# Website accessibility: An Australian view

**Jonathon Grantham*, Elizabeth Grantham†, David Powers***
*School of Computer Science, Engineering and Mathematics,
Flinders University of South Australia
†School of Education
Flinders University of South Australia
PO Box 2100, Adelaide 5001, South Australia
Jonathon.grantham@gmail.com

## Abstract

For nearly 20 years Australian and international legal requirements have existed around the development of accessible websites. This paper briefly reviews the history of legislation against web disability discrimination, along with the current legal requirements for website development as indicated by current international accessibility specifications, and reports on a manual examination of the accessibility of 40 Australian private and governmental websites. Not one of the 20 largest Australian companies, nor the Australian 20 Federal Government portfolios, were found to have produced a legally accessible website as per Australian standards.

*Keywords*: accessibility, disabilities, Disabilities Discrimination Act, web development.

## 1 Introduction

*"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."*
Tim Berners-Lee, director and founder of World Wide Web Consortium (W3C), 2002

Website accessibility refers to the practice of making websites accessible to all users inclusive of race, nationality, religion and disability. Website accessibility includes, but is not limited to, the communication style of the text as well as the technical development of the website. Users have come to expect web accessibility, and Huang (2002) notes that, *"Access to the Internet, to a large extent, decides whether or not one can fully participate in the increasingly turbulent and networked world."* Most governments have implemented laws and policies regarding their own websites, communication plans and technology mediums. The Australian Bureau of Statistics (2009) states that 18.5% of Australians have a disability. This figure does not include the significant percentage of Australians with temporary injury or disability, nor does it cover the aging population who, although without disability, can find themselves with similar accessibility difficulties.

However, of greater significance to the field of website and application design is the percentage of individuals (estimated at 10%) who have a disability that affects their use of Information and Communication Technologies (ICT) (Royal National Institute of Blind People (RNIB), 2011). In addition, approximately 6.2 million Australians have poor literacy or numeracy skills, and of this figure, over a third (2.6 million) (ABS, 1996) have very poor literacy or numeracy skills. Low literacy and numeracy skills can significantly affect an individual's access to and understanding of websites and can, in turn, limit ability to complete tasks such as forms and surveys online.



### 1.1 Why develop accessible websites?

There are social, economic and legal arguments in favour of the development of accessible websites. Traditionally, corporate social responsibility has been based around environmental impact and anti-discrimination guidelines in the workplace (Australian Human Rights and Equal Opportunities Commission (AHREOC), 2010). Social responsibility towards web accessibility seems to have been largely left up to the individual person or organisation. In 2008, an Australian Senate motion emphasised the role of the Australian government and its responsibility to *"foster a corporate culture respectful of human rights at home and abroad"*. This motion encouraged all government portfolios to adhere to a common standard of website accessibility.

Huang (2002) notes the economic advantages to making a website accessible. Non-accessible websites run the risk of the potential alienation of between 10% (AHREOC, 2010) and 20% (Specific Learning Difficulties (SPELD), 2011) of the population. In the competitive corporate world, website accessibility can win or lose clientele and have significant impact on a company's profits (Loiacono and McCoy, 2004). Limited access will encourage users with disabilities to find more accessible websites offering similar products or access more expensive channels such as call centres and walk-in branches.

Aside from the possible alienation of a significant percentage of potential clientele, the development of websites that comply with disability discrimination standards can potentially increase exposure and thus, increase the number of clientele both with and without disability.

### 1.2 Australian legal view

"Accessible web pages promote equal access to information and opportunities"
-Spindler, 2002

The Australian Human Rights Commission (AHREOC) is responsible for investigating discrimination on any grounds including race, colour, ethnic origin, sexual preference, gender, marital status, pregnancy and disability. The AHREOC (AHREOC) states that website owners are obliged to make websites accessible to everyone, without discrimination.

