One World, One Web … But Great Diversity

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ABSTRACT

The mantra "One World, One Web" has a strong appeal to Web developers. They think of it as a design philosophy based on use of internationally agreed open standards for providing universal access to networked resources and services available on the World Wide Web. But does the available evidence show that practices match this philosophy? How would such an approach work in a Web 2.0 environment in which users may be authors of content?

This paper reviews the limitations of the dependence on a single WAI model and WCAG 1.0 guidelines. It describes a holistic approach to Web accessibility that has been discussed previously. There are additional complexities of accessibility in a Web 2.0 environment, in which not only can readers be creators of Web resources in a variety of formats, but also content can be surfaced in a variety of ways, addressed in this paper. The authors describe how the holistic model, initially developed to support the development of accessible e-learning in a Web 2.0 context, is well-suited for a Web 2.0 environment.

The paper provides a case study to illustrate how this holistic approach can be applied in the development of Web resources for users with learning difficulties. The paper concludes by arguing that future work to enhance the accessibility of Web services should focus on the development and commissioning processes rather than continue the current narrow emphasis on the compliance with universal accessibility guidelines of the digital resources themselves, independently of the context of their use.

Finally, the paper refers to two new developments that support the wider focus, providing for individual user-centred accessibility with descriptions of resources and components enabling adaptation of resources to individual needs and preferences.

Categories and Subject Descriptors

H.5.2 [**User Interfaces** – Evaluation/methodology]; K.4.2 [**Social Issues** - Assistive technologies for persons with disabilities]

General Terms

Measurement, Documentation, Human Factors, Standardization, Verification.

Keywords

Web accessibility, people with disabilities, WAI, WCAG, guidelines, methodologies, AccessforAll, metadata

1. THE WAI MODEL

The World Wide Web Consortium (W3C) has a leading role in promoting accessibility of the Web for disabled people. The W3C's Web Accessibility Initiative (WAI) has successfully raised awareness of the importance of Web accessibility and developed a model which can help organisations develop accessible Web resources. WAI promotes a model of accessibility based on the premise that full conformance with each of three components of the guidelines will achieve the stated goal of universal Web accessibility [1]. Of particular relevance to Web page authors is the Web Content Accessibility Guidelines (WCAG) [26].

In the WAI model, WCAG guidelines are coupled with accessibility guidelines for browsing and access technologies (the User Agent Accessibility Guidelines, UAAG [28] and for tools to support creation of Web content (Authoring Tools Accessibility Guidelines, ATAG [27], complemented by the activities of the Education and Outreach Working Group (EOWG) [30] and the Protocol and Formats Working Group (PFGW) [29]. This approach acknowledges that in addition to providers of Web content, developers of authoring tools and of browsers, media players and access technologies also have responsibility towards the provision of accessible Web content.

2. LIMITATIONS OF WAI'S APPROACH

2.1 Shortcomings of the WAI Model

WAI is widely acknowledged as successful in promoting the benefits of accessibility of Web resources and in ensuring that the guidelines, in particular WCAG guidelines, have a high visibility. However, the model of Web accessibility developed by WAI has been criticised for its limited scope. The model relies on conformance with each of the three sets of guidelines –WCAG for content, ATAG for the tools used to create the content, and UAAG for the tools used to access that content. Web authors have control over how well they conform with WCAG, and to a lesser extent ATAG, but they have no control over users' access facilities or practices. This leaves an awkward situation whereby users may not benefit from the accessibility features promised by a WCAG conformant Web page, due to their choice of browsing or assistive technology. Some users have no real choice as their abilities or facilities are restricted.

2.2 Shortcomings of WCAG

Shortcomings of version 1.0 of WCAG have been documented elsewhere [15]. In theory, these shortcomings should be of limited impact given that work has for several years been ongoing on WCAG 2.0, the replacement for WCAG 1.0, since 2001. WCAG

2.0 represents a significant change from the approach to accessibility taken in the original WCAG 1.0 guidelines. In comparison to the HTML-focused WCAG 1.0, WCAG 2.0 is technology-neutral. Its core principles (POUR: perceivable, operable, understandable, robust) and related 'success criteria' aim to be applicable to the widest possible range of present and future technologies used to deliver content on the Web – including non-W3C technologies. The normative guidelines are meant to be complemented by non-normative, technology-specific 'techniques' documents, detailing specific implementation examples and best practices.

A call for review of the WCAG 2.0 was issued in April 2006. This was received in many expert circles with reactions ranging "between the lukewarm and the outright hostile" [22]. In an article that brought WCAG 2.0 to the attention of the wider Web design community, Clark (2006) [6] raised (among other issues) fundamental concerns regarding the size of the documentation, its inscrutable language and lack of adequate provision for users with cognitive disabilities and learning difficulties.

