

Please cite the Published Version

Craven, Jenny (2006) Beyond the guidelines: assessment of the usability and accessibility of distributed services from the users' perspective. In: Libraries Without Walls 6, 16-20 September 2005, Lesvos, Greece.

DOI: <https://doi.org/10.29085/9781856048026.004>

Publisher: Facet Publishing

Version: Published Version

Downloaded from: <https://e-space.mmu.ac.uk/8259/>

Additional Information: This paper was delivered at the Libraries Without Walls 6 Conference, 16-20 September 2005, Delphinia Hotel, Molyvos, Aegean Island of Lesvos, Greece. This material has been published in revised form in Libraries Without Walls 6 edited by Peter Brophy, Jenny Craven, and Margaret Markland, <https://doi.org/10.29085/9781856048026.004>. This version is free to view and download for private research and study only. Not for re-distribution or re-use. © the author.

Enquiries:

If you have questions about this document, contact openresearch@mmu.ac.uk. Please include the URL of the record in e-space. If you believe that your, or a third party's rights have been compromised through this document please see our Take Down policy (available from <https://www.mmu.ac.uk/library/using-the-library/policies-and-guidelines>)

4

Beyond the guidelines: assessment of the usability and accessibility of distributed services from the users' perspective

Jenny Craven

The concept of 'universal design' is not a new one. Organizations and individuals have become much more aware that the provision of accessible electronic information makes not only good ethical sense but also good economic sense. The issue has been driven further forward as a result of current and emerging disability legislation (for example the Disability Discrimination Act in the UK), which requires organizations and service providers to ensure equal access for all (or at least to take reasonable steps towards this).

Advice on assessing of the usability and accessibility of services is widely available. In the field of web accessibility, probably the best-known organization is the World Wide Web Consortium (W3C), whose Web Accessibility Initiative (WAI) provides a comprehensive set of guidelines and checkpoints to help ensure that websites embrace the concept of 'design for all'. These are available in a number of categories, covering guidelines for the accessibility of Authoring Tools (ATAG), User Agents (UAAG), and probably the most well-known: the Web Content Accessibility Guidelines, or WCAG. It should be noted that at the time of writing version 1.0 of the WCAG was still in use, and therefore has informed the findings reported here.

The WCAG Checkpoints are divided into a number of priority and conformance levels to help people assess the accessibility of their websites:

- Priority 1: A web content developer must satisfy this checkpoint. Otherwise, one or more groups will find it impossible to access information in the document. Satisfying this checkpoint is a basic requirement for some groups to be able to use web documents.

- Priority 2: A web content developer should satisfy this checkpoint. Otherwise, one or more groups will find it difficult to access information in the document. Satisfying this checkpoint will remove significant barriers to accessing web documents.
- Priority 3: A web content developer may address this checkpoint. Otherwise, one or more groups will find it somewhat difficult to access information in the document. Satisfying this checkpoint will improve access to web documents. (www.w3.org/TR/WCAG10/)

Priority levels are further defined by a level of conformance:

- ‘A’: all Priority 1 checkpoints are satisfied
- ‘A-A’: all Priority 1 and 2 checkpoints are satisfied
- ‘A-A-A’: all Priority 1, 2, and 3 checkpoints are satisfied. (www.w3.org/TR/WCAG10/)

Many organizations and institutions are adopting the WCAG and related documents as a benchmark for assessing the accessibility of their online services. In the UK, for example, the Cabinet Office e-Government Unit’s *Guidelines for Government Websites* state that all UK government websites should, as a minimum, adhere to Priority 1 and 2 levels of the WCAG (version 1.0) (i.e. A-A compliant).

Accessibility can be assessed by a number of methods, such as those suggested by W3C on their Evaluating websites for accessibility page (www.w3.org/WAI/eval/). Having established the scope of the evaluation, these could include:

- Semi-automatic and automatic testing (using validation tools and accessibility evaluation tools)
- Manual evaluation using relevant checkpoints from the WCAG
- Usability testing of features (include people with different disabilities, technical expertise, users of assistive technology, etc).