The Australian Human Rights Commission Disability Discrimination Act states;

*"Provision of information and other material through the web is a service covered by the DDA. Equal access for people with a disability in this area is required by the DDA where it can reasonably be provided… This requirement applies to any individual or organisation developing a World Wide Web page in Australia, or placing or maintaining a web page on an Australian server… whether providing for payment or not."*

(AHREOC. Version 3.1 May 1999. World Wide Web Access: Disability Discrimination Act Advisory Notes)

Websites that do not conform to the DDA and accessibility guidelines run the risk of information provided within the website not being accessible to those who have a right to use it. Websites in which information is not accessible to all are in breach of the DDA, and therefore, the owners of the website can be prosecuted for discrimination. The most commonly referenced case of this nature is Maguire versus the Sydney Organising Committee for the Olympic Games (SOCOG). Maguire claimed that the SOCOG had created a website that was inaccessible for individuals with vision impairment. The website left individuals with vision impairment unable to access the ticketing information, event schedules or posted event results. The court ruled in favour of Maguire and under the DDA fined the SOCOG $20,000. The court case cost the SOCOG in excess of $500,000 (FCA, 2000).

On the 30th June 2010 the Minister for Finance and Deregulation, Lindsay Tanner, and Parliamentary Secretary for Disabilities, Bill Shorten, released the Website Accessibility National Transition Strategy and Implementation Plan for Australian Government agencies. The plan states that in a four year period ending in June 2014 all government department websites will meet the technical requirements of the Web Content Accessibility Guidelines 2.0 (WCAGv2, 2008). The WCAGv2 is a series of guidelines that 'covers a range of recommendations for making web content more accessible' (W3C, 2008). By meeting these guidelines organisations can create websites that offer accessibility for all.

South Australia and Victoria have the strictest guidelines of all Australian states in regards to disability discrimination legislation. South Australia commissioned websitecriteria (a private organisation focused around web accessibility) to write guidelines for website development, and later regulated that all South Australian Government websites must adhere to the guidelines stated by websitecriteria (2008) as well as the WCAGv2 (SAG, 2011). Websitecriteria is a detailed document that proposes guidelines for communication style and accessibility as opposed to just the technical syntactic requirement of a web language which is covered in the WCAGv2.

The Victorian Government took a similar approach, producing the "Victorian Government Accessibility Toolkit", a recommendation for all Victorian Government websites. The "Victorian Government Accessibility Toolkit" is mostly derived from the WCAGv2 with a significant number of criteria existing in both specifications (VGAT, 2011). There is very little in the Toolkit referring to language communication styles.

### 1.3 International legal view

In 1993 the United Nations released guidelines on the Equalisation of Opportunities of Persons with Disabilities. This document, although not strict law, outlines the need to meet a uniform standard in website development (ILI, 2011).

Most western countries have laws against the discrimination of people with disabilities. The United Kingdom has the Disability Discrimination Act of 1995 which was later extended with the Equality Act of 2010 (Office for Disability Issues, 2011). The United States has the Americans With Disabilities Act (1990) which rules out any discrimination based on a person's disability.

Although Canada does not have a Disability Discrimination Act per se, it operates under the Federal Accountability Act of 2006 (CWDA, 2011). The Federal Accountability Act does not directly address website accessibility; however, it was extended by government policy revolving around declaring website management roles. The policy separates professionals involved in the development of websites into categories such as developers, graphic designers and content managers. The policy then places legal responsibility for accessibility issues associated with each category. This system relies on a specific staffing structure which causes limitations for small organisations and larger organisations that use a different structure.

Across the European Union (EU) a mixture of disability discrimination laws are in place. The EU states that compliance with the WCAGv2 will be mandatory by 2010 (EIS, 2006). In each of the formerly mentioned countries the WCAGv2 is referenced as the common website accessibility standard. The United States has an additional standard entitled "Section 508", which makes reference not only to the technical requirements for accessibility but also to the language and communication issues surrounding accessibility. Section 508 will not be considered further here; the focus of this paper is on website compliance with the internationally recognised WCAGv2.

## 2 Background

In a time where users are pushing for ever more advanced website functionality, websites are becoming rapidly more complicated, and less accessible for those facing difficulties. Milliman (2002) conducted a survey of webmasters, including representatives from many different demographics including; large and small, business to business and business to consumer, not-for-profit and profit-seeking organisations. Over 98% of websites examined in the survey failed the Bobby test (CAST, 2011) for website accessibility and thus, did not comply with US Federal Regulation Section 508 nor the

W3C's WCAGv2 accessibility standard.

