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This study evaluates the homepages of government websites in the three democratic nations of Australia, the United Kingdom, and the United States to determine the level of disability access in each country. This survey was conducted to determine which country has the overall lowest level of accessibility, which areas need the most improvement, and which areas have strong compliancy levels.

Twenty-two websites from each of the top levels of government in each of the three countries (66 total websites) were examined for compliance to current disability standards as set forth by the World Wide Web Consortium's Web Accessibility Initiative (WAI). The websites were evaluated using a questionnaire developed to test for adherence to the WAI's fourteen guidelines. The results show that, despite legislative efforts mandating disability access on government websites, these sites are not fully accessible. The study found the United States to have the highest levels of accessibility, followed by Australia, with the United Kingdom at the lowest levels of accessibility.

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Computers and the handicapped--United States

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A CONTENT ANALYSIS OF DISABILITY ACCESS ON GOVERNMENT
WEBSITES IN AUSTRALIA, THE UNITED KINGDOM,
AND THE UNITED STATES

by

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Introduction

The World Wide Web is one of the richest resources for the dissemination of information. The design of the Web makes it possible to break down such barriers as mobility or physical access; provides a flexible and dynamic environment for information exchange and retrieval; and erodes the divide between the “information haves” and “have-nots”(Waddell, 1999). The power of the Web lay in the possibility of universal access - that all people have access to the same services and information. However, the ideals of the Web and the reality of the Web are sometimes not one in the same.

Government Information on the Web

One of the goals of democratic nations is to provide fair and equitable access to governmental information, whether it is access to laws, legislation, or other important information. The United States, the United Kingdom and Australia have established laws mandating open access to non-classified governmental information to all citizens, regardless of disability. Traditionally, this government information was exchanged in-person (at government offices or the library), through the mail, or over the phone. However, the Internet has become an excellent, more open outlet for the provision of government information and services.

The development of advanced information and communication technologies has given rise to the notion of e-government. E-government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and

mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can provide better delivery of government services to citizens, improved interactions with business and industry, and/or citizen empowerment through access to information.

Disability Access on the Web

What is meant by the terms disabled and disability? Disability is the permanent or temporary restriction on the use of sight, sound, color or motor skills. For the purposes of this study, disabled users include those who are visually or hearing impaired, colorblind, and/or physically handicapped. The study will not directly address those persons with mental handicaps though good accessibility should positively impact any population with a disability, be it physical or emotional.

There are currently an estimated 54 million disabled users in the United States alone (Paciello, 2000), with 3.7 million Australians (ABS, 1998) and 6.5 million British (LFS, 1999) living with a disability. The numbers of disabled persons is expected to grow at a considerable rate in the coming years. This is primarily due to the aging of citizens around the world. For example, one in two Americans 65 years or older has a disability (Paciello, 2000), a considerably higher rate of disability in comparison to the overall number of disabled Americans.

As the world population ages, the numbers of physically, visually and hearing impaired individuals sharply rises. Most of these aging citizens are heavy technology users, users who will continue to demand access regardless of impairment. This is an important issue for businesses and governments alike, as the increased demand for more

accessible sites will greatly impact both parties. Sites that are currently accessible and continue to maintain their accessibility will have the advantage.

This study aims to address the problem of accessibility for disabled users on top-level government websites in the three democratic nations of Australia, the United Kingdom and the United States. Top-level sites include those sites that are created, maintained or sponsored by the highest levels of government in each of the three countries. The purpose of this research is to evaluate American, British and Australian government-run and sponsored websites to determine which country has the lowest overall levels of accessibility, what areas they fail to comply in, and which areas need the most improvement.

All three countries have publicly stated that disability access on their government websites is of high priority, and in the case of Australia and the United States such compliance is mandatory. For instance, it will seek to answer such questions as are disabled Americans able to access important health information provided by the Federal government? Is the United Kingdom providing access for its disabled citizens to information on taxes? Can disabled Australian citizens access the rich resources of the National Library of Australia?

Summary of Disability Access Laws, Legal Cases and Standards

Democratic nations have long stood by the notions of freedom and equality. The United States, the United Kingdom and Australia have incorporated the hope for equality into national legislation mandating the equal treatment of all citizens, especially those with physical or mental disabilities. This section summarizes each country's laws and legislation as they deal specifically with access for disabled persons to information technology and websites.

Australia

The primary piece of disability law in Australia is the Disability Discrimination Act (DDA), enacted in 1992, which recognizes disabled persons as equals under Australian law and works to reduce or eliminate barriers to public services for disabled citizens. The Act is administered by the HREOC (Human Rights and Equal Opportunity Commission), a non-judicial organization charged with protecting the rights of disabled citizens. Enforcement of the DDA is provided either through due process of the law or by a special agency responsible for anti-discrimination issues. The Act's emphasis (in descending order) is given to accessibility measures, anti-discrimination law, individual support, rehabilitation, and prevention (United Nations, 1997).

Under the DDA, Australia has established policies and policy initiatives for the accessibility of electronic commerce and other information technologies to disabled and aging Australians. The Act was extended on March 21, 2000 with the adoption of specific accessibility requirements for Commonwealth websites. The two most relevant requirements for governmental website accessibility are the requirements that:

- All Commonwealth Departments and Agencies conduct evaluations on their sites for compliance to W3C accessibility standards beginning in June 2000; and
- All Commonwealth sites pass accessibility testing by reference to W3C standards by December 1, 2000.

The HREOC has developed a set of guidelines for government site authors to use when designing accessible sites. These guidelines are not mandatory nor are they legally binding regulations, rather they have been established to help promote awareness of accessibility issues and to provide developers with the knowledge to create and maintain accessible sites. Most of the guidelines follow the Web Accessibility Initiative's goals and suggestions (discussed further in Section III.)

In terms of legal cases brought under the DDA, there is only one relevant to disability access to websites - Bruce Lindsay Maguire v Sydney Organising Committee for the Olympic Games (SOCOG). In this case, Maguire (a blind man) brought a lawsuit against SOCOG for violation of the Disability Discrimination Act. Maguire was unable to navigate the Olympic website due to the site's lack of <ALT> tags; additionally, he was not able to use the site to purchase tickets to the Olympic games in Sydney due to the incompatibility of the site with his screen reader software. SOCOG maintained that compliance to Maguire's demands (adding <ALT> tags to the site) was considered an undue burden under the Act. The HREOC disagreed, ruling that the site breached the DDA and ordered SOCOG to add textual representations to all images. This was a major victory for disability access and a reminder to government agencies that website accessibility can cost them more than lost visitors.

The United Kingdom

Disability law in the United Kingdom is focused around the country's Disability Discrimination Act of 1995, "aimed at ending the discrimination which many disabled people face" (DDA, 1995). The initial Act focuses on disabled employment and transportation access issues. The disability policy equally emphasizes prevention, rehabilitation, individual support, accessibility measures, and anti-discrimination law (United Nations, 1997). Disability rights are protected through judicial methods, such as due process, as well as non-judicial methods, including independent expert and special arbitration bodies.

Part III – Discrimination in Other Areas, introduced on October 1, 1999, is the most relevant section to disability access on the Web, requiring the provision of equal access to products and services and establishing the Disability Rights Commission (DRC). The DRC was developed to play a critical role in the formulation of codes of practice and encouragement of the advancement of disability rights (Sloan, 2001). Part III of the Act also enables disabled persons to claim protection from alleged discrimination and recourse under the law.

Although access to websites is never explicitly mentioned in the Act, the Act is written in such general language so as not to exclude the possibility of legislation directed at website accessibility. In addition, the UK DDA is very similar in content to the Australian DDA, which has recently acknowledged web accessibility as being within its scope (Sloan, 2001). Given these two factors, it is most likely that website accessibility will fall under its arena. Although not yet tested, the likely remedy for creating a

government website that is inaccessible to disabled citizens would be civil litigation (Sloan, 2001).

The United States

The United States has enacted several laws concerning disability policy. In general, the strongest disability policy emphasis in the US (in descending order) is on anti-discrimination law, individual support, accessibility measures, rehabilitation, and prevention. The rights of disabled citizens are protected through both judicial and non-judicial measures including due process and the provision of special agencies dealing with anti-discrimination (United Nations, 1997).