Automatic accessibility evaluation tools are a popular way of assessing the accessibility of websites because it can be done quickly and often free of charge (Cynthia Says and WAVE are free online checking services). But this is only part of the process: the results can often be misinterpreted, and will not provide the whole picture in terms of accessibility. This was demonstrated in a formal investigation undertaken in 2004 by the Centre for HCI Design for the UK Disability Rights Commission, which evaluated the accessibility of websites for people with disabilities. One of the findings, identified by a panel of disabled users, was that the majority of problems experienced could not be checked using an automated checking tool, and therefore ‘automated tests alone do not predict the experience

of disabled people when using websites' (Disability Rights Commission, 2004).

Although widely used, the WCAG have often been criticized for being difficult to implement and even difficult to understand (although W3C is currently working on this to produce a second and more user-friendly version of WCAG). With this in mind, some individuals and organizations have decided to take a more holistic approach to web accessibility, rather than relying on existing guidelines and recommendations. One example described by Kelly et al. (2004) outlines broad issues for consideration, such as 'the purpose of the website, interoperability, cultural and resource issues' as well as usability and accessibility issues. The focus is to take a more pragmatic approach to accessibility rather than trying to achieve the 'holy grail' of W3C A-A-A compliance.

The W3C does, however, provide an important framework for ensuring accessible web design, development and assessment, and should be used to inform new developments rather than producing completely separate guidelines on accessibility and checking methods. This has been the focus of an EU Web Accessibility Benchmarking Cluster (a 'cluster' of three EU-funded projects) working together and in close liaison with the W3C/WAI to develop a harmonized European methodology for evaluation and benchmarking of websites: the Unified Web Accessibility Evaluation Methodology, or UWEM. The work will be based on the existing WCAG 1.0 guidelines and will be developed iteratively, involving evaluations with:

- potential users of the methodology (e.g. website developers, accessibility experts)
- users of websites (including people with disabilities) to cross-validate the checklist
- W3C/WAI and other public authorities (see www.wabcluster.org/).

As well as involving users in the development of the UWEM, the methodology itself will include a section on user testing protocols. This emphasizes to anyone considering or preparing to undertake web accessibility assessment that, whether they are using the WCA guidelines or other approaches, it is important to involve users and take into consideration their requirements.

This paper will now move on to consider a number of user-based studies and to describe how users are involved in the continuous development of one of the 'cluster' projects: the European Internet Accessibility Observatory (EIAO).

Findings from user-based studies have identified some interesting insights to web accessibility and usability that might have been overlooked if relying solely on automated or expert assessment. Abels et al. (1999) report on a two-part project to identify and implement user-based design criteria in websites. The user-based design gathered user input at three different times in the process.

The process began with information gathering to determine the criteria for the design process. Data were gathered through task-related information seeking and usage behaviour of a group of users. A focus group session was also run over half a day where the group used decision-making software to brainstorm and rank their ideas about positive and negative website features. Additional information from the task-related process was also gathered. The process identified 33 positive features and 18 negative features, which were grouped into six major criteria in order of importance:

- Use
- Content
- Linkage
- Structure
- Special features
- Appearance.

Another study, the Non-Visual Access to the Digital Library Project (NoVA) (Craven and Brophy, 2003), involved a group of sighted users and a group of blind users, who were asked to perform the same set of web-based tasks for comparison of user behaviour. They were observed by a facilitator and asked to provide a think-aloud protocol while performing the tasks. Pre- and post-task questions were asked in order to reveal what the users thought of the sites visited, how satisfied they were with the tasks performed, what they liked and disliked about the sites, problems encountered, and how they felt about the overall experience of using the web to find the information required of each task. The findings of this study highlighted the problems caused by poorly designed websites, and in particular the fact that people accessing the web using assistive technologies experienced greater problems, and in particular those using screen-reading technology. It also showed that where good training and support had been provided, people had a much better and more successful overall experience.

In their formal investigation of web accessibility the Disability Rights Commission (2004) tested 1000 websites using a software tool, then compared the results of detailed evaluation by 50 users with a variety of impairments. The study evaluated users' attempts to perform set tasks with assessment criteria of ease of use and success of outcome. Users also participated in focus groups and interviews to explore accessibility and usability issues further. A controlled study of six websites was also undertaken by groups of blind users and non-disabled users to assess the difference between the effects of inaccessible design and of the impairment. Focus group discussions concentrated on how people use the web, what they find useful, the variety of problems they encounter in accessing websites, and the problems associated with the assistive technology they use.

