# A Web Accessibility Auditing Instrument to Assist Novice Evaluators

Christopher Bailey
Dr Elaine Pearson
School of Computing
Teesside University
United Kingdom
c.p.bailey@tees.ac.uk

**Abstract:** The ubiquitous nature of the internet and the diversity of user groups means that established techniques for accessibility evaluation may need to evolve in order to be effective. This paper describes the development of a web accessibility auditing instrument, known as the Accessibility Evaluation Assistant (AEA) designed to assist novice auditors in the process of an accessibility evaluation for specific user groups. The audience for such a tool would be undergraduate and postgraduate computing students, small businesses and charitable organisations, all of whom are likely to have a limited knowledge of web accessibility, or lack the resources to undertake professional accessibility evaluations. The software guides the auditor through a series of tailored checks based on a particular user group, as well as the content and specific features of the website. This process enables the auditor to draw more accurate conclusions about the relative severity of potential issues, and facilitates their effective prioritization.

## Introduction

The Web Content Accessibility Guidelines (WCAG) produced by the W3C have become the accepted point of reference for web accessibility. Despite their limitations and rigid approach (Sloan, 2006), guidelines remain the dominant approach in educating web developers in how to develop accessible websites. Practitioners argue that there is a need for a standard framework with which to apply web accessibility guidelines in real-world situations (Kelly, 2005). The application of relevant guidelines may not be obvious and many designers may not have the required knowledge and experience to use them, and even if designers are convinced, or motivated to create accessible products, they often face a lack of knowledge and experience in accessible design. Therefore, methods, tools and criteria (usually provided as sets of guidelines), of some description are needed to help designers with this difficulty (Abascal, 2004).

It is now generally accepted that no single accessibility checking method will provide a comprehensive indication of the accessibility of a web site and a range of checks must be carried out, including evaluation against the WCAG, automated and manual user checks. The over-riding aim of any accessibility evaluation should be to provide information that is clear, logical and comprehensible to developers and relevant to the context of the site. Components of existing evaluation methodologies can be combined into an instrument that would be relevant to the context of the site and would take particular account of the needs of target users. The proposed Accessibility Evaluation Assistant (AEA) aims to utilise existing evaluation tools into a single intelligent resource which guides the user through the checks required for their specific site.

Guidelines attempt to cater for the needs of a wide range of user groups. In some cases, web developers may wish to cater for the needs of one specific user group, e.g. older people, or for those whose first language is not English. The guidelines should be tailored to suit the context of the website. The important role context plays in web accessibility has been recognised by practitioners (Brajnik, 2008, Sloan, 2005). In terms of this research, the concept of context includes:

- The target audience of the site,
- Features specific to the individual site,
- The way the content of the site is presented.

## Rationale

Although WCAG Guidelines do emphasise the importance of manual checking, it has been suggested that in reality an industry has developed based on the use of automated accessibility testing tools and there is a need to re-evaluate current approaches (Kelly, 2007). If automated tools are to be used, perhaps by those with a limited knowledge of accessibility, it is preferable for them to use a tool which is designed specifically to meet their needs.

Programmers typically have little or no usability training and tend to think that web users are just like them (Law, 2005). It is sometimes difficult for people to appreciate the difficulties some users have when using the web, and while they may have a general knowledge of accessibility, they may not have the appropriate knowledge and skills when creating content aimed at a specific user group.

Kelly et al (2008) provide an example of the need to appreciate the needs of a specific user group. When considering developing a website for the visually impaired, podcasts may provide a valuable service for this user community. Compliance with WCAG guidelines would require a textual transcript of the content, even if the target audience could not read such information. Similarly, following WCAG during development of a symbols based interface with audio scanning for users with severe learning difficulties requires the provision of text alternatives for images, even if the textual content would be incomprehensible to this user group.

Law (2006) summarises that part of the problem of ensuring accessibility is a lack of exposure to accessibility during training of computer science and information systems professionals. Requested accessibility fixes for a site are often in addition to security fixes, database fixes, usability fixes and aesthetic fixes. Programmers rarely have a surplus of time and will generally not want to think about website accessibility, even if they support it conceptually. It therefore makes sense that any tool aimed at assisting them in improving or checking and evaluating a web site should be easy-to-use and self-explanatory to the programmer.

## Development of Web Accessibility Auditing Tool

The Accessibility Evaluation Assistant is the result of a University project in which an evaluation methodology was developed for a series of accessibility audits conducted on a range websites (Bailey, 2005). The evaluation methodology was based on a combination of existing accessibility guidelines, advice from disabled end-users, as well as the experience and knowledge gained when researching accessibility and conducting accessibility evaluations. Issues found when evaluating a site were often found to have a greater impact on one user group when compared to another. For example, failing to mark-up Headings using HTML will have a greater impact on screen reader users than sighted users as they can use this semantic mark-up to navigate through the content of a page.