The Americans with Disability Act (ADA) of 1990 prohibits discrimination and ensures equal opportunity for disabled persons in employment, state and local government services, public accommodations, commercial facilities, and transportation. The Act does not specifically address information or communications technologies access for disabled persons. The first piece of legislation to deal with this issue was the 1996 Section 255 of the Telecommunications Act which requires that “a provider of telecommunications services or products shall ensure that such products and services be accessible to and usable by individuals with disabilities, if readily achievable” (p.24).

The next major step towards disability access came with the 1998 amendment to Section 508 of the 1973 Federal Rehabilitation Act. This amendment requires that electronic and information technology (including websites) developed, procured, maintained or used by the Federal government be accessible to people with disabilities (EOP Foundation, 2000). This involves both government agencies and any contractors

to these agencies or government bodies. The Section 508 Standards document defines what is and is not considered accessible in light of this legislation. The amendment also specifies that the Department of Justice is responsible for the enforcement of Section 508. The amendment set the deadline for compliance/implementation as July 21, 2000, after that date, any agency that fails to comply is open to civil complaints or private lawsuits. To date, there have been no legal suits filed against government agencies whose websites are in violation of the amendment.

Disability Access Standards and Guidelines

Introduced in May 1999 by the World Wide Web Consortium's Web Accessibility Initiative (WAI), the Web Content Accessibility Guidelines 1.0 (WCAG) have become the accepted international standard for web page accessibility. The WCAG are a set of 14 guidelines that aid Web developers (page authors and site designers) in creating accessible websites for all users. The guidelines comprise a series of accessibility guidelines issued by the WAI including User Agent Accessibility Guidelines and Authoring Tool Accessibility Guidelines, which deal with device-independent content and Web authoring software respectively (Chisholm, Vanderheiden, and Jacobs, 1999). All three documents in the series were created to enhance web accessibility. For the purposes of this study, only the WCAG will be examined in some detail.

The WAI guidelines are broken down by Priority Levels, ranking from 1 (checkpoints a site *must* satisfy in order to pass compliance) to 2 (checkpoints a site *should* satisfy to disable potential barriers to accessing Web documents) to 3 (checkpoints

a site *may* satisfy; satisfaction of these priorities will increase ease of accessibility). The checkpoints are assigned by the WAI's Working Group, a group of accessibility experts, based upon their impact to accessibility. Thus, a website that fails to pass a Priority 1 checkpoint is more like to be inaccessible to disabled populations than a site that fails to pass Priority 3 checkpoints. The guidelines also establish three levels of conformance to the guidelines themselves. These conformance levels are:

- *Conformance Level "A"*: all Priority 1 checkpoints are satisfied;
 - *Conformance Level "Double-A"*: all Priority 1 and 2 checkpoints are satisfied;
 - *Conformance Level "Triple-A"*: all Priority 1, 2, and 3 checkpoints are satisfied;
- (WAI, 1999).

There are few sites that are currently rated as Triple-A.

According to the WAI, the guidelines address two general themes: “ensuring graceful transformation (pages that remain accessible despite user constraints), and making content understandable and navigable” (1999). The purpose of the recommendations is not to limit the creativity of web designers or restrict the type of information a site can and should offer. Rather, the guidelines stress the importance of providing equivalent forms of information that disabled users – whether they have vision, hearing, or physical handicaps – can access when they are unable to access the original forms.

Literature Review

Website Accessibility Issues

Most scholars and designers alike agree that accessible sites are well-designed sites. These sites use “good” HTML, follow design standards outlined by the W3C, are easy for all levels of users to navigate, and limit the use of multi-media technologies, such as Flash. Such sites are not only disabled-friendly but are also easier for children and people with older software and hardware to use.

In terms of general accessibility issues, there are two major areas of design that typically cause the most accessibility problems. The first element that often causes difficulty for the user is the page layout of a site. Some sites use complicated or abstract layouts. By keeping the overall design simple and clean, it increases the ease of navigation for all users. The second issue is the use, or lack of thereof, of “good” HTML. “Good” HTML is HTML which follows accepted W3C standards and works across a wide range of browsers. Not only is poorly written HTML the cause of browser crashes and pages being displayed incorrectly, it also causes problems with assistive technologies. Assistive technologies include screen magnifiers, input and output devices (voice, Braille), large print screens, and special software such as speech recognition software and screen readers (software program that converts a Web page into speech) (Lescher & Ojala, 2000).

In addition to general design principles, there are several issues that are unique to specific populations of disabled persons. First, it is important to note that not all disabilities adversely affect access to the Web. The primary disabilities that may hinder such access are visual, hearing and dexterity impairments. Second, each disability affects

different areas of website design. Visual disabilities are most impacted by failure of sites to provide textual representations for all graphics and video, poorly marked up tables and frames, and lack of sites to be compatible with screen reader technologies. Access to websites by hearing-impaired individuals is hindered most by a site's lack of captioning for audio. Finally, those with physical dexterity impairments find the lack of keyboard navigation support to be the most troublesome (Chisholm, Vanderheiden, and Jacobs, 1999).

The blind and visually impaired comprise the largest and fastest growing segment of the disabled population. Oppenheim and Selby's (1999) study Access to Information on the World Wide Web for Blind and Visually Impaired People evaluated three of the most popular web search engines (AltaVista, Yahoo!, and Infoseek) for access to blind or visually impaired users. The study was conducted with four participants with varying levels of visual impairment – from minor to total blindness. Oppenheim and Selby found that features that appeal to sighted users (graphics heavy sites with “noisy” backgrounds and many colors), often make websites inaccessible to blind or visually impaired users. All of the participants rated the ease-of-use of the websites as poor, noting that the small font sizes, numerous advertisements, and poorly designed navigation made site use difficult.

The use of textual representations for graphical images and video is one of the most important factors in making a website accessible to visually impaired users. Graphical images (including image maps and buttons) should always be labeled with text, preferably in the form of an <ALT> tag for short descriptions and <LONGDESC> for long descriptions. Multimedia technologies, such as web casts, audio tracks, and video

excerpts, can cause great difficulties for special populations. Websites that use such technologies should provide captioning for hearing impaired individuals and sound for visually impaired members. The failure to provide textual representations of these sources prohibits many disabled persons from equal access to websites and in some cases, may eliminate access altogether.

Another problem area for visually impaired persons is a site's use of color. Web authors should use color appropriately; color should never be used to convey meaning or for site navigation. For example, a site should never ask the user to "click on the green button." This is especially important for colorblind and visually impaired populations (including the growing aging segment) who may have difficulty recognizing colors or reading text when poor color contrast between the site's foreground and background is present. Forms and frames also cause problems for various segments of the population, especially those accessing websites through screen readers. If at all possible, sites should not use frames, or should provide a non-frames or text-only version of their site if they insist on using frames.

Another factor in web accessibility lies in the "why should we bother?" category. Beyond inaccessibility to disabled users, there are several significant reasons to implement accessible websites. According to Axel Schmetzke (2001), a prominent figure in disability access literature, there are four major reasons to implement technology that is accessible to the widest possible segment of the population:

1. *It is the ethically correct thing to do.* The Internet should not be allowed to advance one sector of the population at the expense of another.

2. *It is the economically sensible thing to do.* By alienating certain populations, sites are losing visitors and retail sites are losing possible buyers.
3. *The population is aging.* As individuals increase in age, their hearing and vision decrease. This population will soon begin to place enormous demands for accessibility so becoming accessible now is a definite advantage.
4. *The law.* Both private and public sector organizations are being sued for not being disability accessible – this is likely to only get worse.

The study of website accessibility is not only composed of the “how to” and “whys,” it also entails the analysis of why site designers are not making their sites accessible. One of the most succinct summaries of the reasons site developers offer in response to the question “why is your site not accessible?” is provided in Chung, Austin and Mowbray’s (2000) article [A Defence of Plain HTML for Law: AustLII’s Approach to Standards](#). The authors organize the barriers to site inaccessibility into six categories. The most relevant barriers to site inaccessibility to disabled persons are the last four categories of “the design barrier,” “the ‘somebody else’s problem’ barrier,” “the ‘latest is greatest!’ barrier,” and “I didn’t know that!’ barrier.”

