a. Yes. **(1)**
- b. No. **(0)**

(Does the site use bold text for more than just headers, navigational elements, field identifiers, or to highlight select pieces of prose? If yes, select “B”. If not, select “A”. If the site does not have any bolding, select “A”.)

61. Does the site use a familiar font?

- a. Yes. **(1)**
- b. No. **(0)**

(To answer this question, look at the source code or style sheet and determine if the site uses Times New Roman, Georgia (serif fonts), Arial, Helvetica, or Verdana (sans serif fonts). If the code indicates more than one type of font face and one or more of these fonts are in the list, select “A”. Note: If you see serif or sans serif, this is also acceptable. If none of the above fonts appear in the list, select “B”.)

62. Is the font at least 12-point?

- a. Yes. **(1)**
- b. No. **(0)**

(Again, view the source code to determine the font sizes. If no font is indicated or the font size is in “ems” or percents, select “A”. If the site allows the user to press a button to resize the page, select “A”. If the font is less than 12-point or specified as “small” or “xx-small”, select “B”.)

63. Are list elements ordered to maximize user performance?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no list elements on the homepage or secondary page. **(N/A)**

(To answer this question, refer to both the homepage and the secondary page. Because it is difficult to determine an ordering that will maximize user performance, look for alphabetizing or putting things in numerical order. If this does not exist, evaluate whether the list is easy to scan. If the list is ordered or facilitates scanning, select “A” else select “B”. If the site does not have any lists select “C”. *Note: Lists can include items in pull-down menus and navigation.*)

64. Are list formatted to ease scanning?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no list elements on the homepage or secondary page. **(N/A)**

(Repeat the answer indicated for 63 above.)

65. Does the site use vertical lists instead of horizontal lists?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no list elements on the page. **(N/A)**

(Use both the homepage and the secondary page to answer this question. If some lists are horizontal, select “B”. If all lists are vertical, select “A”. If there are no lists on either page, select “C”. *Note: For this question, do not consider horizontal navigation.*)

66. Is there a heading for each list?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no list elements on the page. **(N/A)**

(*Note: Navigation does not have to have a heading. This is generally understood.*)

67. Does the site use static menus?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no menus on the page. **(N/A)**

(As you interact with menus (navigation) provided on the page, do they shift order based on what you selected? If yes, select “B”. If the menus on the page remain consistent throughout your interactions, select “A”. If there are no menus on the page, select “C”.)

Questions 68-84 ask several questions related to forms and data entry fields. This study uses a very broad definition of a form and takes a broad approach to many of the questions. In general, forms are considered to be any data entry fields that are either on the homepage or directly linked to the homepage. It will be necessary to click the links on the homepage to see if there are any forms included on pages one layer below the homepage. Search boxes are considered to be forms. The only exception to the one layer below the homepage rule is if the site provides users with “Advanced Search” capabilities. The data entry fields included on the “Advanced Search” page is within the scope of this study. You may have to run a search to be presented with the “Advanced Search” option.

- 68. Does the site distinguish between required and optional data entry fields?**
- a. Yes. **(1)**
 - b. No. **(0)**
 - c. N/A, there are no data entry fields or forms on the page or none of the fields should be required. **(N/A)**

(Usually, the form will use asterisks or the word required or some form of highlighting to indicate which fields are required. If any of these elements appear on the form, select “A”. If not, select “B”. If there is no forms on the homepage or if none of the fields should be required, select “C”.)

- 69. Are pushbuttons labeled clearly?**
- a. Yes. **(1)**
 - b. No. **(0)**
 - c. N/A, there are no push buttons on the page. **(N/A)**

(Does the label on the push button indicate the action that will be applied when the button is pushed? If yes, select “A”. If there are no labels on the button or it’s not clear what the buttons function is, select “B”. If there are no push buttons on the page, select “C”.)

70. Are data entry fields labeled consistently?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page. **(N/A)**

(Does the site mix using different parts of speech to identify labels (i.e., sometimes nouns or verbs? Does the site use long sentences to identify some field elements and short 1-2 word phrase to label others? Does the site use different labels for fields soliciting the same type of information? If you answered yes to any of the questions above, select “B”. If you answered no to all of the above questions, select “A”. If there are no data entry fields on the page select “C”).