The results of the Milliman (2002) survey also indicated that 42% of the survey population did not consider persons with disabilities as part of their target audience. Further, only about 13% of the surveyed population claimed that they had insufficient funds to make their site compliant, theoretically leaving 87 % of surveyed organisations with the funding to create accessible websites but making the choice not to.

## 2.1 Barriers to web access

Little research surrounds the effect that disabilities can have in reference to web accessibility. Many and varied conditions can affect website accessibility including, but not limited to; cognitive impairment, motor skill impairment, sensory impairments such as hearing and vision impairment, processing disorders and learning disorders such as dyslexia.

Vassallo (2003) notes a number of common interface design flaws that can have an effect on access for individuals with disabilities including; small fonts, poor contrast backgrounds (either too low or too high), large blocks of text, cluttered pages, animated images or blinking/moving text, automated page or form redirects, excessive use of capitals or italics, fully justified text (resulting in uneven spacing between words); and wordy and confusing use of English.

Assistive technologies designed to boost web accessibility cater to the varied needs of different individuals and different disabilities. Commonly used assistive technologies include; high contrast monitors, low-resolution (high-magnification) monitors, digital Braille devices, screen readers, voice recognition / digital transcribing, low sensitivity input devices, joysticks, track balls and alternate keyboards (manipulated by head movements)

The technologies and development work behind these assistive technologies have a significant effect on how developers and designers create websites. Huang (2002) notes that rules such as using the "ALT" tag when displaying an image, or avoiding calling a button or link "click here", are considered best practice as for someone using a screen reader, "click here" does not portray context.

## 2.2 Methods of evaluating accessibility

Methods of evaluating website accessibility broadly fall into three categories; automatic validation / tools, manual evaluation against the WCAGv2 specification, and accessibility testing via a group of test users.

### 2.2.1 Automatic validation/tools

Automatic validation is by far the simplest and most cost-effective method for evaluating accessibility. Most online automatic validation tools systematically crawl through websites measuring compliance through examining the code structure of the website.

Although this is a very easily implemented and cost-effective strategy, sites that function as applications rather than the more traditional information websites rate poorly. Websites such as Facebook initially open with a login screen asking for a username and password - a common occurrence in restricted web applications. The crawler would not have links to bypass this page, therefore rendering the site non-compliant.

A solution to this may be to temporarily disable web security during the testing and development phases. Another may be to use a client-based validator which will follow a user's navigation path through the website; however, this process has limitations, as only pages visited by the user will be checked.

The use of automated checkers appears to be an effective method of detecting syntactic errors in coding. Killam and Holland (2001) note that in traditional information-based websites automatic checkers are less likely to miss accessibility issues. However, automated checkers do not detect or warn users about formatting, cascading style sheet, display or colour errors (Rowan et al, 2000). Automated checkers are also known to have difficulties in evaluating non-English websites (Cooper & Rejmer, 2001). None of the currently available tools check reading order, or how the website will be interpreted by a screen reader (Cooper & Rejmer, 2001).

### 2.2.2 Manual Evaluation against the WCAGv2

The method of manually checking a website against WCAGc2 criteria, although more cost-effective than user testing, requires more labour, in terms of training and implementation, than the use of automated validation. Familiarity with the WCAGv2 and consistency are vital for a person undertaking the role of evaluator as this approach runs the risk of potentially being very subjective. Manual evaluation is likely to identify a wider range of accessibility issues (Lang, 2003), however, it is less likely to highlight usability issues which may prevent users, with or without a disability, from completing their task (Killam & Holland, 2001). It has also been noted that manually checking large number of pages is not practical and can lead to the overlooking of pages or inconsistent criteria (Rowan et al, 2000).

### 2.2.3 User-Based Testing

User-based testing is generally regarded as the most accurate method of accessibility testing. Although authors debate the specific methodology involved in user testing, the general concept remains consistent: a test group of users systematically work through the website, testing usability and accessibility from their point of view.

As with all testing methods, user-based testing has its limitations, and users are likely to return accessibility issues specifically related to their particular needs. A group of test subjects with vision impairment are likely to focus their feedback around text size and colour contrast whereas a test group consisting of people who have dyslexia are more likely to focus on text content, writing styles and menu systems as possible issues (LaPlant et al, 2001).