The design barrier refers to the way the website is designed and structured, oftentimes this is done without disability access or even general user accessibility in mind. The ‘somebody else’s problem’ and ‘I didn’t know that!’ barriers are closely related, both encompassing the idea that disability access shouldn’t be a web author’s problem, that current authoring software doesn’t code “good, accessible” HTML and that authors can’t be expected to know everything. However, Chung, Austin and Mowbray argue that these excuses are irrelevant given the initiatives of such worldwide

organizations as the W3C towards publicizing the many benefits of accessibility. Finally, the ‘latest is greatest!’ barrier refers to the incorporation of new technologies into websites, done many times before those technologies have even been tested. Also, these new technologies are oftentimes multimedia additions and are inaccessible to anyone with a disability or with older hardware.

Government Websites

There is an abundance of scholarly literature available on the topics of Web design and accessibility issues. Unfortunately, much of the literature is only of peripheral importance to this study as some research is outdated due to technological advances in the field. Another portion of the literature reads like a “how-to” manual, providing instruction to organizations on how to make their websites friendly to disabled populations. Most of these studies explore general accessibility and design issues and many stress the importance of providing access to these special populations, explaining the possible consequences (lawsuits and complaints) that may occur if site accessibility is not improved. However, few if any in this genre, provide much in the way of discussion on the current state of government website accessibility.

Jackson-Sanborn, Odess-Harnish, and Warren’s (2001) technical report, Website Accessibility: A Study of ADA Compliance, evaluated the top layer of pages on 549 randomly-selected websites in the six categories of ‘overall most visited,’ ‘clothing,’ ‘international,’ ‘jobs,’ ‘college’ and ‘government.’ The study utilized the Center for Applied Technology’s (CAST) BOBBY software to evaluate the sites. Other qualitative or quantitative measures of accessibility were not pursued. Of the 549 sites, only 6% of

the total sites were BOBBY approved (meaning they passed the software's compliance test). Of the six categories, government websites had the highest rate of BOBBY approval at 60%. The cause of most of the government website failures were attributed to a lack of textual representation for images on the sites.

There have been several surveys conducted specifically on disability access on government websites. While these studies and surveys are lacking in in-depth analysis, they provide up-to-date outlooks on the state of several country's accessibility levels for disabled citizens.

The United States Department of Justice's (2000) report, Information Technology and People with Disabilities: The Current State of Federal Accessibility, includes a survey of federal agency web pages. Each federal agency was asked to complete a Section 508 self-evaluation questionnaire on 20 of their most heavily used website pages. The questionnaire was based on the W3C's guidelines and designed to evaluate compliance with disability access laws. The pages were evaluated on such things as their use of <ALT> tags on images, ease of navigation, use of image maps and so forth. Based on the results of the survey, the Justice Department determined that "federal agencies' Internet and intranet sites contain *some* (emphasis added) barriers to access for people with disabilities." The most common errors included lack of alternative text for images (881 pages out of 3,028 pages failed to include alternative text for images) and the use of PDF documents as the sole format for much government information. The study determined that most of the accessibility issues on the pages were due to "inattention to detail" rather than lack of knowledge or technical expertise.

The Human Rights and Equal Opportunity Commission's (1999) Working Paper for E-commerce Reference: Web Accessibility surveyed the accessibility of Australian Commonwealth government websites to disabled and aging Australians. The HREOC utilized BOBBY software to test the accessibility of the pages, labeling those that were BOBBY approved as accessible and those that were not as inaccessible. The results showed that there were significant barriers to access present on the sites, mainly inaccessibility to images, .pdf documents, and frames. Unfortunately, the study did not provide access to the quantitative data they collected during the course of the study, nor did they go into any great detail as to how the study was conducted (which sites were reviewed, etc.) Thus, while the study supplies relatively current information on the overall state of disability access to Commonwealth government websites, its importance is limited.

Cullen and Houghton's (2000) study, Democracy Online: An Assessment of New Zealand Government Web Sites, assessed the "effectiveness of New Zealand government websites in providing equitable and appropriate access to government information to all citizens" (p. 243). The study was a content analysis of a selection of 52 New Zealand government websites. Though the specific method of compliance testing was not outlined, Cullen and Houghton found that disability access on these sites was poorly handled. They believed this to be a result of "a lack of knowledge of some critical points of Web design and information design that impact considerably on the question of access and accountability" (p. 250). The study did not provide quantitative analysis on disability access (why the sites failed, how they failed, what needs to be improved) nor did it explore it at any great depth.

The World Markets Research Centre's (2001) Global E-Government Survey 2001 used a detailed examination of 2,288 national government sites in 196 countries to measure the progress of e-government worldwide. The study evaluated disability access on three levels – first, does the site provide features that are helpful to the visually or hearing impaired?; second, is the site BOBBY approved?; and third, does the site have accessibility features in accordance to the WAI's guidelines? Given these attributes, the study found that only 2% of government websites have some form of disability access. The United States came out tops, with 37% of its government websites accessible. Australia was rated as third, with 23% of its sites accessible, and the United Kingdom was ranked in eighth position, with only 7% of its sites accessible to disabled users. Given the emphasis in the Australian, British and American press and governments on the need for disability access, these accessibility numbers are shockingly low.

Darrell West's (2001) survey State and Federal E-Government in the United States, 2001, conducted a detailed evaluation of US state and federal government websites. The survey was an analysis of 1,680 government websites (1,621 state government websites, the federal portal firstgov.gov, 45 federal government legislative and executive sites, and 13 federal court sites) for e-government features and disability access. A site was deemed to be accessible if it had one or more of the following four features: (1) provided a TTY (Text Telephone) or TDD (Telephonic Device for the Deaf) phone number; (2) the site was BOBBY approved; (3) the site had web accessibility features consistent with standards mandated by groups such as the World Wide Web Consortium (W3C) or legislative acts; or (4) the website had a text-only version of the site or text labels for graphics. The study found that 27% of the sites had some form of

disability access -- 16% of the sites had TTY/TDD phone lines, 5% of the sites were BOBBY approved, 4% of the sites followed guidelines and 8% of the sites had a text version. The study concluded that although this is improvement in past levels of disability access, these government sites still need much improvement.

While the study of disability access on government websites has not been neglected, it is also not comprehensive. More information, beyond simple BOBBY counts, is needed so that governments may better understand where they have been successful in providing access and where they have, and continue to, fail. Future studies need to fully address disability access issues – including evaluation of national websites in light of national legislation. In sum, the “how many” is important but the “why” still needs to be better addressed.

Methodology

Scope and Sampling

A content analysis of 66 government websites, 22 from each of the three countries of Australia, the United States, and the United Kingdom, was conducted to evaluate the level of disability access on government websites. The study examined the accessibility levels of each website based upon the website's adherence to the established World Wide Web Consortium's (W3C) web accessibility guidelines. The sites were judged upon such characteristics as font size, ease of navigation, textual labeling of images and multimedia presentations, and use of valid HTML. All of the sites were viewed on Internet Explorer 5.0 on a color 19-inch monitor during the period 1 October 2001 to 31 October 2001.

There were several steps used in the site selection process. First, it was determined that a random selection sample would not be the most appropriate means of site selection due to the fact that the government sites all represent different levels of government and that each government had a different hierarchy. Next, a set of website selection criteria were developed based upon the goals of the study. Sites were chosen based on the following criteria:

1. Sites that are sponsored or created by the government, or carry out activities on behalf of the government with direct funding from the government – all of the sites chosen were those at the national/federal level and did not include those at the state, district, or borough levels;
2. Sites that are at the highest level of the governmental hierarchy for each individual nation in the following categories:

- 1) Agriculture

- 2) Arts, culture
- 3) Benefits/Employment
- 4) Consumer Safety
- 5) Defense
- 6) Economics/Finance
- 7) Education
- 8) Energy
- 9) Environment
- 10) Foreign Relations/Travel
- 11) General/Portal
- 12) Health
- 13) Housing/Urban
- 14) Immigration
- 15) Justice
- 16) Legal
- 17) Legislative
- 18) Library (National)
- 19) President/Prime Minister
- 20) Statistics
- 21) Taxes
- 22) Transportation

The sites were selected from the nationally run general government portal for that particular nation – www.firstgov.gov (USA), www.fed.gov.au (Australia), and ukonline.gov.uk (United Kingdom). For the purposes of this study, a “government portal” is a portal provided by the governments of the respective nations as a link to web sites within those governments. Each of the three portals contained a hierarchical listing of the government departments and their respective websites. It is from these listings that the highest governmental levels were determined. The categories were selected based upon the review of the governmental structures of the three nations and upon the information needs of their citizens. While category selection was somewhat subjective, the selection for the websites to represent these categories followed the study’s previously outlined criteria. (The full list of sites can be found in Appendix A.)