The WCAG 2.0 developers responded to such criticisms. An updated version of the WCAG 2.0 guidelines was published on 11 December 2007 [30], with positive feedback being received to the question raised by Henry (2008) [32] "*Is it better for web accessibility overall for the community to continue to debate, or is it better to polish and accept WCAG 2.0?*" from accessibility experts and practitioners.

3. A HOLISTIC APPROACH TO WEB ACCESSIBILITY

Although the deficiencies of the original versions of the WCAG 2.0 guidelines are being addressed, the WAI model does not seem to allow flexibility for the context of use. The lack of context for the application of accessibility guidelines can result in a simplistic and conservative approach being taken, which can fail to recognise technological developments, the specific needs of users of a Web service or accessible alternatives to Web resources.

Kelly (2005) [15] has developed a holistic approach to Web accessibility for e-learning which promoted an approach based on accessible learning outcomes rather than accessible resources. This model reflected a pedagogical approach which supports a diversity of learning styles and preferences – if a student is uncomfortable with an IT solution to learning, then the student should have the option to chose alternative ways of learning. This approach, which is illustrated in Figure 1, treats the student not as someone who is disabled but as someone with alternative learning preferences. Nevile and Treviranus (2006) [19] have argued for what they term 'inclusive' learning environments, again recognizing the need for individual satisfaction. The emphasis in such environments is on the outcomes for the individual learners rather than the objective qualities of the resource.

Further, the recent United Nations Convention on the Rights of Persons with Disabilities (2006) [25] requires the activities within a context to be inclusive so that all can participate equally. This draws on Oliver's 'social model' of disability (1990) [20] and places emphasis on what is to be done and who will be participating rather than on an absolute standard that is assumed to work for all involved. The social model of disabilities should be recognised now as appropriate to social networking.

The authors now argue that a broad or holistic approach is well suited for use in a Web 2.0 context in which users may exploit a variety of technologies (blogs, wikis, social networking services, RSS feeds, etc.) in both formal and informal ways. In this environment the learner is regarded as an active participant in the learning process, and not just a passive consumer of content. The learner's environment should adapt to the learner's needs and preferences rather than to a standard to which learners are expected to adapt. The question is then, when Web surfers become Web authors, how should accessibility issues be addressed?

Figure 1: Blended Model For Learning [15]
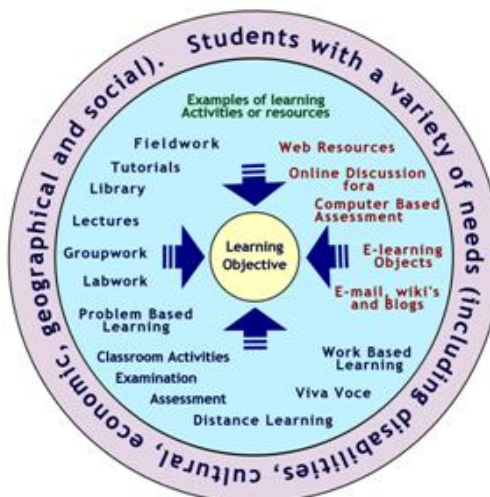
The application of this holistic approach to other areas, such as a cultural context, has been described by Kelly (2007) [16]. Nevile & Ford (2006) [18] have previously pointed to the problems for accessibility of location needs and preferences, where location becomes the context.

A simple example of the need to appreciate the role of context can be seen by considering a volunteer organisation for the visually – impaired. Podcasts may provide a valuable service for this user community, allowing audio content to be automatically transferred to an MP3 device. But compliance with WCAG guidelines would require a textual transcript of the content, even if the target audience could not read such information. The dangers are that mandating WCAG compliance independent from the context of use would lead in this case to the podcast not being developed and the intended audience deprived of a useful and accessible service.

4. ACCESSIBILITY METADATA

An approach which complements the holistic model is the development of a metadata framework which can label aspects of a resource related to its accessibility, allowing for the selection of variants of a resource which are best suited for the individual user at the time and in the context.

In developing the AccessForAll approach to accessibility [9], Nevile and others have supplemented the work of W3C by providing for metadata that can be used to describe components of resources so that they can be selected on the fly, according to the needs and preferences of users. The advantage of this work is that it makes it possible for an individual to discover a resource that suits them, even if not necessarily everyone else, or that does not

suit them, despite being conformant to WCAG 1.0 guidelines. Within a closed environment, such as that in which TILE operates at the University of Toronto [14], all the necessary components might be available, but in the wider world, they might have to be discovered after finding the target resource is wanting or created in response to a new need. This development also anticipates the trends in social networking and surfer authoring and expects publishers to think more in terms of atomic components that are assembled into resources on demand and which can be more flexible than previous ones in the recombination. Many of the accessible components are expected to be distributed and often made by third parties, independently of the original author, and hopefully automatically discovered and retrieved for the user by what is known as the AccessForAll service that matches them to the user's needs and preferences [17]. The use of metadata supports post-production of accessible components for resources, which otherwise cannot be managed in a distributed environment.