Note: If the search box is the only data entry field and it is labeled consistently from page to page, select “A”. If the search box is the only data entry field and it is only on ONE page, select “C”. If it makes sense to use sentences or longer labels to communicate the purpose of a data entry field even though some are labeled with one word, select “A”.)

71. Are upper- and lowercase letters equivalent when users are entering codes?

- a. Yes. **(1)**
- b. No. **(0)**

(Try searching for the homepage and change the case of the URL. Did you obtain a 404 or Not Found error message? If yes, select “B” else select “A”. *Note: Normally you will receive a 404 error message if the URL contains a file name or a specific directory.*)

72. Are data entry fields clearly labeled?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page. **(N/A)**

(If all data entry fields have a label, select “A”. If not, select “B”. If data entry fields are not present, select “C”).

73. Is data entry minimized?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page. **(N/A)**

(Are users required to enter redundant information that could automatically be populated by the computer? For example, are users required to enter both a mailing and shipping address? Could the computer automatically remember a users ID or log-in, but does not provide this feature? These questions are just two examples of how the computer can be used to minimize data entry. If these or other scenarios are not adequately addressed, select “B”. If the computer does provide data entry assistance to users or if there is no opportunity for the computer to automatically populate fields, select “A”. If there are no data entry fields select “C”.)

74. Are labels close to data entry fields?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page. **(N/A)**

(Are labels physically placed near the data entry fields they describe?)

75. Can users see their entered data?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page. **(N/A)**

(Some information may not be visible, but for this study, if users can see the majority of the data entered select “A”.)

76. Are radio buttons used when users need to select only one option?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page or there are no items that require users to select one option. **(N/A)**

(Note: If there are pull-down menus on the page that has eight items or less, these are good candidates for radio buttons. If radio buttons were not used, select “B”. If pull-down menus have more than eight items, select “A”. If there no items that require radio buttons or if there are no data entry fields on the page, select “C”. In order to receive an “A”, ALL items that can be radio buttons, should be radio buttons.)

77. Does the site anticipate user errors?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page. **(N/A)**

(If the site has data entry fields or perhaps search features, do these elements account for spelling errors, provide feedback if data is entered incorrectly, or let the user know when needed information is missing? If the site offers some support, select “A”. If no support is offered select “B”. If there are no data entry fields or no search options, select “C”.)

78. Are long data items partitioned?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page or there are no items that need to be partitioned. **(N/A)**

(If fields like name, address, social security number, and phone number are present, does the site partition these elements into smaller parts to guide the user in data entry? For example, is address divided in street, city, state, and zip? If some items are partitioned select “A”. If no items are partitioned and there are items that need to be partitioned, select “B”. If there are no data entry elements or no items that need to be partitioned, select “C”.)

79. Does the site use a single data entry method?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page or there is only ONE data entry field on the page. **(N/A)**

(For this question, the site is allowed to have more than one data entry method; however, if the site switches between text fields, pull-down menus, check boxes, and radio buttons then this is problematic because the user is required to switch between keyboard and mouse. If however, these form elements exist, but are grouped together (all of the text fields, then mouse related fields) this is acceptable. If the different types of fields are mixed together, select “B”. If they are grouped into sections or there is only one type of field present, select “A”. If there are no data entry fields or if there is only ONE data entry field, select “C”.)

80. Are pushbuttons prioritized?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no push buttons on the page or the push buttons do not occur in pairs or sets (there is only one button). **(N/A)**

(If there is more than one push button for a particular form or data entry field, are they organized according to what task is most likely to occur most often? For example, if submit and reset are included, the submit button should come before reset. If yes, select "A". If there is no logical order for all of the push buttons, select "B". If there are no push buttons or if there is only one button per element, then select "C".)

81. Are check boxes used to enable multiple selections?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page or there are no items that require users to select multiple options. **(N/A)**

82. Are units of measurement clearly labeled?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page or there are no items that require units of measurement. **(N/A)**

(If fields require users to enter pounds, inches, years, days, months, number of weeks, number of items, levels of importance, etc. are the units required indicated near the data entry field. If all necessary fields have indicators, select "A". If, not select "B". If there are no data entry fields or if there are no items that require units of measurement, select "C".)