The study identified 585 accessibility and usability problems. The most reported problems relating to the WCAG checkpoints were as follows:

- Checkpoint 1.1: Provide a text equivalent for every non-text element.
- Checkpoint 2.2: Ensure foreground and background colour combinations provide sufficient colour contrast, etc.
- Checkpoint 6.3: Ensure pages are usable when scripts etc. are turned off, and if this is not possible provide an alternative.
- Checkpoint 7.3: Until user agents allow users to freeze moving content, avoid movement in pages.
- Checkpoint 10.1: Until user agents allow users to turn off spawned windows, do not cause pop-ups without informing the user.
- Checkpoint 12.3: Divide large blocks of information into more manageable groups where natural and appropriate.
- Checkpoint 13.1: Clearly identify the target of each link.
- Checkpoint 14.1: Use the clearest and simplest language appropriate for a site's content.

As a result of these findings the DRC recommended that the WCAG should 'provide better coverage of information architecture and navigation design issues in relation to accessibility', addressing in particular elements relating to the problems identified above (DRC, 2004, 47–8).

The EC-funded European Internet Accessibility Observatory (EIAO) has been exploring user requirements as a way of informing the development of a user-driven automated web accessibility tool. The initial findings have confirmed the importance of gathering users' requirements and perceptions of accessibility in order to look beyond the guidelines to provide an insight into web accessibility. The remainder of this paper describes the project and reports on the user requirements gathering process and results.

The EIAO is a three-year project co-funded by the European Commission, under the Information Society Technologies Sixth Framework programme (running from September 2004 to August 2007). The project aims to contribute to better e-accessibility for all citizens and to increase the use of standards for online resources by establishing a technical basis for a possible European Internet Accessibility Observatory (see www.cerlim.ac.uk/projects/eiao/). The 'Observatory' will consist of the following elements:

- A set of web accessibility metrics (WAMs) based on the WCAG 1.0 checkpoints (with a view to conversion to version 2.0 when appropriate)

- An internet robot (ROBACC) for automatically and frequently collecting data on web accessibility and deviations from web standards (i.e. the WAI guidelines)
- A data warehouse (ROBACC DW) providing online access to collected accessibility data.

Alongside the technical project partners, the Centre for Research in Library and Information Management (CERLIM) is leading two work packages relating to user requirements and user testing, which will be used to inform the technical development of the project and will also feed into work carried out in collaboration with the two other EC-funded projects (Ben-To-Web and Support-EAM) and in co-ordination with the World Wide Web Consortium Web Accessibility Initiative (W3C/WAI) with the aim of developing a unified website evaluation methodology.

User requirements were gathered from groups of users identified as those who might experience problems accessing the web. This could include people with disabilities, people using alternative devices (e.g. mobile phones), people whose first language is not English (but who have to access English-language sites), or people with a limited or slow connection. The project focused mainly on people with disabilities, although some were people using English-language sites whose first language was not English.

A mixture of qualitative and quantitative data was gathered to obtain a clear picture of perceptions, experiences, opinions and ideas. The data were gathered through a questionnaire and then follow-up interviews with a selection of respondents. Quantitative data included questions relating to disability, demographic data, and questions that required users to choose a frequency or rank a list of suggestions, for example asking users how often they use the internet: frequently, quite often, not very often, or very infrequently. They were also asked to rank potential problems with accessibility, for example whether missing ALT text was a serious problem, a minor problem, or no problem. Qualitative data were gathered from open-ended questions such as asking users what they liked about a website, what they disliked and the main barriers faced. After data analysis, follow-up interviews were conducted, picking out interesting and relevant themes and topics raised by users for further investigation.

Analysis of the questionnaire data showed that keyboard access (shortcut keys, tab navigation and/or keyboard navigation) was the most frequently cited accessibility problem experienced by the participants:

Have to navigate using keystrokes when the page is designed to be navigated using the mouse. Have to listen to links, headings etc. one at a time rather than scrolling down to relevant link.

This was followed by problems with either lack of ALT text or poor use of ALT text:

Moving away from no ALT text to inappropriate ALT text – e.g. file names, etc. Another good example is a Customer Services telephone number displayed as a graphic with the ALT text as ‘Customer Services telephone number!’ ‘Click here, Click here – no good when using the links list in JAWS.’