5. ACCESSIBILITY IN A WEB 2.0 ENVIRONMENT

Although developed before the Web 2.0 term became widely used, a holistic approach to Web accessibility would appear to be relevant in a Web 2.0 environment. The focus on the learning objective, for example, does not require that learning objectives be fulfilled through passive access to digital resources. Rather, such an objective may be achieved in a variety of ways, which might include accessing digital resources, but more likely, are in keeping with modern pedagogical models, and also include using the resource, discussing the resource and critiquing the resource. And the resource need not be a digital resource which was originally envisaged as supporting the learning process: rather a variety of learning resources may be provided which can be selected by the user in ways which reflect their preferences or learning style. And such learning resources may be digital resources, physical resources, or, indeed, processes rather than tangible objects.

In the Web 2.0 context, a learner can be empowered to choose their preferred learning route. In a formal course, this will need to relate to satisfying particular learning requirements to particular standards. However, in other contexts such as informal learning, cultural appreciation, etc., the learner can have more flexibility in achieving their desired goals.

The approaches to accessibility in a Web 2.0 context might include:

(a) ensuring the desired outcomes can be achieved by the target audience;

(b) identifying reasonable measures to ensure that the desired outcomes can be achieved by people with disabilities, and

(c) documenting decisions taken in cases in which the desired outcomes cannot be achieved by people with disabilities without having to take excessive measures or unnecessarily disenfranchising other users.

As an example of this approach, consider the example of a user with disabilities using Second Life. In a video entitled Wheeling In Second Life (YouTube, 2007) [33], Judith, who suffers from cerebral palsy, describes the pleasure she gains from the use of Second Life and the facility it provides her to meet others. Nevertheless, Second Life is not universally accessible. It is a graphically-oriented environment which requires a high-spec PC. Public sector organisations which emphasise the importance of

compliance with rules and legislation might feel compelled to shy away from making use of Second Life. And yet who can deny the benefits that it has provided to students in terms of engagement as discussed by Robbins at an Educause conference [8].

There are accessibility implications related to use of social networking services such as Facebook. The traditional approach might be to check whether Facebook conforms to WCAG 1.0 guidelines but as these guidelines are now out-of-date, this would be inappropriate. Another approach might be to ask individuals with a range of disabilities to interact with Facebook and then document ease of use and accessibility as well as the problems they may encounter when using the environment. But as we have seen in the case of Second Life, a digital environment may provide a valuable experience for some users with disabilities if not all users with disabilities. Can we, then, find users with disabilities who find that Facebook provides a valuable experience? And how might we balance their use against that of users with disabilities who have difficulties using Facebook?

There are a number of Facebook groups which are used by people with disabilities such as 'Deaf all around the world' with 2,460 users,' Blind Students on Facebook' (388 users) and 'Deaf and Hard of Hearing' (898 users) and there are also groups such as 'STOP facebook discriminating against disabled users' (153 users) which seek to address Facebook's accessibility barriers.

The biggest barrier to use of Facebook by visually impaired users is the CAPTCHA interface which required users who wish to register for the service to type in letters which are displayed as an image in order to act as a deterrent to automated tools. However, a user campaign has resulted in an audio version of the CAPTCHA being made available [1]. The RNIB's Web Access Centre Blog (RNIB, 2007) [23] admits the difficulties of reconciling the tensions between making it easy for users with disabilities to sign up for such services and making it difficult for automated tools to do so: "there is no catch all accessible alternative to CAPTCHA that can be secured from spammers". It has also been observed that spamming approaches which rely on fooling humans into breaking spam barriers are being developed [2].

How should the CAPTCHA barrier for visually impaired users be addressed? It could have been argued that Facebook was inherently inaccessible and its use should be deprecated and perhaps even banned. The use of social networking environments which have been designed with the needs of disabled users in mind, such as Common Knowledge [7] and Disaboom [10] could be promoted. And yet the point of social networks is to be able to engage with one's friends, one's peers, one's colleagues at work and at college. The danger with social networking sites which are targeted at people with disabilities is that they will not be used by one's wider circle of contacts. And it is clear that, especially in the educational sector and for young people, Facebook, along with MySpace and Bebo, are the major players in social networking in the UK and US.

