

# Accessible Online Services

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[January 6, 2000]

## **Introduction**

*"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."*

*Tim Berners-Lee, creator of the graphical interface World Wide Web.*

Accessible web design is based upon principles developed by the World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI).<sup>1</sup>

Hypertext Markup Language (HTML) is the code that sits behind the visible web page. Tim Berners-Lee and others who worked on HTML intended it as a universal interface language so that content could be used by people, sighted and blind, or those who need to use adaptive hardware and software to manipulate their browser to read a web page.

As a consequence, disabled users, particularly those with sight-impairments, are dependent upon the proper use of standardised HTML code so that their adaptive tools work.<sup>2</sup>

For people with muscular disabilities, mouseless navigation via a keyboard or switching device is frequently a necessity, and this is enhanced by the correct construction of navigation bars and links in websites.

The need for accessible design is not just restricted to disabled people. In the near future, sighted users of hand-held devices will find also text-only versions of web sites useful for viewing over a small screen. Others will want access while they drive and listen to the web in the car, and others will use their phones to listen to web-based information. They will probably also want to navigate a site through logical selection commands on a keypad.

All these features can be part of regular web design if we build web sites the right way, from the very start, but these needs are also a tremendous challenge to the way that most web sites are currently built.

## **Accessibility - A Challenge for Government ,Community, and Commercial Websites**

There are critical issues we can call ‘information justice’ at play in development of an accessible web. As many government and commercial organisations put information sources on line in preference to any other source of communication, it is imperative that this information be available for all, irrespective of disability. If we do not have a concern for information justice, there will be not only a gap between the information rich and information poor based on access to the internet, but one based on physical or other disability<sup>3</sup>.

Bill Mitchell, who was born near Ballarat, but who now teaches at the Massachusetts Institute of Technology, wrote in *City of Bits*,

"It is pleasant to imagine a nation of networked Aspens and cyberspaced Santa Monicas peopled by convivial bicycle-riding locals, but the obvious danger is that such restructuring will instead produce electronic Jakartas - well-connected, well-served, fortified enclaves of privilege surrounded by miserable hyperghettoes, where investments in information infrastructure and appliances are not made, electronically delivered services do not reach, and few economic opportunities are to be found.

...Surely the most fundamental challenge in building the biosphere will be to deploy access according to principles of social equity - not in ways that heighten the privilege of the have and further marginalise the have-nots." <sup>4</sup>

From a health perspective, Nancy Milio has written about the implications of information equity in the context of health and poverty in her country and the UK. She notes that “the basis for health lies in communities where essential resources are available and where the sense of social cohesion – the other face of “community” – can bring about sufficient distribution of these resources to support health.” <sup>5</sup> Information is part the bond that make for social cohesion – and people with disabilities should not be excluded from it because of poor web design.

Community organisations engaged in web development, government content managers, and commercial online services should be able to incorporate accessibility standards into their online publishing plans by following accessibility guidelines. In particular, community organisations committed to the principle of inclusion as an aspect of online networking should seek to make their web services available for all. <sup>6</sup>

Good design for accessibility or ‘interoperability’<sup>7</sup> also has trade offs for most other users: it leads to sights that are quick to load, unencumbered by a too-generous use of graphics and plugins, as well as more effective navigation and logic in site constructions.

Concerns about accessible and universal web design have also been raised by some remote and rural users.<sup>8</sup> If we consider bandwidth to be a scare resource – and compared to the US, it is expensive in Australia - we can apply an ecological metaphor and argue that accessible or universal web design is eco-friendly. We know from experience that we never have enough bandwidth, and an efficient use of HTML

design reduces online waste of bandwidth. Narrow-band networks – those which use plain old copper wire – are quite adequate for most every-day needs, but policy makers appear to have abandoned any consideration that the old narrow-band networks might in fact be suitable (and cheaper) for a long time to come.

Furthermore, for the many internet users reliant upon older computers and operating systems, web content that is quick to load and use is a boon.

### ***Why the problem?***

There are a number of reasons for the ad hoc use of markup languages: the promotion of free proprietary editing software (eg as part of the free Navigator or Internet Explorer software, or as purchasable products) which offer no guidance or correction about the way to build a web page. Furthermore, many organizations feel the imperative to get online as quickly as possible, without developing their internet skills. Many of us have learned how to write a web page the hard way: as an add-on to our existing jobs responsibilities.

Since HTML as a basis for the web works well most of the time and is generally forgiving of minor tag errors, if it looks good it is assumed that it works for all. In fact, if HTML was as exacting as other related languages (eg Perl), very few of us would be web authors.