In the case of the Statistics, Tax, Library and Consumer categories, the highest level of governmental body assigned to that category was not the highest level of governmental hierarchy in any of the three countries. In each country, these categories were one level under the highest level, usually an agency or office of the highest-level governmental department. Additionally, these sites enable the study to examine the possibility that a site’s accessibility may be related to its level in the governmental hierarchy.

Upon selection of the 66 websites, the next step was development of a questionnaire that would aid in the systematic evaluation of the websites chosen.

Evaluation of the Websites

The World Wide Web Consortium's Web Accessibility Initiative's (WAI) guidelines (<http://www.w3.org/TR/TAI-WEBCONTENT>) were the primary source of recommendations used in the evaluation of the sites. These guidelines were selected for the study based upon the fact that they are internationally recognized and have been developed by cross-discipline board of worldwide accessibility experts. Additionally, each of the three nations has published some form of guidelines, either mandatory (as in the case of the US) or merely suggested (as in the cases of Australia and the UK). The questionnaire developed is a compilation of these four sets of recommendations, with questions reflecting topics found in all four and with an emphasis on Priority 1 and 2 recommendations.

The homepages of each site were evaluated – on the whole, layers of the web pages linked to the home page were not evaluated and were not within the scope of this research study. The selected 66 websites were tested using a set of criteria for compliance to each of the guidelines and data was recorded on data collection sheets (see Appendix A). Both the source code and actual physical appearance/layout of the pages were evaluated for accessibility. Qualitative observations were recorded regarding the overall accessibility of the site, including such factors as font size, ease-of-navigation and general usability. These observations were not tabulated and did not effect the numerical scoring of any of the sites; they were recorded only to aid in the final analysis of the results.

Answers to the questions were weighted based upon their importance to accessibility. The higher the point value, the more critical the checkpoint is to allowing

for accessibility. Therefore, the questions on BOBBY compliancy, link targets , and appropriate use of ALT tags and textual description to multimedia receive higher points than do compliancy to font sizes or rollovers. The questions in the BOBBY and guidelines section of the questionnaire were ranked on a numerical point scale from 1-2. Sites that complied with the accessibility standard a question was testing, whether it be from proper use of the technology or from not using the technology at all, would receive 1's and 2's. Sites that failed to comply would receive a score of 0 for the question. The guideline question scores for each site were summed to create an index score. This index score was representative of the site's compliance to WAI and country recommendations. The index was formulated so that the higher the score, the more accessible the site.

Software Evaluation

To answer several of the questions on the questionnaire, each of the sites was tested with a range of software evaluation tools. The Center for Applied Special Technology's BOBBY validator version 3.2 (<http://www.cast.org/bobby>) was used to help determine which Level, if any, of accessibility compliance the sites passed. BOBBY is designed to use the WAI guidelines to measure a site's accessibility. Sites that pass are considered "accessible" and become "BOBBY approved" sites. A website is considered Level One accessible if it causes no Priority One errors; Level Two accessible if it does not cause any Priority One or Two errors; and Level Three accessible if it does not contain any Level One, Two or Three errors. Failure to pass is caused by having one or more Priority Level One errors.

While this software is very useful in determining if a site is accessible, BOBBY does have its limitations. This is evident on the software's results summary page. This summary provides the results – what levels a website passed and what lines of code failed, as well as a list of user checks. These user checks are priorities that BOBBY is unable to check for, such as appropriate use of color, meaningful ALT tags (it can check that all images are labeled but is unable to distinguish meaningful labels from irrelevant ones), and so forth. Thus, while passing BOBBY is definitely a positive step towards providing disability access to the website, it alone is not conclusive proof that the site is easily accessible.

BOBBY's limitations on measuring accessibility levels are the primary reason Section III of the questionnaire was developed - to test for checkpoints that the software was incapable of determining compliance of. Although BOBBY tests for the overall compliance of a website with the WAI's guidelines, and even ranks sites according to the WAI's Levels (1-3) of compliance, the software does not allow for a very detailed evaluation of the coding and does not distinguish between errors. Thus, two Level 1 Accessible sites may be of very different calibers – one may be easy for a disabled person to access, another may have qualities that although allowed by the BOBBY software still make it difficult to access.

To test the pages for appropriate use of color, the pages were run through the Vischeck Color Vision Simulator (<http://vischeck.com/vischeckURL.php3>). This software simulates how a person with Deuteranope, a form of red/green color deficit, views all colors (both image and author-selected) that appear on the page. The software is currently in beta testing and is presently only able to test for Deuteranope (the most

common form of colorblindness). Additionally, the software has a few “bugs” in that it has difficulty transforming pages that use very advanced cascading style or java script sheets.

Finally, the W3C’s HTML Validator (<http://validator.w3.org/>) was used to check the pages for use of valid HTML. HTML Validator parses each page, comparing the page’s declared document type and use of HTML with the actual HTML document type definition (DTD) to see if there are any errors. The Validator passes pages as HTML valid if they do not cause any errors when parsed. Valid pages should be able to work well with multiple browsers and assistive technologies. If the pages do cause errors when parsed, or if the page author fails to include a declared document type, the pages are deemed invalid.

Data Collection

The questionnaire was divided into three major sections: Section 1 – Administrative, Section 2 – BOBBY Compliancy, and finally, Section 3 – Guidelines/Accessibility. The purpose of the first section was to establish the independent variables to be used in the statistical analysis of the sites. This section contained such information as which country the site was from, what governmental level the site was at, and the categorical classification of the site. Section 2 tested the sites with the BOBBY v3.2 to determine which sites were BOBBY approved, and of the BOBBY approved sites, what levels of accessibility they passed. The final section was designed to determine compliancy levels to the WAI guidelines/country recommendations and to good accessibility design principles. Several of the questions found in this section were adapted from the US Department of Justice (“Section 508 Self-Evaluation Web Page Accessibility Questionnaire for Component Web Contacts”)

Section I – Administrative

This section contains four questions which establish the URI/URL of the homepage of the site, which country the website was from, what level of government the site represented, and what topic category the site fell under. There are two choices for level of government – (A) highest, includes those sites of departments within the Executive, Legislative or Judicial branches or (B) lowest, includes those sites that are a department or agency of one of the higher sites. Topic is determined through reading descriptions of the departments provided on their websites or on the portal websites. These questions were developed to help make statistical and analytical comparisons of

the various governments' websites and the hierarchy of the sites within those governments. Answers to these questions were not used to determine the level of accessibility amongst the sites.

Section II – BOBBY Compliancy

This section is comprised of only one question used to record the results of the page's BOBBY score. The question deals with whether or not the page passed BOBBY's accessibility standards and was therefore deemed "BOBBY approved." And, of the approved pages, which Priority Level it passed – this corresponds directly with the priority levels outlined by the WAI. To many, if a site is deemed accessible by BOBBY software, it is considered disability accessible. If it fails to pass BOBBY, the site is most likely inaccessible to disabled persons. Due to the importance of the question, answers are weighted accordingly. Failure to pass Bobby is given a score of "0;" passing Level One earns a "1;" passing Level Two earns a page a "2;" and passing Level Three gives a score of "3" for the question.

Part III – Guidelines and General Accessibility

This section attempts to run the user checks that BOBBY is unable to conduct in order to gain a clearer picture of a website's accessibility. This section tests for disability access issues most prevalent in the hearing and visually impaired environments. Section III is organized by the WAI guideline numbers. Several of the guidelines are not represented in this section for two reasons. The first is the fact that running a site through BOBBY adequately checks for compliance to the guideline. The second is that some of

the guidelines are impossible to check for without full access to the site; the aid of a screen reader; or by having a person with a specific disability check for them.

The specific guidelines and accessibility issues the questions relate to follows:

1. *Guideline 1* – Does the page contain meaningful text equivalents for all images through use of <ALT> tags? Does the page provide text captioning for all multimedia (video and audio) content? Does the page supply alternative text for image type buttons in forms? Does the page provide alternative formats (such as HTML/text) to all Adobe PDF documents?
2. *Guideline 2* – Is the page using color appropriately?
3. *Guideline 3* – Does the page allow users to increase or decrease the font sizing?
4. *Guideline 7* – Does the page cause the screen to flicker, blink or auto-refresh?
5. *Guideline 8* – Do pages that utilize frames use descriptive frame titles?
6. *Guideline 13* – Does the page clearly identify the target of each of its links? Does the page provide an alternative navigation system to image rollovers? Does it supply general information to the user about the site, its content or layout?
7. *Good Design Issues* – Does the site provide contact information so that disabled persons can report inaccessibility issues? Does it provide a text-only version? Is the page constructed using valid HTML?