83. Does the site avoid limiting viewable list box options?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page or there are no list boxes. **(N/A)**

(Does the site show as many items as possible within the list box with requiring users to scroll? Note: There are times when scrolling is necessary (when listing states, countries, months, days, years, etc). However, these lists can display more than 5 or so values at a time. If the site makes an effort to not limit scrolling within list boxes select "A". If there are items that could be in list boxes with no scrolling, but the user is forced to scroll, select "B". If there are no data entry fields or if there are no lists box items on the page, select "C".)

84. Are default values displayed?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no data entry fields on the page or there are no items that have obvious default values. **(N/A)**

(Sometimes default values are automatically populated in data entry fields to speed data entry. Some fields that are good candidates for default values are state, country, and quantity. If any default values are present select “A”. If no default values are present and there are fields that are good candidates for default values, select “B”. If there are no data entry fields on the page or there are no items that are good candidates for default values, select “C”. Note, you may have to look at the code to see if a default value is select – especially for pull-down menus.)

85. Does the site use simple background images?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no background images on the page. **(N/A)**

(If the page uses background images, do they interfere with text readability? If yes, select “A”. If no, select “B”. If there are no background images, select “C”.)

86. Are clickable images labeled or easily understood?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no clickable images. **(N/A)**

(If an image is clickable, is it obvious for all clickable images what they represent. Is there a label or surrounding text? If yes for all clickable images, select “A”. If for some images it is not clear what they represent, select “B”. If there are no clickable images on the page, select “C”.)

87. Do pages with images download within 10 seconds?

(Repeat answer to question 5 above.)

88. Is the logo included in a consistent place on each page?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there are no logo on the page. **(N/A)**

(Reuse the webpage identified in question 22 to answer this question. If the logo is consistently placed on the homepage and the secondary page, select “A”. If not, select “B”. If there is no logo on the page, select “C”.)

- 89. Does the site avoid including large images above the fold?**
- Yes. **(1)**
 - No. **(0)**

- 90. Are actual data values included with data graphics?**
- Yes. **(1)**
 - No. **(0)**
 - N/A, there are no graphs on the page. **(N/A)**

(If graphs are included on the page, be sure that the value of each part of the graph is indicated on the graph.)

- 91. Is monitoring information displayed graphically?**
- Yes. **(1)**
 - No. **(0)**
 - N/A, there is no monitoring information on the page. **(N/A)**

(If there is information on the site that users have to monitor for changes, this information should be displayed graphically.)

- 92. Is the search engine designed to search the entire site?**
- Yes. **(1)**
 - No. **(0)**
 - N/A, there is no search engine on the page. **(N/A)**

- 93. Are upper- and lowercase search terms equivalent?**
- Yes. **(1)**
 - No. **(0)**
 - N/A, there is no search engine on the page. **(N/A)**

(If a search option is present, search for health and HEALTH. Did you retrieve different results? If yes, select "A". If not select "B". If there are no searching capabilities on the page, select "C".)

- 94. Is there a search option on each page?**
- Yes. **(1)**
 - No. **(0)**
 - N/A, there is no search engine on the page. **(N/A)**

(For this question, reuse the site you identified in question 22. If a search option is on both the homepage and this internal page, select "A" else select "B".)

95. Does the site allow simple searches?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there is no search engine on the page. **(N/A)**

(A simple search is one that has one or two words. Try searching for “health”. If you retrieve results, select “A”. If not, select “B”. If the page does not have a search engine, select “C”.)

96. Does the site notify users when multiple search options exist?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there is no search engine on the page. **(N/A)**

(Does the site state advanced search or additional search options (i.e., indexes, by topic, etc.) or different ways of searching (by date, category, within site, statewide, etc.)? If yes, select “A”. If no, select “B”. If the page does not have a search engine, select “C”.)

97. Does the site include hints to improve search performance?

- a. Yes. **(1)**
- b. No. **(0)**
- c. N/A, there is no search engine on the page. **(N/A)**

(Either on the homepage or the search results page, is there a feature that offers search tips or does the system automatically offer ways for you to improve your search (i.e., spelling, other terms, etc.). If yes, select “A”. If no, select “B”. If there is no search engine on the page, select “C”.)