As a consequence, what we now largely see (but not hear) online is a computer language held together by the generosity of its code; not a language held together by good syntax, but rather, a jumble of syntactic elements, pushed together, and working, most of the time. For some users, however, it doesn't work at all. All they get are segments of the code that make up the language.

For blind people in particular, the visual orientation of most websites is a disaster. When the internet existed as a text-only medium (for most people, prior to 1995), text-to-speech software operated in a straight-forward fashion, but the current ad hoc state of HTML means that such software cannot interpret content that is determined by visual means. Furthermore, the abuse of other elements (such as tables and frames) makes text-only navigation difficult. Only the most expensive speech software corrects this mess, and then, considerable expertise is still required on the part of the user to make aural sense of the whole. Other sight impaired users attach universal style sheets to their browsers which reformat the page to their needs. For example, some users reformat pages with extra large fonts and yellow text on a blue background, and all images removed to simplify interaction. If images are used for making sense on the page (eg as links), their absence means that the page's utility is reduced

The problem of access is not just one of sight. For someone with arthritis or other physical restrictions better options for navigating a web site are also important. Using a mouse may be impossible. For example, a person may not be able to move a mouse around an image map to find the hot spots for links. With a text navigation bar alternative at the top of the page to tab through in sequence, or alternate macros that can be written into HTML code, the situation can be entirely different. But more often than not, the web designer has not provided such an option because of a visual

orientation in presenting content. She assumes that both sight and hand can be used as tools by all to access content on a web page, when this is not the case for some people.

Fortunately, some sense is starting to emerge from the chaos.

- The giant, Microsoft, has recognised the need for accessible design – see [www.microsoft/enable/](http://www.microsoft/enable/) for its own excellent work in this area, which also includes, as far as possible, the incorporation of accessibility options into its own products. The Microsoft Seniors site, [www.microsoft/seniors/](http://www.microsoft/seniors/), also demonstrates how close are the needs for many older users are those to what outsiders might consider as ‘traditionally’ disabled. Adobe Software also have a web site devoted to accessibility issues for Adobe products, particularly documents in pdf format which cannot be accessed, in the first instance, by screen readers. See Adobe Acrobat options at <http://access.adobe.com>.
- There are a large number of websites that supplement the World Wide Web Consortium’s own resources on web accessibility. These include the Trace Research Centre in Wisconsin ([www.trace.edu.au](http://www.trace.edu.au)), and Usable Web (<http://.usableweb.org>), which provides hundreds of links to different sites and materials.
- Locally, the Australian Human Rights and Equal Opportunity Commission (HREOC) is currently conducting an Equal Opportunity Commission. It “has been given a reference by the Attorney General to investigate the implications for older Australians and Australians with a disability of new technologies in electronic commerce and the provision of government and other services, and outline their specific needs in accessing services which utilise these technologies.”<sup>9</sup>

This writer, with colleagues, has made a number of detailed submissions to the HREOC inquiry<sup>10</sup>. Recommendations, binding will be delivered in the first quarter of 2000. I believe that much of what will be recommended will resemble what is now being implemented in the US.<sup>11</sup>

HREOC’s recommendations should have a major impact upon future industry development, and it is sure not be without controversy for several reasons. Even if HREOC adopts WAI’s minimal set of standards for compliance, these will prove to be a challenge for many designers as a new design philosophy will need to be adopted.

### ***How to become compliant***

All internet highways, lead not to Rome, but to MIT on Massachusetts Avenue, and particularly, the World Wide Web Consortium’s Accessibility Initiative ([www.w3.org/wai](http://www.w3.org/wai)). International collaboration with organisations such as the Trace Centre at the University of Wisconsin ([www.trace.wisc.edu](http://www.trace.wisc.edu)) has led to the development of very detailed standards and guidelines for the correct implementation of HTML and related codes.

At a minimum level, compliance to accessibility includes the following factors in web design:

1. Images & animations. Use the alt attribute to describe the function of each visual.
2. Image maps. Use client-side MAP and text for hotspots.
3. Multimedia. Provide captioning and transcripts of audio, and descriptions of video.
4. Hypertext links. Use text that makes sense when read out of context. For example, avoid "click here."
5. Page organization. Use headings, lists, and consistent structure. Use CSS [Cascading Style Sheets] for layout and style where possible.
6. Graphs & charts. Summarize or use the longdesc attribute.
7. Scripts, applets, & plug-ins. Provide alternative content in case active features are inaccessible or unsupported.
8. Frames. Use NOFRAMES and meaningful titles.
9. Tables. Make line by line reading sensible. Summarize.
10. Check your work. Validate. Use tools, checklist, and guidelines at [www.w3.org/TR/WAI-WEBCONTENT](http://www.w3.org/TR/WAI-WEBCONTENT).