Regardless of the nature of test groups, user-based testing is likely to be the most expensive of the three methods and also poses the added challenge of finding a large enough group of diverse, experienced testers to challenge the accessibility of the website. However, this method is an effective way to uncover usability issues that affect all users, both with and without a disability

(Killam & Holland, 2001).

## 2.3 Limitations of the WCAGv2

Colwell & Petrie (1999) investigated the accessibility of web pages developed under the WCAG guidelines. They compared the different web pages in relation to different browsers and screen readers using a test group of 15 users with vision impairment. The results showed that even though the web pages were WCAG-compliant, some major usability issues still persisted. Six out of the 15 users could not view the "ALT" text that was available (this appeared to be linked to the users' / test subjects' experience). Other results showed that some deviations away from the WCAG guidelines actually improved accessibility.

Colwell & Petrie (1999) remarked that companies following the WCAG guidelines could develop a false sense of security as simply passing the WCAG criteria does not necessarily make a website accessible. As most western countries reference the WCAGv2 as the recognised legal document for website accessibility, this is cause for concern. Rowan et al (2000) affirm that although guidelines provide a good starting point, common sense and user testing are the most effective way to carry out accessible development. Unreflective adherence to the WCAGv2 or any other guidelines, especially in the dynamic and creative field of website development, will lead to restricted and inferior products (Sloan et al. 2006).

# 3 Methodology

Assessment criteria were selected to test the compliance with DDA standards of the websites of the top 20 Australian companies and the 20 Australian Federal Government portfolios. Websites were examined manually in order to assess compliance with each of the criteria.

## 3.1 Selection of websites

The AHREOC (1999) states that, *"Equal access for people with a disability in this area is required by the DDA where it can reasonably be provided…"* By choosing the top 20 Australian companies, financial hardship as a defence for noncompliance can be eliminated.

Companies can be ranked in a variety of ways including; company wealth (assets), number of employees, turn over, net profit, physical land etc. The Australian Stock Exchange ranks the top 200 traded publically listed companies, however, this measurement has limited validity as it is a measure of stock trading and neglects other influencing factors of size or wealth. Therefore, for the purpose of this paper the top 20 Australian companies will be derived from the Thomson Financials world scope database. The Thomson list is derived from roughly 1,800 publicly traded Australian companies. Companies are ranked into four equally weighted lists of; biggest sales, profit, assets and market value. Companies receive points based on their rank within each category. If a company does not appear in any of the four lists, they will receive no points for that category. Rank positions are then summed to create the final top 20 companies list.

## 3.2 Assessment criteria

The WCAGv2 covers a wide range of requirements and recommendations for making website content more accessible. These guidelines cover coding, colours, size, accessibility, media, error correction and business logic. Following the WCAGv2 guidelines will ensure content is accessible to a wider range of users including those with disabilities. The guidelines specifically target vision impairment, hearing impairment, learning disabilities, cognitive limitations, physical disabilities, speech disabilities, photosensitivity and combinations of these conditions. WCAGv2 criteria have been written as non-technology-specific testable statements allowing for application across various mediums.

For the purpose of this paper, twelve criteria have been selected directly from the WCAGv2 based on experience and observations of web development industry practices. Although the chosen criteria are based on the WCAGv2, by no means are they a complete substitution for the WCAGv2. This means it is possible for a website to pass all twelve criteria used in this paper and still not meet the WCAGv2 standard. However, if a website fails any one of the chosen criteria, the website has failed to meet the WCAGv2 standard.

### 3.2.1 Criterion 1 – W3C validation service

Most web documents are written using a markup language such as HTML or XHTML. These markup languages are defined in the technical specifications covered in the International Standard ISO/IEC 15445-HyperText Markup Language and the International Standard ISO 8879-Standard Generalized Markup Language. These technical specifications include detailed rules regarding syntax or grammar in relation to specific elements within a document. These rules include which elements can be contained inside which elements as well as what types of data can be contained inside a specific element.