Calculation of Percentage:

To calculate the percentage, do the following:

- Determine the total possible score: Add the ratings in the Rating column where the guidelines were applicable to the site. Do not include rating values where you indicated N/A.
- Determine the actual score: Add the ratings included in the Total column.
- Calculate the percentage: Divide the actual score by the total possible score and multiply by 100. $((\text{Actual/Possible}) * 100)$

Calculation of Compliance Score:

To calculate how compliant the site is with usability guidelines, do the following:

- If the site received a percentage that is greater than +1 standard deviation from the mean, then the site is very compliant and the score = 2.
- If the site received a percentage that is within +1 standard deviation from the mean, then the site is somewhat compliant and the score = 1.
- If the site received a percentage that is less than the mean, then the site is not very compliant and the score = 0.

Section D: Overall Accessibility

Calculation of Overall Accessibility Score:

To calculate how accessible a site is, consider the following:

- If the compliance score in section B and C are 2 (very compliant), then the accessibility score is 2 (very accessible).
- If in sections B and C, one of the compliance scores is 2 (very compliant) and the other is 1 (somewhat compliant), then the accessibility score is 1 (somewhat accessible).
- If the compliance score in section B and C are both 1 (somewhat compliant), then the accessibility score is 1 (somewhat accessible).
- If either in section B or in section C, the compliance score is 0 (not very compliant), then the accessibility score is 0 (not very accessible).

Appendix D: Coding Form

Section A: Background Information

State _____ Homepage Address _____

Second Page Address _____

Date _____ Time Begin _____ Time End _____

Section B: Accessibility Guidelines

Question	0, 1, N/A
1. Is the homepage Section 508 compliant?	
2. Are meaningful text equivalents provided for every non-text element?	
3. Are equivalent alternatives for any multimedia presentation provided and synchronized with the presentation?	
4. Is the page navigable even if users do not have the ability to identify specific colors or differentiate between colors?	
5. Are documents readable without requiring an associated style sheet?	
6. Are row and column headers identified for data tables?	
7. If a table has two or more rows or columns that serve as headers, is structural markup used to identify their hierarchy and relationship.	
8. Are frames titled with text that facilitates frame identification and navigation?	
9. Are pages designed to <i>avoid</i> causing the screen to flicker?	
10. Is a text-only page provided?	
11. Does the site provide text equivalents for content or interface elements that are created with a scripting language?	
12. Are form elements accessible to persons using assistive technology?	
13. Does the site allow users to skip repetitive navigation links?	
14. If a timed response is required, are users alerted of this and given sufficient time to indicate that more time is required?	

Total Possible: _____

Total Earned: _____

Percentage: _____

Compliance Score: _____

15. Include descriptions of errors identified by Watchfire Bobby. Please include the frequency of the error.

Section C: Usability Guidelines

Question	0, 1, N/A	Rating	Total
1. Can the site be found within the top 30 searches?		4	
2. Does the site <i>avoid</i> displaying unsolicited windows or graphics?		5	
3. Is the website credible?		4	
4. Does the website reduce the user's workload?		4	
5. Is there minimal page download time?		4	
6. Does the page warn of 'time outs'?		4	
7. Is the information formatted to encourage online reading?		4	
8. Does the site provide feedback when users must wait?		4	
9. Does the site inform users of long download times?		4	
10. Do pages print properly?		4	
11. Does the site avoid requiring users to multitask while reading?		3	
12. Does the site provide printing options?		3	
13. Is the site designed for common browsers?		4	
14. Does the site account for browser differences?		4	
15. Is the site designed for popular operating systems?		4	
16. Is the site designed for user's typical connection speed?		4	
17. Is the site designed for commonly used screen resolutions?		3	
18. Can users access the homepage from any other page on the site?		5	
19. Does the homepage create a positive first impression of the site?		5	
20. Is the purpose of the website communicated?		4	
21. Is prose text on the homepage short and concise?		4	
22. Does the homepage look like a homepage?		4	
23. Is the important information on the homepage presented above the fold?		3	