[Source: <http://www.w3.org/WAI/References/QuickTips/>]. The WAI site includes links which go into considerable technical detail, including examples that can be used for a training curriculum at <http://www.starlingweb.com/wai/wcag/> ]

The ten points above are just a quick guide and to achieve recognized levels of compliance, reference must be made to the WAI website for more thorough implementation.

### ***Responses to the Challenge***

How might people involved in design and content development respond to the accessibility challenge?

The web industry, as we know from the debate over censorship, is renowned as an area where free expression reigns, and I am sure that many designers (or their managers) will be reluctant to change what on the surface, may look fine, for the needs of a minority.

For those committed to accessibility, it means going back to the drawing board and learning standardized HTML code. HTML code that complies with Web Accessibility Initiative standards does not mean a graphics-free web. In fact, use of

HTML combined with style sheets is leading to impressive results, and examples can be found at [www.css.nu](http://www.css.nu).

Furthermore, achieving a reasonable level of compliance means that organisations need to invest the resources required to bring their sites up to standard. Large and complex sites may need considerable re-engineering, and this may be in competition with an organisation's other priorities.

Taking the lead from Jakob Nielsen, one of the foremost usability experts, I argue that a phased implementation approach needs to be undertaken. Nielsen has said:

"The official standard tells you what ought to be done. In practice, it is necessary to prioritize standard-compliance on large sites and plan a staged roll-out of accessibility.

The home page and high-traffic pages should be redesigned to follow the high-priority accessibility rules immediately. The same is true for any pages on the critical path to successful completion of e-commerce purchases or other important transactions.

All new pages should follow the high-priority and medium-priority rules, and checking for compliance should be made part of the organization's verification procedures for new content.

Medium-traffic pages should be gradually redesigned to follow the high-priority accessibility rules. As a longer-term goal, redesign high-traffic pages to follow all three levels of accessibility rules and recommend that new pages also follow the lower-priority rules as much as possible.

Low-traffic old pages may be left alone unless they concern matters of particular interest to users with disabilities.

Some accessibility advocates will deplore this staged approach and demand that all pages be made to comply with all the rules immediately.

Unfortunately, this is simply not possible for most sites and managers will ignore accessibility unless they are presented with a plan that works and places the most important improvements first. "

[ Jakob Nielsen's Alertbox, June 13, 1999: Disabled Accessibility: The Pragmatic Approach <http://www.useit.com/alertbox/990613.html>]

We therefore have two basic options, whatever the model for implementation:

- a 'one stop fits all model', which means meeting the many requirements of the WAI, particularly for higher levels of conformance. Technically, this will require a high level of skill to meet the challenge. It may also take considerable time to achieve.
- text-only alternate versions of websites, with no changes to existing inaccessible sites except for egregious errors such as unlabelled images,

particularly those used for navigation purposes. Such sites are accessed by 'text-only' links on existing pages.

The development of 'text-only' versions of 'full' sites will not meet with acceptance by some advocates, who argue that such sites will not be properly maintained in the long term. However, text-only versions of web sites may be the only option for large data-driven websites. Fortunately, with a database, a general style for the entire site can be set up as a template, and content which is generated has a consistent look, set by the template without additional coding required.

Furthermore, the BBC is now working with a Perl script that can be used to present text-alternate versions of 'full' web sites, whether they are hard code or data-base driven HTML. The code can be adapted as needs arise, and if properly customised, will meet the needs of many people with disabilities. Details about how the BBC's Betsie works can be found at [www.bbc.co.uk/education/betsie/initiative](http://www.bbc.co.uk/education/betsie/initiative).

### ***Adaptive Technology***

A web interface is just a page of code. How that code is interpreted is dependent upon the choice of equipment at the user end. For most people, standard browsers such as Internet Explorer or Netscape Navigator are adequate for their internet needs.

For the vision impaired or otherwise-disabled person, there are a range of adaptive devices that supplement the major browsers. Some devices are that are sometimes incorporated into the product (eg Microsoft's accessibility options for Internet Explorer and other software). Other products, such as JAWS, provide synthetic speech to complement, with some changes, what appears on the screen.

There are also products which offer a much fuller range of keyboard or touchscreen options for the mobility-impaired, including the Opera browser or the Enhancing Internet Access browser. Many of us are familiar with trackballs, but there are also special keyboards such as Intellikeys which can be adapted for internet use.

Some of these products have been carefully tested with disabled users as part of a project being conducted by Vicnet in conjunction with Information Needs and Telecommunications Research, School of Information Management, Monash University, funded by the National Office for the Information Economy.

The research project has set out to find out what actually works for people with a range of disabilities, using public libraries as the point of public access. The project has worked with over 50 individuals with disabilities to evaluate equipment. Project findings have implications for any organisation interested in the installation of online access equipment for people with disabilities and particularly, the testing of websites for accessibility.