The tool has been designed with the needs of an academic audience in mind. Undergraduate and Postgraduate students need skills in accessible design to prepare them for employment. They need to understand accessibility beyond the basics, and need it in real-world situations, such as developing different content and solutions for different audiences. Generally speaking, students have:

- Very limited access to disabled users
- No access to expert reviewers
- Limited existing knowledge of accessibility
- Little time to dedicate to accessibility in the wider context of their assignments

The Accessibility Evaluation Assistant (AEA) aims to assist novice auditors in the process of an accessibility evaluation by prioritising accessibility checks which are most relevant to the specified user-group and the content features of a website as defined by the auditor. The initial interaction the user has with the tool is through a single HTML form. The auditor specifies the access needs they wish to prioritise by selecting from a drop-down list of ten user groups, (Figure 1).

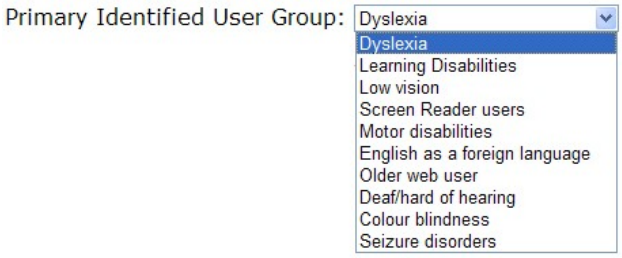


**Figure 1: Selecting User Group**

As discussed earlier in this paper, the rationale for prioritising particular user groups is that web developers, small businesses or charities might be developing websites, or sections of sites aimed at specific user groups but don't have the necessary skills and experience in accessibility or have the resources for professional accessibility audits. For example, individuals with learning difficulties represent a user group where standard accessibility guidelines alone may not be appropriate as they do not cater for symbols based interfaces and resources, when this may be the most appropriate way to present content to this user group.

The user provides information about the content, presentation and features of the site by checking the relevant boxes (Figure 2). The next stage is the reporting phase where the AEA recommends checks which are most relevant to the specified user-group and the content of the website. The AEA then guides the auditor through the specific procedures and techniques to be carried out to ensure accessibility. It includes techniques and appropriate links for both manual and automatic tests to ensure it is more effective than using a single method of evaluation.

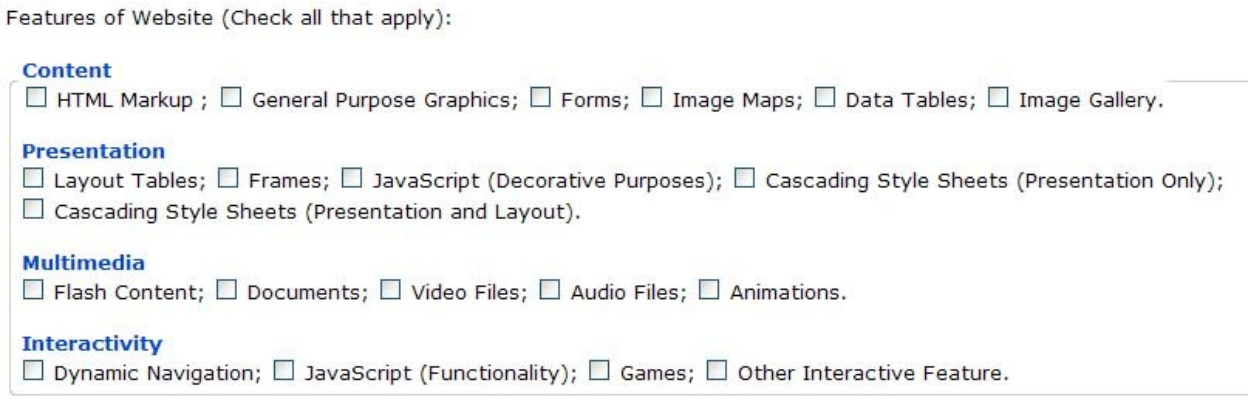


**Figure 2: Selecting Features of Website**

To make the auditing process easier the AEA breaks down the checking procedure into four categories these are:

- Design checks – examine the overall visual design.
- User checks – involves testing with a human element.
- Structural checks – concerned with the overall structure of the website, how content is structured and how each page is constructed.
- Technical checks - concerned with coding elements.