Question	0, 1, N/A	Rating	Total
24. Does the site avoid having cluttered displays?		5	
25. Are important items placed consistently throughout the site?		5	
26. Are important items placed at the top center?		5	
27. If users need to compare information on a site, is that information structured for easy comparison?		4	
28. Does the site establish level of importance of information?		4	
29. Does the site avoid creating pages that are crowded with items of information?		4	
30. Are items aligned on the page?		4	
31. Does the site use a flexible layout?		3	
32. Does the site avoid using scroll stoppers?		3	
33. Are pages set to appropriate lengths?		3	
34. Does the site use white space moderately?		3	
35. Does the site provide navigational options?		4	
36. Are navigational elements differentiated from other elements and grouped together?		4	
37. On long pages, does the site provide links or anchor tags to navigate to different parts of the page?		4	
38. Does the site let users know their location within the site?		4	
39. Are primary navigation menus placed in the left panel?		4	
40. Are tab labels descriptive?		3	
41. Are tabs presented effectively?		3	
42. Does the site <i>avoid</i> horizontal scrolling?		5	
43. Does the site provide descriptive page titles?		4	
44. Are headings used in appropriate HTML order?		3	
45. Does the site use meaningful link labels?		5	
46. Do link names match with their destination pages?		4	
47. Does the site <i>avoid</i> using misleading cues to click?		4	
48. Does the site use ONLY text for links?		4	
49. Does the site designate used links?		4	
50. Does the site provide consistent clickability cues?		3	
51. Are embedded links descriptive?		3	
52. Does the site avoid using mouse over for navigation?		3	
53. Are text links of an appropriate length?		3	
54. Does the site indicate internal versus external links?		3	
55. Are clickable regions of image maps obvious?		3	

Question	0, 1, N/A	Rating	Total
56. Does the site use black text on plain, high-contrast backgrounds?		4	
57. Are common items formatted consistently?		4	
58. Does the site use mixed-case for prose text?		4	
59. Does the site ensure visual consistency?		4	
60. Does the site use bold text sparingly?		3	
61. Does the site use a familiar font?		3	
62. Is the font at least 12-point?		3	
63. Are list elements ordered to maximize user performance?		4	
64. Are list formatted to ease scanning?		4	
65. Does the site use vertical lists instead of horizontal lists?		4	
66. Is there a heading for each list?		3	
67. Does the site use static menus?		3	
68. Does the site distinguish between required and optional data entry fields?		5	
69. Are pushbuttons labeled clearly?		5	
70. Are data entry fields labeled consistently?		4	
71. Are upper- and lowercase letters equivalent when users are entering codes (URLs)?		4	
72. Are data entry fields clearly labeled?		4	
73. Is data entry minimized?		4	
74. Are labels close to data entry fields?		3	
75. Can users see their entered data?		3	
76. Are radio buttons used when users need to select only one option?		3	
77. Does the site anticipate user errors?		3	
78. Are long data items partitioned?		3	
79. Does the site use a single data entry method?		3	
80. Are pushbuttons prioritized?		3	
81. Are check boxes used to enable multiple selections?		3	
82. Are units of measurement clearly labeled?		3	
83. Does the site avoid limiting viewable list box options?		3	
84. Are default values displayed?		3	
85. Does the site use simple background images?		4	
86. Are clickable images labeled or easily understood?		4	
87. Do pages with images download within 10 seconds?		4	
88. Is the logo included in a consistent place on each page?		4	

Question	0, 1, N/A	Rating	Total
89. Does the site <i>avoid</i> including large images above the fold?		4	
90. Are actual data values included with data graphics?		3	
91. Is monitoring information displayed graphically?		3	
92. Is the search engine designed to search the entire site?		5	
93. Are upper- and lowercase search terms equivalent?		4	
94. Is there a search option on each page?		4	
95. Does the site allow simple searches?		3	
96. Does the site notify users when multiple search options exist?		3	
97. Does the site include hints to improve search performance?		3	