Detailed project reports can be found at the ITNR website, [www.vicnet.net.au/~itnr](http://www.vicnet.net.au/~itnr) under the publications link.

## Conclusions

Web designers and content managers need to take accessible design seriously if they have a commitment to providing information for all people. Accessible design standards necessitate a change a change in current web culture, which unfortunately often locks out users with different disabilities. Web developers, whether in community, government, or commercial organisations need to learn how to write accessible web pages by using the many tools that are out there. It also means that organisations will need to invest resources in getting these skills.

If we don't take these issues seriously, and approach them carefully, many people for whom the internet is their lifeline to information and independence will be locked out of the new pathways offered by the internet.

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<sup>1</sup> See [www.w3.org/WAI](http://www.w3.org/WAI).

<sup>2</sup> PowerPoint presentations at the Communities Networking Conference can be accessed via the conference website at [www.communityconference.vicnet.net.au](http://www.communityconference.vicnet.net.au) under the papers and presentations link., L. Stillman, Principles of Accessible Web Design and A. Bow, L Stillman, and K Williamson, Online Services for People with Disabilities in Australian Public Libraries

<sup>3</sup> "Definitions of disability are complex and also have been a matter of contention (Bowles 1995, 15). The Australian Bureau of Statistics (ABS) uses the World Health Organisation's earlier definitions of disability and handicap:

*Disability:*

One or more of a group of selected limitations, restrictions or impairments which has lasted, or is likely to last, for 6 months or more.

*Handicap:*

Results from a disability and limits a person's ability to perform certain tasks associated with daily living.

The limitation must be in relation to one or more of the tasks of: self-care, mobility, verbal communication, schooling or employment (Newell 1994, p.1).ABS's most recent *Survey of Disability, Ageing and Carers* (1998) estimated that 19.3% of the Australian population (or 3,610,300) persons had a disability with 87% or 3.2 million of these having a handicap. In 1996, the Royal Blind Society estimated that 300,000 persons in Australia have at least some difficulty reading ordinary print, even when wearing glasses and contact lenses.

The World Health Organisation (1999) has now revised their definitions in major ways. They are now more oriented to a social, rather than a medical model. The term 'activity' replaces 'disability' and 'participation' is used instead of 'handicap'. Key concepts are 'disablement' and 'functioning'. Disablements are:

- losses or abnormalities of bodily function and structure (impairments),
- limitations of activities (disabilities),
- restrictions in participation (formally called handicaps)."

Cited from Kirsty Williamson, Larry Stillman, Amanda Bow, and Don Schauder, Online Services for People with Disabilities in Australian Public Libraries [accessed via [www.vicnet.net.au/~itnrrn/](http://www.vicnet.net.au/~itnrrn/) under the Publications link]

<sup>4</sup> Cited from [http://mitpress.mit.edu/e-books/City\\_of\\_Bits/](http://mitpress.mit.edu/e-books/City_of_Bits/) [accessed 7 January 2000]

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<sup>5</sup> Milio, N. (1996). Engines of Empowerment: Using Information Technology to Create Healthy Communities and Challenge Public Policy. Chicago, Ill, Health Administration Press.

<sup>6</sup> Beamish, A. (1995). Communities On-line: Community-based computer networks. Department of Urban Studies and Planning. Cambridge, Mass. Anne Beamish's study from the mid-1990's is still very relevant, as she identified inclusion as one of the key principles of community networking.

<sup>7</sup> Another term used to refer to the capacity of anyone with any system to use the web is 'interoperability', and there are websites such as Anybrowser ( [www.anybrowser.com](http://www.anybrowser.com) ), devoted to the promotion of this principle.

<sup>8</sup> Mr Jim Groves, at <http://www.kewl.com.au/~grovesc/>

<sup>9</sup> Cited from [http://www.hreoc.gov.au/disability\\_rights/current\\_inquiries/ecom/ecom.html](http://www.hreoc.gov.au/disability_rights/current_inquiries/ecom/ecom.html). (Accessed December 29, 1999).

<sup>10</sup> See the HREOC reference and submissions at [http://www.hreoc.gov.au/disability\\_rights/current\\_inquiries/ecom/ecom.html](http://www.hreoc.gov.au/disability_rights/current_inquiries/ecom/ecom.html).

<sup>11</sup> See the Electronic and Information Technology Access Advisory Committee Report [<http://www.access-board.gov/pubs/eitaacrpt.htm>]. "The changes to Section 508 of the 1998 amendments to the Rehabilitation Act were designed to strengthen current law to ensure that people with disabilities will have equity in the use of electronic and information technology (E&IT)." [Accessed 4 January, 2000]