The unique aspect of the AEA is the way in which it will prioritise the checks the user should conduct. For example, if the auditor identified Screen Reader Users as the main target audience for the site, the AEA would prioritise checks for accessibility issues which primarily affect this particular user group. Similarly, if the website being audited contains particular features (for example forms or data tables), checks relating to these features would be displayed to the user thereby increasing the relevance of the checking process. The AEA report has three priority levels for checks:

- Critical Issues are those that will render content totally inaccessible or cause significant annoyance or inconvenience to the specified user group. An example of a critical issue for screen reader users would be ensuring that content did not rely on colour alone to convey meaning.
- Problem Issues will present accessibility barriers or may cause a noticeable annoyance or inconvenience to the specified user group. An example of a problem issues for screen reader users would be checking that a means for users to skip over repetitive navigation links was provided.
- General Issues are checks that should be conducted to ensure that a website follows the basic principles of accessible design as well as adhering to good practice.

## Conclusion and Further Work

By identifying the main target audience and considering their access needs in relation to the content of the site, the relevant checks can be prioritised during an accessibility audit. This will provide a more accurate impression of the overall accessibility of a website to the target audience. The final deliverable for the project will be the development of a database driven web-based tool which would present to the user, in an easy to understand format, the checks the auditor must carry out to effectively evaluate the accessibility of a website. While some practitioners may feel that the approach of evaluating a website by user group is not ideal, our position is that it is better that developers try to ensure optimum accessibility for a specific target audience rather than do nothing at all.

The research into tailoring guidelines to the context of a website is part of an ongoing study and as such the AEA will undergo continued development. Although the methodology behind the tool has been used on a range of sites, the AEA needs to be tested to ensure the results it produces are logical, accurate and usable. It is anticipated the finished tool will initially be utilised as a resource to educate University students in the effective accessibility evaluation of websites for specific user groups, however there is a potential for its use by small and medium sized businesses and charitable bodies and other organisations with limited resources.

## References


Abascal, J., Arrue, M., Fajardo, I., Garay, N., and Tomás, J. (2004). The use of guidelines to automatically verify Web accessibility. Univers. Access Inf. Soc. 3, 1 (Mar. 2004), 71-79.

Bailey, C., Pearson, E., and Gkatzidou, S. (2005). Developing a Tailored Accessibility Auditing Methodology. In Richards, G. (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2005* (pp. 1889-1894). Chesapeake, VA: AACE.

Brajnik, G. (2008). Beyond Conformance: The Role of Accessibility Evaluation Methods. In *Proceedings of the 2008 international Workshops on Web information Systems Engineering* (Auckland, New Zealand, September 01 - 04, 2008). S. Hartmann, X. Zhou, and M. Kirchberg, Eds. Lecture Notes In Computer Science, vol. 5176. Springer-Verlag, Berlin, Heidelberg, 63-80.

Brewer, J & Letourneau, C. (2002), Evaluating Web Sites for Accessibility, World Wide Web Consortium, http://www.w3.org/WAI/eval/ , Last Updated: 18/12/2008, Date Accessed: 10/04/09

Kelly B., Sloan D., Phipps L. Petrie H. and Hamilton F. (2005). Forcing Standardization or Accommodating Diversity? A Framework for Applying the WCAG in the Real World. Proceedings of W4A at WWW2005: International Cross-Disciplinary Workshop on Web Accessibility. New York: ACM Press.

Kelly, B., Sloan, D., Brown, S., Seale, J., Petrie, H., Lauke, P., and Ball, S. (2007). Accessibility 2.0: people, policies and processes. In *Proceedings of the 2007 international Cross-Disciplinary Conference on Web Accessibility (W4a)* (Banff, Canada, May 07 - 08, 2007). W4A '07, vol. 225. ACM, New York, NY, 138-147.

Kelly, B., Nevile, L., Draffan, E., and Fanou, S. (2008). One world, one web .. but great diversity. In *Proceedings of the 2008 international Cross-Disciplinary Conference on Web Accessibility (W4a)* (Beijing, China, April 21 - 22, 2008). W4A '08, vol. 317. ACM, New York, NY, 141-147.

Law, C., Jacko, J., and Edwards, P. (2005). Programmer-focused website accessibility evaluations. In *Proceedings of the 7th international ACM SIGACCESS Conference on Computers and Accessibility* (Baltimore, MD, USA, October 09 - 12, 2005). Assets '05. ACM, New York, NY, 20-27. DOI= http://doi.acm.org/10.1145/1090785.1090792

Sloan, D., Heath, A., Hamilton, F., Kelly, B., Petrie, H., and Phipps, L. (2006). Contextual web accessibility - maximizing the benefit of accessibility guidelines. In *Proceedings of the 2006 international Cross-Disciplinary Workshop on Web Accessibility (W4a): Building the Mobile Web: Rediscovering Accessibility?* (Edinburgh, U.K., May 22 - 22, 2006). W4A '06, vol. 134. ACM, New York, NY, 121-131.

Smith, J. (2004*), Evaluating Web Site Accessibility*, WebAim, http://www.webaim.org/techniques/evaluating/ , Date Accessed: 10/04/09.