Participants also cited problems relating to the organization of the page:

Too many layers of pages in a site make it hard to find the information you want, tracking the information, etc. Not logical.

Pages sometimes are too big so that you have to keep scrolling down and down.

And an inability to navigate the site:

Navigation is a problem when using the in-built magnification because you can only view about two lines at a time.

Nav buttons not in the same place and too small.

Also poor use of mark-up (e.g. titles and/or headings) for web pages:

Title of page doesn’t always correspond to what you have retrieved. You think the site should be about one thing, but the contents are something else.

If each page is given a title it makes it much easier to know where you are in a web-site.

Other problems mentioned were confusing use of language, such as acronyms and abbreviations that are not fully explained; problems using multimedia; slow download times and having to download software; and being unable to personalize pages.

Participants indicated that they felt excluded from a number of elements found in web pages. The most frequently cited was images, followed by multimedia and forms. In the follow-up interviews participants talked about problems accessing FLASH, PDF and JavaScript, as well as specific problems associated with filling complex online forms when using a screen reader. Some participants also indicated problems using English-language websites when English was not their first language.

Regarding ways of improving accessibility, the most frequently cited suggestion (from a list of possibilities) related to the organization of the page or site ('a clear design with menus'); this was followed by the use of mark-up, such as titles to help inform the user about the content of the page; and forms that are easy to complete. Interestingly, although keyboard navigation and ALT tags were the most frequently cited problems, they were not the most popular suggestion for improving access.

In the questionnaire and interviews, participants were encouraged to raise any other accessibility issues that had not already been covered. Typical responses related to slow download times when not on broadband, and having to register on some websites before being allowed to access the information. Participants were also asked to talk further about specific websites they liked or disliked, and again they cited problems relating to page organization; navigation; use of text; lack of or inappropriate ALT text; incompatibility with their software; form filling; use of colour; and poor use of titles and headings. Interestingly, some of the websites identified were cited as both good and bad examples by different participants: this again demonstrates the diversity of user needs, perceptions and opinions.

As well as providing data on user requirements, the study also compared the problems identified by the participants with the WCAG checkpoints and priority levels. The purpose of this was to enable informed decisions to be made about which elements for checking should be made a priority for the first release of the software. The analysis revealed that a greater number of priority 2 and 3 checkpoints (as illustrated in Figure 4.1) could be linked to the problems identified by participants. Further comparison with the study conducted by the DRC (2004) show similarities with the problems identified in this study – in particular that fewer priority 1 checkpoints were identified as accounting for the problems reported.

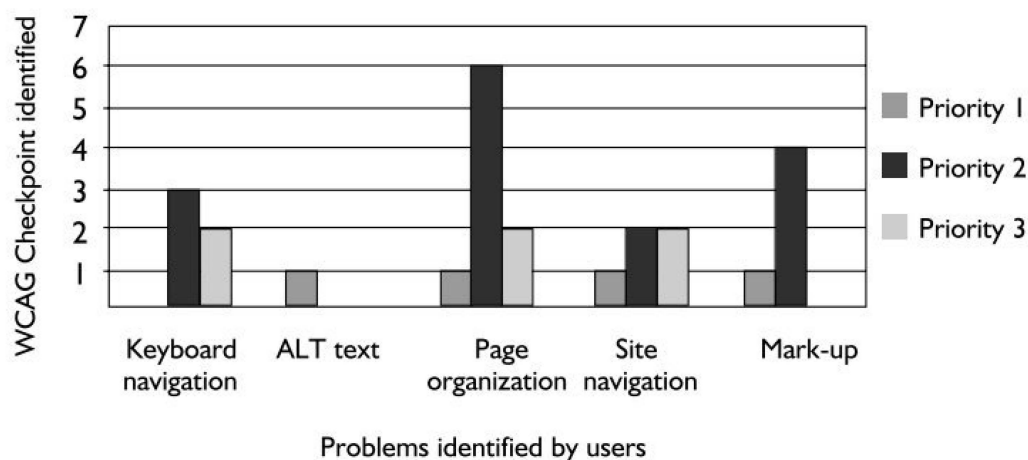


Figure 4.1 *Relevance of problems identified by users to WCAG 1.0*

The fact that more accessibility issues can be related to priority levels 2 and 3 of the WCAG (version 1.0) (as illustrated in Figure 4.2) suggests that there are differences between real users' needs and their perceptions of accessibility, and the formal recommendations such as those produced by the WCAG.