Total Possible: _____

Total Earned: _____

Percentage: _____

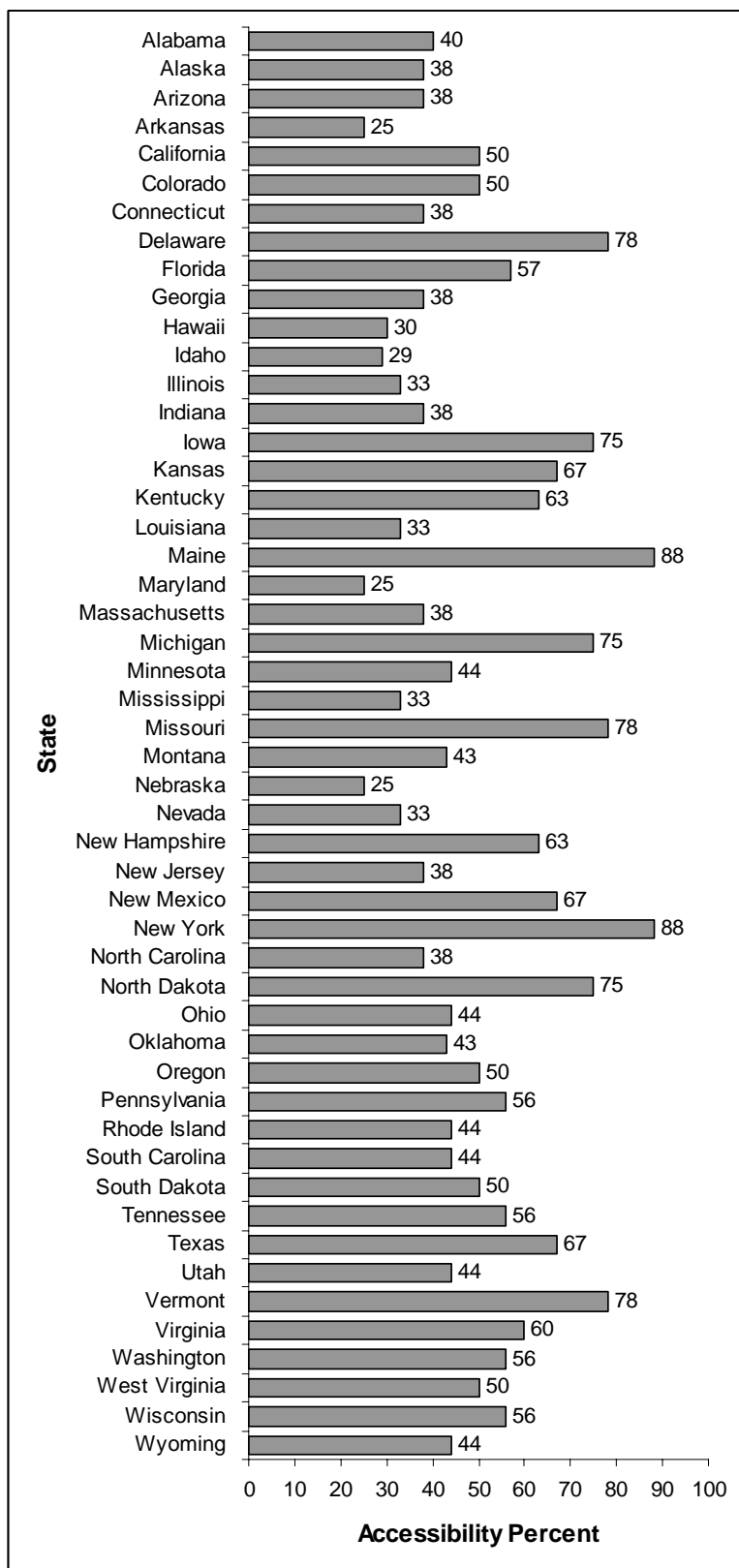
Compliance Score: _____

Section D: Overall Accessibility

Use the compliance scores calculated in sections B and C above to determine how accessible is the website?