(For detailed specifications on how the answers to each individual question were determined, please refer to Appendix B.)

The results of each of the questions were recorded on the collection data sheet and tabulated to determine the following:

1. Which country has the overall lowest levels of accessibility for disabled persons?
2. Which guidelines have the greatest percentage of use by each nation? Which guidelines were least followed?
3. Is there any statistically significant difference between the page's index score and its BOBBY relationship?

Data Analysis

Data in the study was rated on a numerical scale from 0 (not accessible) to 2 (highly accessible) for each question. The lowest levels of accessibility were determined through the evaluation of the individual site's overall compliance with the W3C guidelines and with country-specific guidelines. Lowest level refers to the site with the least requirements for the guidelines met and for those sites that do not pass accessibility Level 1. The analysis was designed to determine which guidelines, and aspects within each guideline, are being met.

Data was then entered in the SPSS statistical software program where statistical analyses were run. For tests run on the entire set, N=66; and for tests run on individual countries, N=22. ANOVA and correlation tests were run on the data and reported in the subsequent Results section of this study.

Results

The purpose of the statistical analysis was to determine which country had the lowest level of disability access through evaluation of the country's BOBBY score and guideline index score. Further, the data was tabulated to examine the accessibility levels of various guidelines, compare the BOBBY score versus index score, and explore the relationships between type, country, government level and the index and BOBBY scores.

BOBBY Score (Pass Level)

A page's BOBBY score was determined through question #4 on the questionnaire. The question used the page's BOBBY results to determine its score – “0” if the page was not BOBBY approved; “1” if the page was BOBBY Level One approved; “2” if the page was BOBBY Level Two approved; and “3” if the page was BOBBY Level Three approved. In this study, there were no pages that received a score of three. The scores for this question ranged from “0” to “2,” with a majority of the sites scoring either “0” or “1.”

Table 1

Bobby Score (Pass Level)

Country	Mean	Standard Deviation
Australia	.59	.59
United Kingdom	.27	.55
United States	.86	.35

The United States had the highest average BOBBY score, with a mean of .86. Australia followed with a mean score of .59 and the United Kingdom lagged behind with a mean of .27. The US had the lowest level of variability in its scores, with a standard deviation of .35. Both Australia and the UK had significantly higher levels of variation with standard deviations of .59 and .55 respectively.

A one-way ANOVA test was run to determine if there was a relationship between the country the site was from and the site's BOBBY score. The test showed strong significance between the site's BOBBY score and country. These results enable us to reject the hypothesis that the country the site is from does not impact its BOBBY score.

Table 2

BOBBY Score – ANOVA Test Results

BOBBY Score * Country	F	Sig.
Between groups (combined)	7.450	.001

Index Score (Guidelines)

The sum of the numerical scores from questions #7 to #21 on the questionnaire were used to create an index score for the page's adherence to the WAI guidelines. The index scores ranged from a low of 10 to a high of 16; 10 being a poorly accessible/inaccessible page to 16 being a highly accessible page. While several pages received scores of 10, only one page received a 16.

Table 3

Guidelines Index Score

Country	Mean	Standard Deviation
Australia	12.55	1.57
United Kingdom	11.96	1.21
United States	13.00	1.11

The United States was the clear leader in the index score category, having the highest average index score with a mean score of 13. The US also had the lowest rate of variability in the score with a standard deviation of 1.11. While Australia had the next highest average index score (mean of 12.55), it had much more variation in its scores, with a standard deviation of 1.57. Australia had the single highest index score at 16, but its overall mean was brought down by a number of sites scoring 11's. Finally, the United Kingdom had the lowest average index score with a mean score of 11.96 and a standard deviation just slightly above the US at 1.21. This data closely follows those seen in the BOBBY Score data analysis.

To determine if the presence of a relationship between the country the government site was from and its index score, an ANOVA test was used. The test revealed that there is a significant relationship between the two, and allows us to reject the null hypothesis that the country does not affect the index score.

Table 4

Guidelines Index Score – ANOVA Test Results

Index Score * Country	F	Sig.
Between groups (combined)	3.513	.036

The relationship between the Bobby Score and the Index Score (Guidelines) is further demonstrated through correlation analysis. A Pearson Correlation was run to determine what, if any, is the relationship between a page's BOBBY scores and its Index Score (Guidelines).

Table 5

Correlation between Index Score and Bobby Score

	Index Score	Bobby Score
Index Score		
Pearson Correlation	1	.589
Bobby Score		
Pearson Correlation	.589	1

These results reveal the anticipated outcome – that there is a positive correlation between the page's Index Score and its Bobby Score. As both scores are based upon interpretation of the WAI's guidelines, it is not surprising that the two are significantly

correlated. While not the purpose of this study, this data also reveals that BOBBY is an effective tool for assessing a site's accessibility to disabled users.

Several tests were run to examine further relationships within the data. An ANOVA between index score and government level and between BOBBY score and government level showed that we could not reject the null hypothesis that government level had no effect on either the index score or the BOBBY score. Effectively, the test found that there was no relationship between a site's BOBBY or index score and its level of government. However, this statement may not be valid beyond the scope of this study as the study used a small sample (66 homepages) and had an uneven distribution of top level versus lower level pages (49 to 17). Also, this study's lower level pages are still agencies and departments that are very high in the governmental hierarchy.

Table 6

	F	Sig.
BOBBY score* gov level		
Between groups (combined)	.011	.916
Index score*gov level		
Between groups (combined)	.011	.919

Second, an ANOVA test was run to see if there was any relationship between a page's BOBBY or index score and the page's type category. Surprisingly, the test results came back positive in the case of the page's index score and type category and negative

in the case of the page's BOBBY score and type category. The null hypothesis could only be rejected in the case of the relationship between index score and type.

Table 7

	F	Sig.
BOBBY score* type		
Between groups (combined)	1.047	.434
Index score*type		
Between groups (combined)	2.016	.025

While the ANOVA showed that there was no relationship between type and BOBBY score, it showed that there was a possible relationship between index score and type. This suggests that there are additional factors being measured by the index score that are not being measured by the BOBBY score. Possible factors include the index score's testing for meaningfulness and good site design. While these attributes are promoted by BOBBY software developers, they are not directly tested by the software.

Although the study proved that there is no statistical significance between a site's BOBBY score and the site type, there were a few interesting facts that resulted when comparing the two. There were several site types that had 100% failure or approval ratings amongst the three nations. For example, in the agriculture site type, all three (one from each country) pages failed to pass BOBBY compliance. Though it is beyond the scope of this paper, it would be interesting to conduct further tests, with greater sample

numbers, to determine if there is, in fact, a relationship between site type and BOBBY score. And, if there is, why does this exist?

Table 8

Site Type	Mean	N	Standard Deviation
Agriculture	.00	3	.000
Culture	.00	2	.000
Finance	1.00	3	1.000
Education	1.00	3	1.000
Environment	1.00	3	1.000

The means of each country's numerical scoring on each of the guideline attributes was tabulated to explore which, if any, guideline attributes were most and least adhered to by each individual nation, and the nations overall. Attributes that had high compliance levels in all the nations included not causing the screen to flicker or blink, proper use of color, and not causing the page to auto refresh. Those that had the low levels of compliance in all nations included lack of valid HTML, and not using relative positioning for font sizing. Most of the other attributes were somewhere in the middle in terms of compliance, with some nations averaging high in the category and others with low means.

Table 9

	Colors	Flicker or Blink	Auto Refresh	Font Sizing	Valid HTML
Total (Australia, UK, US)					
Mean	.98	1.00	.97	.00	.03
Standard Deviation	.123	.000	.173	.000	.246

Discussion

Simply stated, disability access on government websites needs to improve. Of the 66 governmental homepages tested, only 33 pages, or 54% of the total, were BOBBY approved. 86% of the homepages of the American government websites tested, 54% of Australian government websites and a dismal 23% of British websites were BOBBY approved. Although these numbers do not appear startlingly low, it may not accurately reflect their total real-world levels as this study only tested the homepage of the sites – the page most likely to be accessible. If the homepages are retrieving such low accessibility rates, it is not overly presumptuous to assume that an analysis of lower pages on governmental sites would result in far poorer compliancy rates. Additionally, the study was conducted on Federal sites, rather than state or local government sites, sites that have consistently scored lower than Federal websites on accessibility ratings.