The W3C markup validation service (*http://validator.w3.org/)* is a free web application produced by the World Wide Web Consortium (W3C) which allows the user to enter the URL of a publicly accessible website and check whether the website meets the technical specification of the specific markup language. The W3C validator can process documents written in most markup languages including HTML 1.0 – 4.01, XHTML 1.0 and 1.1, MathML, SMIL, SVG 1.0 and 1.1. In addition to being a syntax error detector the W3C validator will check some (but not all) of the accessibility specifications specified by the WCAGv2.

A website will be deemed to have failed on Criterion 1 if the website is found to have any errors after being passed through the W3C validator.

### 3.2.2 Criterion 2 – Images without "ALT" tags

Section 1.4.5 of the WCAGv2 specifies that websites should not contain images of text, the exception being when the images can be visually customized to the user's requirements. This one section of the WCAGv2 alone results in non-compliance from nearly every website

(including W3C's own website).

For the purpose of this paper, a website will fail against Criterion 2 if it does not contain "ALT" or alternative text for every image containing text.

### 3.2.3 Criterion 3 – Minimum colour contrast

Section 1.4.3 of the WCAGv2 specifies that the text on a website should have a contrast ratio of at least 4.5:1 for AA standard and 7:1 for AAA standard. The only exception to this is logos and trademarks, in which no minimum colour contrast applies and large text (18pt and above) in which a lower contrast ratio of at least 3:1 is required.

Colour brightness formula:

*((Red value X 299) + (Green value X 587) + (Blue value X 114)) / 1000*

Colour difference formula:

*(max (Red 1, Red 2) - min (Red 1, Red 2)) + (max (Green 1, Green 2) - min (Green 1, Green 2)) + (max (Blue 1, Blue 2) - min (Blue 1, Blue 2))*

For a website to pass criterion 3, the text colour of all text on the home page and the "about us" page must reach at least AA standard by having a brightness difference greater than 125 and a colour difference greater than 500.

*Source:*
*http://snook.ca/technical/colour_contrast/colour.html*

### 3.2.4 Criterion 4 – Text size increase

Section 1.4.4 of the WCAGv2 specifies that, with the exception of captions and images of text, the user should be able to increase the size of the text by 200 percent without the loss of content or functionality. For the purpose of this test the definition of "loss of content or functionality" will be defined as: the text should be clear to read by not overflowing over another element, background image or other text.

A website will fail on Criterion 4 if, by increasing the text size by 200 percent, there is a loss of content or functionality or if the website has restricted the user from adjusting the text size by using specified font sizes in their style sheets.

### 3.2.5 Criterion 5 – Flash / PDFs as content

The document "Techniques for WCAGv2: Techniques and Failures for Web Content Accessibility Guidelines 2.0" specifies the accessibility best practices for Flash and PDF development. Included in the specification is the requirement that any Flash and PDF text content needs to be accessible for assistive technologies, including but not limited to: Job Access With Speech (JAWS) (4.5 and newer), Window-Eyes (4.2 and newer), Non Visual Desktop Access (NVDA), ZoomText (8 and newer).

For the purpose of this paper, a website will fail against criterion 5 if JAWS 4.5 cannot read any text contained in Flash or PDF documents. In the event that the website does not contain any Flash or PDF documents then the website will be considered to have passed Criterion 5.

### 3.2.6 Criterion 6 – Breadcrumbs

Breadcrumbs are a series of hyperlinks showing the user's position and history within the website. Section 2.4.5 of the WCAGv2 specifies that there must be more than one way to locate a page within a website, with the exception of pages which are the result of a process. Section 2.4.8 of the WCAGv2 states that the user should be able to easily identify where he/ she is in the website.

For the purpose of this paper a website will be regarded as failing on criterion 6 if it does not display a breadcrumb trail for pages deeper than two levels in the navigation tree.

### 3.2.7 Criterion 7 – Time dependent menus

Principle 2 of the WCAGv2 states that the website's user interface components and navigation must be operable. Specifically, this paper is assessing the functionality of dynamic menus. Many dynamic menus are built using a timer. Hence, if the user is a slow reader or is unable to move the mouse quickly, timed menus can make a website unusable. To test this criterion, dynamic menus will be navigated by moving the mouse pointer at a slow, uniform speed over the menu. To pass this criterion, a website's dynamic menus must be operable at slow speed. The website will automatically pass against criterion 8 in the event that the website does not have any dynamic menus.