Overall Accessibility Score: _____

Appendix E: Accessibility Percents by State



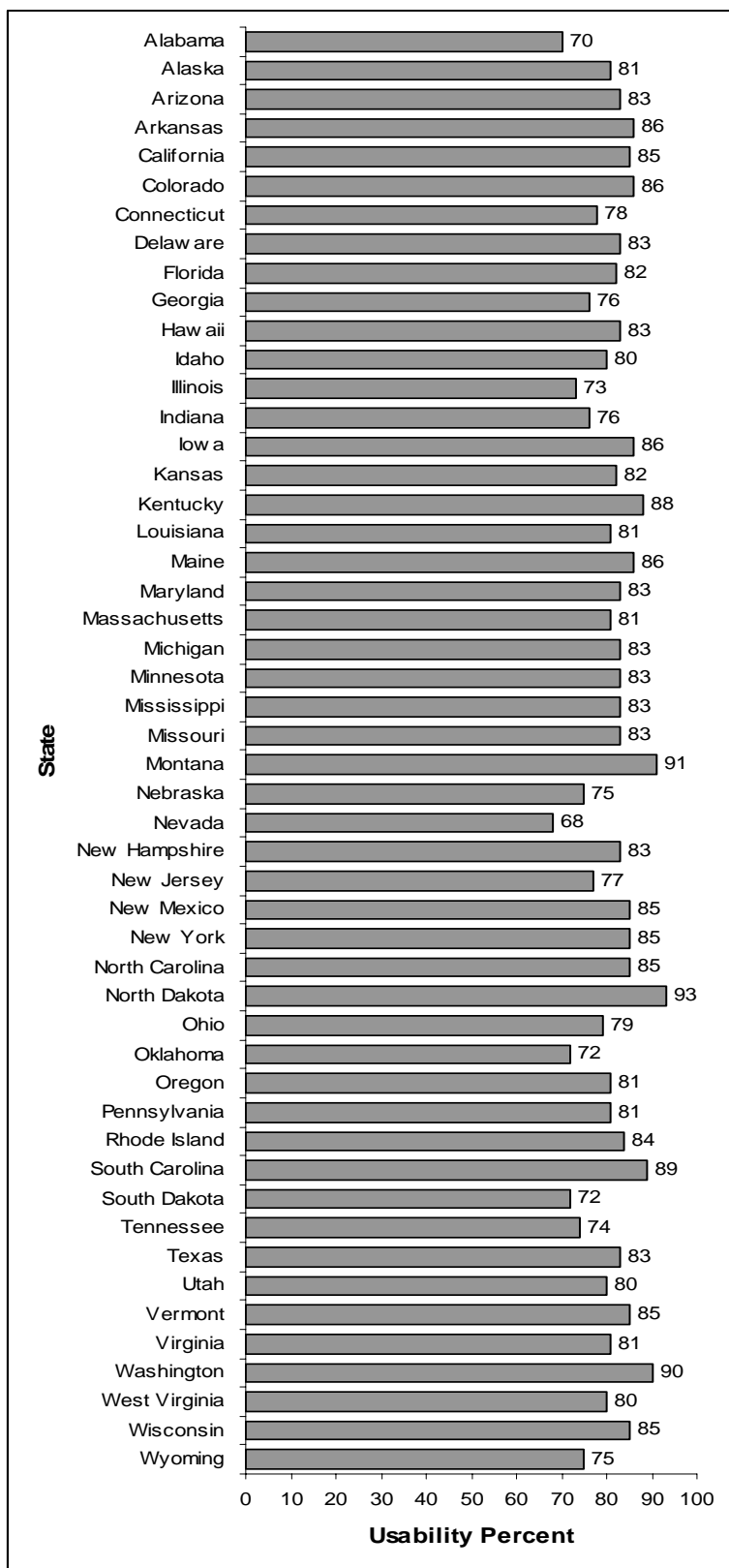
Appendix F: Websites' Download Time with 128 Kbps Internet Connection

These values were generated using Microsoft FrontPage's estimated time to download feature.