Despite the higher than expected accessibility statistics, these websites are far from fully accessible. First, with the exception of a single Australian site, all of the homepages failed to pass the HTML validator. Many of the failures can be attributed to a failure for site authors to declare a document type. Adding a document type is a simple procedure and should be a made a priority. However, of those that did declare a document type, there were numerous HTML errors in the document. Some pages had upwards of 60 HTML errors, ranging from minor errors (use of deprecated tags) to major errors that cause all users problems (forgetting to use the <HEAD> </HEAD> tags). Correcting for errors on all of the site's pages, and in some cases, learning to write good HTML, may take considerable time. However, not using well-written HTML, increases

the chances that some browsers, especially screen readers, may not be able to parse or access the pages.

Another problem that is evident on the websites of all three nations is the complete failure of any of the sites to use relative font sizing. Relative sizing refers to the use of percentages and “ems” rather than pixels and points in font size declarations. Using relative sizing allows users with visual impairments to easily adjust the font size to suit their needs. Sites that fail to provide relative sizing limit the amount a user may increase the page’s font, thereby creating pages that are illegible to certain populations. Not only did all of the pages use fixed font sizes, but also many used incredibly small fixed font sizes – sizes that few, if any, elderly or visually impaired persons could read. As most of the text on these homepages was links, these small font sizes could at best, make site navigation more difficult than need be and at worst, effectively close off portions of the site to a user.

Despite these shortcomings, disability access on the Web is improving due to greater public awareness and developer education. This is evident when comparing this study’s data to that of previous studies. Much of the literature from the late 1990’s stated that government websites, even those at the highest levels, were completely inaccessible to disabled users. The primary reason cited was the failure of developer’s to include <ALT> tags with images. However, this study’s findings revealed that a considerable majority of the page’s tested effectively used textual representations for all or most of the images included on the page. Responses to other questions in the index score section of the questionnaire also revealed that these governmental pages were adding meaningful link targets and frame titles to the pages – all issues in previous studies.

These findings suggest that website developers may be designing sites that will secure BOBBY approval. Failure to include frame titles or <ALT> tags will cause a page to fail Level One access, thereby causing them to not be BOBBY approved. While many sites have improved their use of such essential Priority One elements, there are many other important Priority One, Two and Three access points that they are failing to incorporate into their site. For example, none of the sites are using relative sizing or valid HTML, and many have poor navigation systems. However, failure on any of these priorities will not prevent a site from becoming BOBBY approved. There is a clear emphasis in the sites tested on elements that the BOBBY software emphasizes.

This phenomenon has resulted in both positives and negatives. Due to the fact that BOBBY is using the WAI guidelines to determine a site's accessibility rating, sites that pass BOBBY are much more accessible than those that don't. Therefore, building a site that is BOBBY approved is definitely a positive step towards disability access. However, while these sites are BOBBY approved, they are not always fully or easily accessible to disabled populations. Sites do need to consider issues outside of BOBBY approval to improve their access to disabled and other special populations.

Analysis of the data also established that there is a relationship between a page's BOBBY and index scores and its country. This is further evidenced through examination of the BOBBY approval numbers. Out of 22 US pages tested, only 3 failed to receive BOBBY approval. Australia had 10 pages out of 22 fail, and Britain had a far greater number fail than pass, with 17 pages out of 22 failing to meet BOBBY approval. If there were no relationship between the country and the accessibility levels of its sites, we would not see such disparity in levels. There are several plausible reasons for these

differences – culture, access to technology, and governmental action. However, as all three nations are democratic, support the concept of accessible websites and are technologically advanced, this study argues that the most important factor is the country's legislation.

The United States scored the highest averages with least variation in both indexes. One possible theory to explain this is that these results are directly related to recent moves in American legislation. Section 508 made accessibility compliance mandatory by Summer 2001 therefore by law, all the sites should be passing BOBBY Level 1. This legislation also came with literature on how to make a site accessible and accessibility guidelines that must be met. Finally, it opened these agencies up to possible civil suits and complaints should their sites fail to meet BOBBY approval and/or not follow all of the required site guidelines. Even with this more stringent approach, not all of the Federal websites tested passed.

Australia also has adopted a mandatory accessibility policy for its government websites. It too is the only nation of the three to have had a civil litigation suit brought against a governmentally funded agency for violation of its disability legislation (the DDA). Although Australia has made disability access to government websites mandatory, it has not provided specific guidelines as to how to accomplish these goals. Rather, it has supported recommended guidelines. The lack of obligatory, explicit guidelines for disability access may be one of the reasons Australia is not as compliant as the US. The US has stated what a website must have (or not have) in order to pass compliancy; Australia has stated that passing is mandatory, but has not provided a list of what must be done in order to pass.

Finally, the United Kingdom's legislation on disability access and websites is only recommended, and is not mandatory. Of the three countries, the UK scored significantly lower in both the BOBBY and index scores. To the best of my knowledge, the country has not conducted accessibility studies on its websites as both Australia and the US have, and there is no explicit legislation dealing with website accessibility. While the British government fully and publicly supports making its websites accessible to disabled citizens, there is much less of a threat for lawsuits brought against the agencies for not making their pages compliant. Therefore, there is much less incentive to utilize sometimes limited funds to make potentially costly updates to the sites.

As the disabled and aging population increases so will the need for accessible websites. Through legislation, Australia, the United States and the United Kingdom have all declared both the importance of citizen access to government information and the importance of equal access to products and services to all citizens. In order to uphold the basic tenets of earlier equal access legislation, each of these countries will have to come to a definite decision about disability access and websites – in both the public and private sector. An important factor in this equation will be the decision of each of the countries as to how to determine compliance and how to penalize those who fail to comply.

Conclusion

This study aimed to evaluate the present state of disability access on high-level governmental websites in the United States, the United Kingdom, and Australia. The study's results must be viewed in light of the dynamic nature of the Web – websites are constantly changing and what is inaccessible one day may be made accessible the next. Therefore, while the statistical data offers a significant look into disability access into each of the countries, these results are by no means static and may have changed since the content analysis was first conducted.

While the actual numbers of websites tested was much smaller than that seen in other disability access surveys, the level of evaluation was greater. Many earlier studies have used the BOBBY software as the only means of evaluation for compliancy. While this is an effective test for accessibility, it does have the limitations discussed earlier. One of the goals of the study was to test the pages for the use of good design and accessibility techniques (such as easy and logical navigation systems), not just BOBBY approval. This study sought to test the overall accessibility of governmental websites to the disabled.

To test for greater adherence to the WAI guidelines and good design techniques, a comprehensive questionnaire was developed. The questionnaire included the page's BOBBY approval but also added the inclusion of an "index score." The index score questions were designed to measure for both syntax (is the page correctly using technology to increase access?) and semantics (is the site using meaningful labeling?). BOBBY, like most software, can only test a site's syntax. It cannot test whether the site is using logical navigation or meaningful textual representations.

Additionally, BOBBY does not test the site for use of good design issues. While BOBBY does suggest that site design is important (it includes site design questions in its user checks section), having poor site design does not necessarily detract from a site's BOBBY approval rating. The index score was designed to test a page for the inclusion of good design techniques such as use of valid HTML and contact information. Thus, the combination of a page's BOBBY score and index score is a more valid representation of the accessibility of a site and therefore, provides more value to the study's findings.

The questionnaire could be used to extend the study in several ways. One possibility is to utilize the questionnaire to conduct a content analysis on lower web pages to determine if there is a difference in compliancy levels between a site's homepage and that of its interior pages. Another option would be use the questionnaire to test other country's pages, especially those of nation's with other forms of government. Other possibilities include testing on state, borough and local level governmental websites to measure their compliancy to legislation and accessibility guidelines.

Future research could also be conducted to eliminate one of the limitations of the study – namely, the lack of website evaluation by disabled persons. There are several guidelines that the study could not address. One such element was the evaluation of the site's navigation system using various assistive technologies, such as a screen reader. A user study would be able to provide further qualitative data on a site's accessibility level and would provide greater detail and insight.