### 3.2.8 Criterion 8 – URL error detection

Missing pages or 404 errors can be caused by users typing in a webpage URL incorrectly or on occasion poor web content or link management. Section 3.3.3 of the WCAGv2 states that any user input error should be met with a correct usage suggestion. In the situation where a user misspells the "Contact Us" URL, the website should redirect the user to a "Page not found" page which will, in turn, suggest where the user will find the "Contact Us" page. This criterion will be tested through manual attempts to access the "Contact Us" and "About Us" pages by misspelling the page URL by one character.

To pass against criterion 8 a website will need to either catch the error and provide a URL suggestion, or include a site map in a "Page not found" page. If the website does not catch the 404 error or provide a "page not found" page it will fail against criterion 8.

### 3.2.9 Criterion 9 – Page titles

Section 2.4.2 of the WCAGv2 states that all pages must have meaningful page titles that describe the topic or purpose of the page. This criterion will be tested by navigating through the website and observing wether the page title changes from page to page. A website will fail on criterion 9 if the page titles do not change or if the developer has not specified a page title.

### 3.2.10 Criterion 10 – Use of PDF / Flash forms

PDF and Flash solutions for data entry forms create useability issues for people with text readers or users who require magnification. A website will fail on criterion 10 if the forms used in the "Search" or "Contact Us" functionality are found to be built using flash or PDF technology.

A website will pass on this criterion if there are no forms present on the website or if the forms have been built using traditional HTML.

### 3.2.11 Criterion 11 - Form sample answers

Section 3.3.5 of the WCAGv2 states that user input forms must contain sample answers, assuming the sample answers do not jeopardize the security or validity of the input / form. To pass against criterion 11, websites will need to have sample answers in the "Contact Us" forms and search forms. In the event that neither form is present the website automatically passes criterion 11.

### 3.2.12 Criterion 12 - Form validation and bypass

Section 3.3.6 of the WCAGv2 states that all forms must provide error identification / validation. This type of validation is designed to, for example, stop a user from accidentally inputting a letter in a telephone number field, or to warn a user that he/she has entered an incorrect piece of data or omitted data. The WCAGv2 also states in section 2.4.1 that the user should be able to bypass any blocks. An example of a failure to provide a bypass is a website that features a compulsory home telephone number field.

This criterion will be tested in the context of a form on the website. Data that does not correspond to the prescribed fields will be entered and the website will be expected to provide an error message. If the website displays an error message, a bypass route will be sought.

A website will pass against criterion 12 if the form has validation and a bypass mechanism, or if the website does not contain a form. For the purposes of this paper, the authors will recognise the organisation's contact details as a bypass mechanism.

## 4 Results

The results are displayed in the tables below and right. Both tables show criteria one through twelve along the top and indicate a pass or a fail of each criteria with a 'tick' or a 'cross' respectively.

Table 1 shows the largest 20 private Australian companies as derived from the Thomson Financials world scope database represented as A – T.

Table 2 shows the 20 organisations which make up the Australian federal portfolio represented as A – T.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | × | × | × | × | ✓ | ✓ | ✓ | × | ✓ | ✓ | × | × |
| B | × | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × | × |
| C | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × | × |
| D | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × | × | × |
| E | × | × | ✓ | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | × | × |
| F | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × |
| G | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × | × |
| H | × | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × | × |
| I | × | ✓ | ✓ | ✓ | × | ✓ | × | ✓ | ✓ | ✓ | × | ✓ |
| J | × | × | × | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | × | × |
| K | × | × | × | × | ✓ | ✓ | ✓ | × | × | ✓ | × | × |
| L | × | × | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × | × |
| M | × | ✓ | ✓ | ✓ | ✓ | ✓ | × | ✓ | ✓ | ✓ | × | × |
| N | × | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × | × |
| O | × | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × | × |
| P | × | × | ✓ | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | × | × |
| Q | × | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × | × |
| R | × | × | × | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | × | × |
| S | × | × | × | × | ✓ | ✓ | × | ✓ | ✓ | ✓ | × | × |
| T | × | × | × | × | ✓ | ✓ | × | ✓ | ✓ | ✓ | × | × |