States	Websites	Download Time
Alabama	http://www.adph.org	26 seconds
Alaska	http://health.hss.state.ak.us/	10 seconds
Arizona	http://www.hs.state.az.us/	11 seconds
Arkansas	http://www.healthyarkansas.com/	8 seconds
California	http://www.dhs.ca.gov/	11 seconds
Colorado	http://www.cdphe.state.co.us/	2 seconds
Connecticut	http://www.dph.state.ct.us/	23 seconds
Delaware	http://www.dhss.delaware.gov/dhss/	14 seconds
Florida	http://www.doh.state.fl.us/	11 seconds
Georgia	http://health.state.ga.us/	14 seconds
Hawaii	http://www.state.hi.us/health	26 seconds
Idaho	http://www.healthandwelfare.idaho.gov/	24 seconds
Illinois	http://www.idph.state.il.us/	90 seconds
Indiana	http://www.in.gov/isdh/	39 seconds
Iowa	http://www.idph.state.ia.us/	15 seconds
Kansas	http://www.kdhe.state.ks.us/	16 seconds
Kentucky	http://publichealth.state.ky.us/	45 seconds
Louisiana	http://www.opd.dhh.state.la.us/	32 seconds
Maine	http://www.state.me.us/dhs/boh	9 seconds
Maryland	http://www.dhmm.state.md.us/	9 seconds
Massachusetts	http://www.state.ma.us/dph/dphhome.htm	12 seconds
Michigan	http://www.michigan.gov/mdch	36 seconds
Minnesota	http://www.health.state.mn.us/	9 seconds
Mississippi	http://www.msdh.state.ms.us/	17 seconds
Missouri	http://www.dhss.mo.gov/	11 seconds
Montana	http://www.dphhs.state.mt.us/	8 seconds
Nebraska	http://www.hhs.state.ne.us/	12 seconds
Nevada	http://health2k.state.nv.us/	21 seconds
New Hampshire	http://www.dhhs.state.nh.us/	19 seconds
New Jersey	http://www.state.nj.us/health	16 seconds
New Mexico	http://www.health.state.nm.us/	7 seconds
New York	http://www.health.state.ny.us/	9 seconds
North Carolina	http://www.ncdhhs.gov/	14 seconds
North Dakota	http://www.ndhealth.gov/	9 seconds
Ohio	http://www.odh.state.oh.us/	13 seconds
Oklahoma	http://www.health.ok.gov/	11 seconds
Oregon	http://www.oregon.gov/dhs	64 seconds
Pennsylvania	http://www.health.state.pa.us/	41 seconds
Rhode Island	http://www.health.ri.gov/	25 seconds

States	Websites	Download Time
South Carolina	http://www.scdhec.net/	6 seconds
South Dakota	http://www.state.sd.us/doh	40 seconds
Tennessee	http://state.tn.us/health/	27 seconds
Texas	http://www.dshs.state.tx.us/	13 seconds
Utah	http://health.utah.gov/	20 seconds
Vermont	http://healthvermont.gov/	6 seconds
Virginia	http://www.vdh.state.va.us/	10 seconds
Washington	http://www.doh.wa.gov/	7 seconds
West Virginia	http://www.wvdhhr.org/bph	4 seconds
Wisconsin	http://dhfs.wisconsin.gov/	8 seconds
Wyoming	http://wdh.state.wy.us/main/index.asp	11 seconds

Appendix G: Usability Percents by State



Appendix H: Level of Compliance and Overall Accessibility by State

States	Accessibility Compliance	Usability Compliance	Overall Accessibility
Alabama	0	0	0
Alaska	0	1	0
Arizona	0	1	0
Arkansas	0	1	0
California	1	1	1
Colorado	1	1	1
Connecticut	0	0	0
Delaware	2	1	1
Florida	1	1	1
Georgia	0	0	0
Hawaii	0	1	0
Idaho	0	0	0
Illinois	0	0	0
Indiana	0	0	0
Iowa	2	1	1
Kansas	1	1	1
Kentucky	1	2	1
Louisiana	0	1	0
Maine	2	1	1
Maryland	0	1	0
Massachusetts	0	1	0
Michigan	2	1	1
Minnesota	0	1	0
Mississippi	0	1	0
Missouri	2	1	1
Montana	0	2	0
Nebraska	0	0	0
Nevada	0	0	0
New Hampshire	1	1	1
New Jersey	0	0	0
New Mexico	1	1	1
New York	2	1	1
North Carolina	0	1	0
North Dakota	2	2	2
Ohio	0	0	0
Oklahoma	0	0	0
Oregon	1	1	1
Pennsylvania	1	1	1
Rhode Island	0	1	0
South Carolina	0	2	0
South Dakota	1	0	0

States	Accessibility Compliance	Usability Compliance	Overall Accessibility
Tennessee	1	0	0
Texas	1	1	1
Utah	0	0	0
Vermont	2	1	1
Virginia	1	1	1
Washington	1	2	1
West Virginia	1	0	0
Wisconsin	1	1	1
Wyoming	0	0	0

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