In conclusion, disability access is critical to the future of government services on the Web. As more and more citizens use the Web to access governmental information

and documents, the issue of universal access will be pushed to the front and likely tested in the courts.

Appendix A - List Of Sites Evaluated

NAME	TYPE	URL
United States		
Department of Agriculture	Agriculture	http://www.usda.gov/
Department of Labor	Benefits/Employment	http://www.dol.gov/
Federal Trade Commission	Consumer Safety	http://www.ftc.gov/
Department of Defense	Defense	http://www.defenselink.mil/
Department of Commerce	Economics/Finance	http://home.doc.gov/
Department of Education	Education	http://www.ed.gov
Department of Energy	Energy	http://www.energy.gov/
Department of the Interior	Environment	http://www.doi.gov/
Department of State	Foreign Relations/Travel	http://www.state.gov/
First Gov	General/Portal	http://www.firstgov.gov/
Department of Health and Human Services	Health	http://www.dhhs.gov/
Department of Housing and Urban Development	Housing/Urban	http://www.hud.gov/
Immigration and Naturalization Service	Immigration	http://www.ins.gov/
Department of Justice	Justice	http://www.usdoj.gov/
House of Representatives	Legislative	http://www.house.gov/
Senate	Legislative	http://www.senate.gov/
Library of Congress	Library	http://www.loc.gov
White House	President/Prime Minister	http://www.whitehouse.gov/
Fed Stats	Statistics	http://www.fedstats.gov/
Internal Revenue Service	Taxes	http://www.irs.gov/
Department of Transportation	Transportation	http://www.dot.gov/
Treasury Department	Treasury	http://www/treas.gov/
Australia		
Department of Agriculture, Fisheries and Forestry	Agriculture	http://www.affa.gov.au/
Consumers Online	Consumer Safety/Protection	http://www.consumersonline.gov.au
Federal Department of Communications, Information Technology and the Arts	Culture/Communications	http://www.dcita.gov.au/
Department of Defence	Defence	http://www.defence.gov.au/index.html
Department of Finance and Administration	Economics/Finance	http://www.finance.gov.au/
Commonwealth Department of Education, Training and Youth Affairs	Education	http://www.detya.gov.au/
Department of Employment, Workplace Relations and Small Business	Employment	http://www.dewrsb.gov.au/
Department of Industry, Science and Resources	Energy/Competitive	http://www.isr.gov.au/

Department of the Environment and Heritage	Environment	http://www.ea.gov.au/
Australian Department of Foreign Affairs and Trade	Foreign Relations/Travel	http://www.dfat.gov.au/
Federal Government of Australia Website	General/Portal	http://www.fed.gov.au/
Department of Health and Aged Care	Health	http://www.health.gov.au/
Department of Family and Community Affairs	Housing/urban/consumer	http://www.facs.gov.au/
Department of Immigration and Multicultural Affairs	Immigration	http://www.immi.gov.au/
Attorney-General's Department	Justice	http://www.ag.gov.au/
Parliament of Australia	Legislative	http://www.aph.gov.au/
National Library of Australia	Library	http://www.nla.gov.au
Prime Minister of Australia	President/Prime Minister	http://www.pm.gov.au/home.htm
Australian Bureau of Statistics	Statistics	http://www.abs.gov.au/
Australian Taxation Office	Taxes	http://www.ato.gov.au/
Department of Transportation and Regional Services	Transportation	http://www.dotrs.gov.au/
Department of the Treasury	Treasury	http://www.treasury.gov.au/
United Kingdom		
Department for Environment, Food and Rural Affairs	Agriculture/Food/Nutrition	http://www.defra.gov.uk
Department for Work and Pensions	Benefits/Employment	http://www.dwp.gov.uk/
Office of Fair Trading	Consumer Protection	http://www.oft.gov.uk/
Competition Commission	Consumer Protection/Fair Competition	http://www.competition-commission.org.uk/
Department for Culture, Media and Sport	Culture	http://www.culture.gov.uk/
Ministry of Defense	Defense	http://www.mod.uk/
Department for International Development	Development	http://www.dfid.gov.uk/
Department for Education and Skills	Education	http://www.dfes.gov.uk/index.htm
Foreign and Commonwealth Office	Foreign Relations/Travel	http://www.fco.gov.uk/
Open.Gov.UK	General/Portal	http://ukonline.gov.uk
Department of Health	Health	http://www.doh.gov.uk/
Home Office	Housing/urban/internal affairs	http://www.homeoffice.gov.uk/
Immigration and Nationality Directorate	Immigration	http://www.ind.homeoffice.gov.uk/
The Lord Chancellor's Department	Justice	http://www.lcd.gov.uk/lcdhome.htm
Houses of Parliament Website	Legislative	http://www.parliament.uk/
British Library	Library	http://www.bl.uk/
10 Downing Street	President/Prime Minister	http://www.10downingstreet.gov.uk
National Statistics Website	Statistics	http://www.statistics.gov.uk

Inland Revenue	Taxes	http://www.inlandrevenue.gov.uk
Department of Trade and Industry	Trade/Industry	http://www.dti.gov.uk/er/
Department for Transport, Local Government and Regions	Transportation	http://www.detr.gov.uk/
Her Majesty's Treasury	Treasury	http://www.hm-treasury.gov.uk/

Appendix B - Website Accessibility Questionnaire (Annotated Version)

SECTION 1: ADMINISTRATIVE

1. What is the URI/URL of the web page?

(Enter the full URL of the site's main homepage. If the option between text-only or graphics is given on the first page, select the graphics page and use the URL of this site to represent the homepage URL.)

2. What country is the website from?

- a) Australia
- b) United Kingdom
- c) United States

3. What level of government does the site represent?

- a) Highest – Executive, Legislative, Justice or Department
- b) Lowest – Lower than Department/Bureau level

(Websites of the highest level in the governmental hierarchy for a country should be given a listing of A. If the site falls under the scope or power of a Department higher in the country's governmental hierarchy, it is given a B.)

4. What type does the site fall under?

1) Agriculture	2) Benefits/Employment	3) Consumer
4) Culture	5) Defense	6) Economics/Finance
7) Education	8) Energy	9) Environment
10) Foreign Relations/Travel	11) General/Portal	12) Health
13) Housing/Urban	14) Immigration	15) Justice

16) Legislative	17) Library	18) President/PM
19) Statistics	20) Tax	21) Transportation
22) Treasury		

(In order to respond to this question, you must first determine the primary purpose of the Department. To do so, read the description on the agency/Department provided on both the portal and on the Department’s homepage.)

SECTION 2: BOBBY ACCESSIBILITY

5. What level of accessibility did the page pass?
- a) Level One **(1)**
 - b) Level Two **(2)**
 - c) Level Three **(3)**
 - d) N/A. It did not pass any levels of compliancy. **(0)**

(Does BOBBY pass the site for accessibility? If the site has any Priority One errors or receives any graphical “helmuts,” the answer is no. If the results page states that the site is “BOBBY approved,” it has passed compliancy. If the answer is “yes,” at the minimum the site is Level One accessible. If the site has no Priority One or Two errors, it is Level Two accessible. If the site has no Priority One, Two or Three errors, it is considered Level Three accessible. If the answer to question number 5 is “no,” the site did not pass any levels of compliancy.)

SECTION 3: GUIDELINES/ DESIGN ISSUES

Guideline 1:

6. Does each non-text element on the page have a **meaningful** text equivalent via “alt” or does the page include a meaningful description of the non-text element in the text accompanying the non-text element?
- a) Yes. **(2)**
 - b) Yes and No. Some non-text elements have meaningful text equivalents while others do not. **(1)**
 - c) No. None of the non-text elements have text equivalents or the alt tags are meaningless to disabled users. **(0)**
 - d) N/A. There are no non-text elements on the page. **(NULL)**

(This question is answered by holding one’s mouse over the image to read the ALT tag that appears. 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 a “B.” If the site does not provide a single graphical image, this question is not applicable.)

7. For any multimedia content, is text captioning provided for all audible output and audible output provided for all important visual information?
 - a) Yes, it is provided for all multimedia content. **(2)**
 - b) Yes and No. It is provided for some multimedia content, but not for all. **(1)**
 - c) No. The page has multimedia content but does not provide textual equivalents. **(0)**
 - d) N/A. There is no multimedia content on the page. **(NULL)**

(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, “C” is the appropriate response. Finally, if the page does not provide any multimedia content, the question is N/A. This question is weighted more heavily than others as failure to provide any textual representation of the multimedia content prevents persons with certain disabilities access to information that non-disabled persons can view.)