**Table 1: 20 largest Australian private companies**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | × | ✓ | ✓ | ✓ | ✓ | × | ✓ | × | ✓ | ✓ | ✓ | ✓ |
| B | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| C | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | × | ✓ | ✓ | ✓ | ✓ |
| D | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| E | × | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| F | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | × | ✓ | ✓ | ✓ | ✓ |
| G | × | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| H | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| I | × | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| J | ✓ | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| K | × | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| L | × | × | × | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| M | × | × | × | ✓ | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| N | × | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| O | × | ✓ | × | × | ✓ | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ |
| P | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Q | × | × | × | × | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| R | ✓ | × | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | × | ✓ |
| S | × | × | ✓ | ✓ | ✓ | × | ✓ | × | ✓ | ✓ | ✓ | ✓ |
| T | × | × | ✓ | × | ✓ | ✓ | ✓ | × | × | ✓ | ✓ | ✓ |

**Table 2: Australian federal government portfolio**

## 5 Discussion

When reviewing the results it is important to remember that the criteria are not comparable, and that individuals with different needs will place different importance on certain criteria. A user who relies on a screen reader will regard criterion one (W3C checker) as of higher importance than colour contrast (criterion 3), however this may not be the same for another user.

The Australian government is in the process of enforcing the WCAGv2, and this is evident with three government portfolios achieving a pass in criterion one. A number of websites, both government and private industry, failed on criterion one with only one or two errors. It is possible that when these websites were developed they did meet criterion one (W3C checker) but through normal content editing and content changing, minor mistakes were made, resulting in the website failing to meet criterion one. Content Management Systems (CMS) have been largely blamed for this; however, it would be unfair to say that this is the CMS's fault as by and large they are designed to the WCAGv2 specification. A more likely reason for the error is that a content editor has made a process mistake. An example of this would be adding an image without including the 'ALT' text: this caused at least two websites to fail criterion one.

This is an issue which can be easily addressed with adequate staff training. Although the authors take issue with the specific level of government dictation and specification, the Canadian system of specifying website management roles (developer, content manager, designer) and assigning legal responsibility has merit. Companies and government departments would benefit from assigning specific individuals the responsibility of maintaining sections of website accessibility.

Criteria 10, 11 and 12 are based around accessibility of web forms. There is no legal requirement for a corporate or a government website to include a "contact us" form and it was noted that the government portfolio websites were less likely to include them. This is a limitation of the methodology used in this paper in that the criteria used rewards websites with less functionality. Because of this it is in an organisation's interest to limit the use of technically "clever" designs as this increases the likelihood of creating accessibility issues. Taking the example in criteria 11 and 12 surrounding the provision of sample answers to form questions, by providing the example of 'Joe Bloggs' it could be argued that the user may be inclined to copy the example rather than entering in their own data, thus raising questions around the validity of the form. The WCAGv2 also instructs that a "bypass" capability should be available for required fields. If taken literally this means that if when asked to confirm a password by typing it a second time it is typed incorrectly, users should be able to bypass the password confirm step. This is an example where following the accessibility guidelines too closely will result in an inaccessible website.

The results show that there is a general trend for federal government websites to be more accessible than websites in private enterprise. Partly this can be explained by federal government's unwillingness to use "contact us" forms and technically challenging designs. Website accessibility is a complicated problem and is specific to individual users, therefore, as website content keeps changing it will be near impossible to make a completely accessible website. That being said, it is the authors' belief that there is no excuse for making a website which is syntactically flawed, and that passing the W3C automated checker should become an industry standard.

## 6 References


ABS (1997): Australian Bureau of statistics (ABS) http://www.abs.gov.au/ausstats/abs@.nsf/mediareleasesbytitle/F8B88F8E13D8FC64CA2568A900136245?OpenDocumeent Accessed 2 Aug 2011

AHROCC: Australian Human Rights Commission (2010). World Wide Web Access: Disability Discrimination Act Advisory Notes http://www.hreoc.gov.au/disability_rights/standards/www_3/www_3.html Accessed 4 Aug 2011.

AwD: Americans with Disabilities act 1990 http://www.ada.gov/pubs/adastatute08.htm Accessed 6 Aug 2011.

CAST: Centre for Applied Special Technology – Bobby http://www.cast.org/learningtools/Bobby/index.html Accessed 8th Aug 2011.