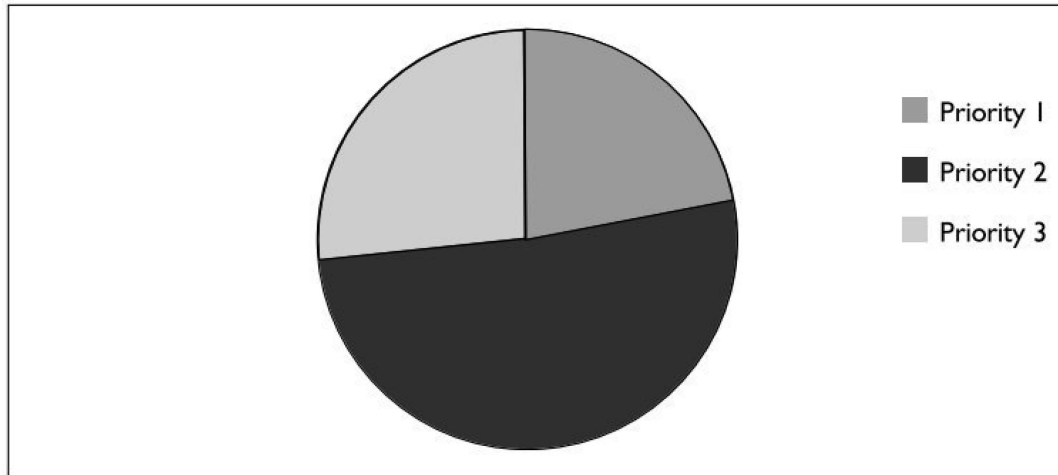


Figure 4.2 *Problems identified relating to WCAG 1.0 priority levels*

It is also interesting to note that in a recent document published by the W3C (Henry, 2005) designed to help organizations develop a business case for web accessibility, a list of WCAG checkpoints that 'directly increase usability to all users' is suggested, only one of which is a priority 1 level checkpoint, the majority being priority 2 (five suggested checkpoints) and 3 (seven suggested checkpoints).

The first iteration of user requirements gathering for the EIAO study was conducted on a relatively small scale, therefore the resulting analysis does not necessarily mean that those checkpoints not identified as relevant should be discounted, or that any significant statements should be made about the relevance of WAI guidelines and checkpoints in relation to responses in the study. It simply provides an initial picture of end-user requirements and their perceptions of accessibility, which can be fed into the development of the European Internet Accessibility Observatory and the development of the UWEM.

These results have, however, demonstrated how involving users can provide a broader picture of the accessibility of services delivered via the web, and shown the importance of looking beyond the guidelines towards what people really want from a web-based service. Once awareness of the diversity of user needs is increased there will be a greater understanding of the need for a more flexible and pragmatic approach to the design, delivery and assessment of distributed services.

The author wishes to express grateful thanks to all the participants who took part in the questionnaires and follow-up interviews.

References

- Abels, E. G., White, M.D. et al. (1999) A User-based Design Process for Web Sites, *OCLC Systems and Services*, **15** (1).
- Cabinet Office (2002) *Illustrated Handbook for Web Management Teams. Guidelines for government websites*, www.cabinetoffice.gov.uk/e-government/resources/handbook/html/htmlindex.asp.
- Craven, J. and Brophy, P. (2003) *Non-Visual Access to the Digital Library: the use of digital library interfaces by blind and visually impaired people. Library and Information Commission Research Report 145*, Manchester, Centre for Research in Library and Information Management.
- Disability Rights Commission (DRC) (2004) *The Web: access and inclusion for disabled people. A formal investigation conducted by the Disability Rights Commission*, London, DRC.
- Henry, S. L. (ed.) (2005) *Financial Factors in Developing a Web Accessibility Business Case for your Organisation*, www.w3.org/WAI/bcase/fin. Version 1.0 (up-to-date as of August 2005).
- Kelly, B., Phipps, L. and Swift, E. (2004) Developing a Holistic Approach for E-Learning Accessibility, *Canadian Journal of Learning and Technology*, **30** (3).
- World Wide Web Consortium (1999) *Web Content Accessibility Guidelines*, www.w3.org/TR/WCAG10/.