8. Is alternative text (via ALT tags or linked text) provided to image type buttons in forms?
 - a) Yes. Graphical buttons are used but alternative text is provided. **(1)**
 - b) No. Graphical buttons are used but no alternative text is provided. **(0)**
 - c) N/A. There are no such graphical buttons on the page. **(NULL)**

(This question tests whether or not a disabled user would be able to use a page’s image buttons. If the page uses a graphical button (such as GO, SEARCH, SUBMIT), does it

provide textual representation for that graphic in the form of a standard text link beside the graphical button or a textual description delivered via the ALT tag. If the answer is yes, such text is provided for all buttons, the answer is yes. If there is such textual representation or if only some of the buttons have textual representation, the answer is no. N/A refers to those pages that have no such buttons.)

9. Does the page offer an alternative to PDF documents?
- a) Yes. The page has documents in PDF format but also offers them in alternative, accessible formats such as HTML, or text. **(1)**
 - b) No. The page has documents in PDF format but does not offer alternatives. **(0)**
 - c) N/A. The page does not have documents in PDF format. **(NULL)**

(Most PDF documents are not accessible to disabled users and therefore any information in a document that is provided only in PDF format may not be available to certain members of the disabled population, namely those with visual problems. If the page provides a PDF document(s), and it does not provide an HTML or other version of the document, the answer to the question is no. If it does provide HTML or other versions of the document the answer is yes. For this question, both the homepage and the pages one level directly below the homepage are considered WHEN there is a link from the homepage to the page containing such documents. To determine the answer to this question, it is necessary to look at the document source code to see if any of the <a href> tags point to pdf documents. Also, the researcher must click on all links that could lead to such documents, including links with the wording of reports, publications, speeches, talks, summaries, brochures, etc.)

Guideline 2:

10. 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 three stages to answering this question. First, the homepage must be viewed to see if any instructions reference clicking on a particular color button or link for navigation. Second, the sites are viewed through Vischeck's Color Vision Simulator – <http://www.vischeck.com> - to test to see if the page is navigable to colorblind people. 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. If the site passes all 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.)

Guideline 3:

11. Are users able to increase/decrease the font size on the page?

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

(Users may only effectively increase or decrease a page's font size if the site is using relative font sizing, either within the HTML itself or within the site's style sheet. Although the browsers allow users to increase the font to some extent via the font size menu item, this feature is limited. To determine if the page allows users to increase or decrease the font size, the source code and style sheet (if present) must be examined for use of fixed font sizing. If the site uses pixels, points, or inches, the answer to this question is "no." If the page uses ems or percentages on ALL of the font declarations, the answer is "yes.")

Guideline 4:

12. Are changes in the natural language of a document's text and text equivalents identified using the appropriate tags?

- a) Yes. The lang= " " tag is used. **(1)**
- b) No. Changes in language are not marked with appropriate tags. **(0)**
- c) N/A. The site does not use foreign languages. **(NULL)**

(Marked changes in the natural language enable screen readers to utilize appropriate pronunciation when reading off the terms. Any change in the natural language of a page should be tagged with the <lang=""> tag. To determine if the page adheres to this rule, the page must be examined for use of foreign language terms. If such terms appear, the source code must be examined for the inclusion of two tags, first, the <lang="en"> tag declaring that the document's native language is English and secondly, a <lang=""> tag for each use of a foreign term. If both are present, the answer to the question is "yes." If only one or neither is present, the answer to the question is "no." If the page does not use any foreign language terms, the answer is N/A.)

Guideline 5:

13. If the page includes data in tables, does each cell provide identification of row and column headers?

- a) Yes. The page includes tables but each cell within the table includes identification of its row and column headers. **(1)**
- b) No. The page includes tables but some cells fail to comply. **(0)**
- c) N/A. The page does not include any tables. **(NULL)**

(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.)

Guideline 6:

14. If the page uses cascading style sheets or JavaScript style sheets, is it viewable without style sheets or with style sheets turned off or not supported by the browser?
- a) Yes.
 - b) No.
 - c) N/A. The page does not use CSS or JavaScript Style Sheets.

(To determine if a page is using CSS or JavaScript style sheets, the source code must be examined for the occurrence of both or either of these. If the page does use both or either

Guideline 7:

15. Does the page cause the screen to flicker or blink?
- a) Yes. **(1)**
 - b) 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 “yes.” This can be determined by simply viewing the page. If it flickers or blinks on all browsers it is displayed on, it is “yes.” If the page does not flicker or blink, the answer is “no.”)

16. Does the page cause periodically auto-refresh?
- a) Yes. **(1)**

- b) No. **(0)**

(Page authors can make pages periodically auto-refresh. To determine if a page is designed to automatically refresh, run the page through BOBBY and read through the user checks on the summary results page. BOBBY can determine if this is happening. If BOBBY finds that the page is designed to auto-refresh, the answer is “yes.” If not, the answer is “no.”)

Guideline 12:

17. If the page uses frames, does each frame have a title that describes it?

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

(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, can 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 ...) title, the answer is “no.” If the site does not use frames, the answer is N/A.)

Guideline 13:

18. Does the page clearly identify the target of each link?

- a) Yes. Each link target is clearly identified. **(1)**
- b) No. None of the link targets are clearly identified. **(0)**
- c) N/A. The page does not have links. **(NULL)**

(A page that clearly identifies the target of each link uses text that describes

19. If the page uses rollovers for navigation, is an alternative navigation system intact?

- a) Yes. The page uses rollovers but also supplies alternative navigation. **(1)**
- b) No. The page is only accessed through rollovers. **(0)**
- c) N/A. The page does not use rollovers. **(NULL)**

(The purpose of this question is to determine if a page that uses java script rollovers as its primary navigation system, also provides users with an alternative method of navigating the site. For the purposes of this survey, relevant alternative methods for rollovers are site maps, text-only sites, traditional text links (using <a href> tags), or images/image maps/graphical buttons that provide alt tags. If the page uses rollovers for navigation but does not provide any of the above alternatives, the answer is “no.” If it does provide one or more of the alternatives, the answer is “yes.”)

20. Does the page provide general information about the layout and user accessibility of the site?

- a) Yes. The page provides a sitemap and/or accessibility information. **(1)**
- b) No. The site does not provide either accessibility information or a sitemap. **(0)**

(Site maps and accessibility information help users navigate pages. To determine if a page contains either, a page must be examined for such links as “site map,” “about our site,” “help.” For the purposes of this study, a site map is a textual hierarchy of the site, providing links to the various pages in a site. Accessibility information is anything that provides information or help on disability access, navigation, or general accessibility issues (how to search the site, how the site is organized, what technologies the site is using.) If the page provides a link to one or both of these objects, the answer is “yes.” If it provides no such links on the page itself, the answer is “no.” Site maps/Accessibility information found on lower layers is not relevant to this question and is not considered applicable.)

General Accessibility/Good Design Issues

21. Does the page provide contact information (contact name, phone/fax number and/or email) to make it easy to report accessibility design issues?

- a) Yes. The page provides complete contact information. **(1)**
- b) No. The page does not provide contact information. **(0)**

(All homepages should provide a link to contact information so that users of their site may report any accessibility issues. The purpose of this question is to determine if these pages include such contact information. It is not intended to evaluate the usefulness or completeness of the contact information. Only contact information that is provided on or directly linked from the homepage is considered. If there is such contact information (minimum is an email address), the answer is “yes.” If there is no contact information (no phone, fax, electronic form, email or mail address), the answer is “no.”)

22. Does the page provide a link to a text-only version of the site?
- a) Yes, the link is at the top left or right of the page.
 - b) Yes, there is a link at the page but it is not at the top of the page.
 - c) No, the page does not provide a link.
23. Is the page using valid HTML?
- a) Yes. The page passes HTML validation. **(1)**
 - b) No. The page does not contain valid HTML. **(0)**

(Pages that use valid HTML work best with assistive technologies. To determine if a page uses valid HTML, the pages are run through the W3C’s HTML validator at <http://validator.w3.org/> . If the HTML passes the validator, it is considered valid and the answer is “yes.” If the software discovers errors in the HTML or the page does not have a declared DOCTYPE, the page is not constructed with valid HTML, and the answer is “no.”

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