Colwell, C. & Petrie, H. (1999). Evaluation of Guidelines for Designing Accessible Web Content. Position paper *INTERACT'99 Workshop: Making Designers Aware of Existing Guidelines for Accessibility*.

Cooper, M. & Rejmer, P. (2001): Case study: localization of an accessibility evaluation [Electronic version. *ACM CHI2001 Conference on Human Factors in Computer Systems*.

CWDA: Canadians With Disabilities Act http://www.canadianswithdisabilitiesact.com/ Accessed 6 Aug 2011.

EIS: Europe's Information Society (EIS) - Riga Ministerial Conference (2006). http://ec.europa.eu/information_society/activities/einclusion/events/riga_2006/index_en.htm Accessed 11 Aug 2011.

FCA: Federal Court of Australia (2000). Maguire v Sydney Organising Committee for the Olympic Games http://www.austlii.edu.au/au/cases/cth/federal_ct/2000/1112.html Accessed 7 Aug 2011.

Huang, C. J. (2002): Usability of E-Government Web-Sites for People with Disabilities. *36th Hawaii International Conference on System Sciences. Shih-Hsin University.*

ILI: Independent Living Institute - No more exclusion international day of persons with disabilities http://www.independentliving.org/docs6/idf-world-dev.html Accessed 8 Aug 2011.

Killam, B. & Holland, B. (2001): Position Paper on the Suitability to Task of Automated Utilities for Testing Web Accessibility Compliance. *The Usability SIG Newsletter: Usability Interface Accessibility and Usability: Partners in Effective Design. April 2003.*

LaPlant, W.P., Laskowski, S.J. & Stimson, M.J. (2001): Report on UPA Workshop 6 Exploring Measurement and Evaluation Methods for Accessibility. *Workshop at Tenth Tania Lang Peak Usability © 14 Annual Usability Professionals' Association Conference.*

Loiacono, E. and McCoy, S (2004). Web site accessibility: an online sector analysis. Information Technology & People, *Vol. 17 No. 1, pp. 87-101. Emerald Group Publishing Limited*.

ODI: Office for Disability Issues HM Government - Equality Act 2010 and the Disability Discrimination Act 1995 http://odi.dwp.gov.uk/disabled-people-and-legislation/equality-act-2010-and-dda-1995.php Accessed 4 Aug 2011.

RNIB: Royal National Institute for the Blind

http://www.rnib.org.uk/ Accessed 2 Aug 2011.

Rowan, M., Gregor, P., Sloan, D. & Booth, P. (2000). Evaluating web resources for disability access *The Fourth International ACM Conference on Assistive Technologies (ASSETS 2000). Virginia: ACM.*

SAG: South Australian Government - Application and internet (2011) http://www.sa.gov.au/government/entity/1670/About+us+-+Office+of+the+Chief+Information+Officer/What+we+do/Policies,+standards+and+guidelines/Applications+and+internet Accessed 6 Aug 2011.

Sloan David, Heath Andy, Hamilton Fraser, Kelly Brain, Pertrie Helen, Phipps Lawrie (2006). Contextual Web Accessibility – Maximizing the benefit of Accessibility Guidelines

Spindle, T. (2002). Accessibility of Web Pages for Mid-Sized College and University Libraries. *Librarian Publications University Libraries, Rodger Williams University.*

Tania Lang, (2003). Comparing website accessibility evaluation methods and learnings from usability evaluation methods.

Tanner, Lindsay (2010). Government Releases Website Accessibility National Transition Strategy

http://www.financeminister.gov.au/archive/media/2010/mr_372010_joint.html/mr_052010_joint.html Accessed 2 Aug 2011.

Thomson Reuters (2011). Worldscope fundamentals

http://thomsonreuters.com/products_services/financial/financial_products/a-z/worldscope_fundamentals/ Accessed 3 Aug 2011.

VGAT: Victorian Government Accessibility Toolkit, (2011). *eServices Unit, Information Victoria, Department of Business and Innovation. Ver 3.1.1*

WCAGv2: W3C. Web Content Accessibility Guidelines (WCAG) 2.0 http://www.w3.org/TR/WCAG20/ Accessed 2 Aug 2011