Recognising that environments such as Facebook are being widely used leads to the question of how institutions may respond to its use in a formal or informal context. Use of Facebook (and other social networks) in an informal learning context would recognise its ubiquity and ensure that the potential pitfalls (such as the privacy implications) are addressed as part of an institution's information literacy policy. A more formal approach to the use of Facebook would require that the implications of a social network within a formal teaching environment be addressed.

An application of the holistic approach would recognise that Facebook can be used to support a variety of user objectives (finding new information, engaging in discussion, etc.) but also that many of these services can be used independently of Facebook. Facebook then, can be regarded as providing an option which users can select for accessing services. An institution could choose to encourage use of Facebook as an environment for accessing blog posts, uploads of photographs, micro-blogging, etc... If so, the social networking service is to be regarded as a user agent and, provided users with disabilities have the ability to make use of alternative interfaces, limitations with the particular social networking service need not be a significant barrier to its use.

The AccessForAll description of the resources and services involved can help those making the choice of what to use and when by either supporting an automated choice of interfaces, as done by TILE, or at least giving access to the information upon which the choices might need to be made. Without metadata, users have to retrieve each application, try them and then make their decision. This can be a cumbersome process and so being able to use the descriptions can save time and effort. The descriptions can be cumulative so that as users learn more about the applications or resources, they can contribute information about their experiences in the form of additional metadata.

Taking accessibility in its widest sense and accepting user preferences, motivations and expectations, there are aspects of Web 2.0 with which many individuals choose not to engage. Their reasons can range from 'I do not need Second Life, I already have a real one' or 'I do not have the time to waste on FaceBook' to 'my course does not require use of these applications.' In any given situation, by offering a range of collaborative mechanisms for social networking, not only would the outcomes become more personalised but users could be free to find applications that suit their skills and abilities. This may mean a mix of synchronous and asynchronous communication with e-mail, instant messaging tools, Skype and Facebook interactions. Not all applications will offer the same features but users can be in control of how and where they share their content.

The FLUID project aims to offer a new architecture for resources that will enable not only the interchange of resource components, but also of interfaces [12]. This project is developing and will freely distribute a library of sharable, customizable user interfaces designed to improve the user experience of Web applications. The approach being taken by the FLUID project is to go beyond the limitations of WCAG conformance by encouraging independence not only of the content of resources from its presentation, but of interfaces within user agents. Specifically, FLUID extends the possibilities for adaptation of environments, freeing content from the applications in which they may be authored or interacted with.

6. USER-CENTERED APPROACH TO LEARNING DISABILITIES

How might a user-centred approach to learning disabilities work? Assuming the holistic approach described in this paper, it could be deployed in the design stages of a Web services aimed at users with learning disabilities.

In a three-year project at the University of the West of England, Bristol, Fanou is planning to make use of the holistic approach to Web development described in this paper. The focus is on the accessibility of the outcomes of a service rather than the resources, and the emphasis moves from the creator of the Web

resources to the end user. In the proposed development and research, the end user will not only be involved in content creation but also in the design and creation of the system from the beginning of the development cycle through to its conclusion. The purpose of this approach is **not** to try to create a system and content that is **universally** accessible, as the WAI guidelines suggest, but rather to try to maximize the usefulness and usability for a specific targeted audience of learning disability users. This goal aims to be achievable and will be more relevant to the specific user group than an approach that aims to create content by the application of international guidelines. The aim is to avoid developing services which theoretically will be accessible to everyone but in reality may fail to satisfy the target audience and may even fail to be used.

The goal of universal accessibility, although appealing as a vision, is probably unachievable in reality, as has been recently acknowledged in the WCAG 2.0 guidelines which now state that "*Note that even content that conforms at the highest level (AAA) will not be accessible to individuals with all types, degrees, or combinations of disability particularly in the cognitive language and learning areas.*" [10].

In the development of the proposed system, the emphasis is on making it usable to a group who are specifically disabled. Initially these will be the Health Trainers who have learning disabilities. This group will be trained to support health promotion in the learning disabilities community. They currently have limited engagement in the use of Web 2.0 technologies in their personal and working lives. Their engagement in Web 2.0 is limited by their preference for visual and diagrammatical ontologies that are not met through current designs which rely heavily on text based deliveries. In the research project, it is hoped that the users will start to identify and develop an ontology for online engagement that can provide materials and also venues for social networking to support them in their roles as Health Trainers. Through this approach it may be possible to develop an ontology that can extend into the wider learning disability community and more importantly across to the 'able user' communities.

The participant methodology proposed should help to address accessibility issues for learning disabilities that are not covered in the WCAG guidelines. The build and operation of the system will depend on and be influenced by how the stakeholders respond to drivers, such as WCAG and other guidelines, and legislation and feedback from users' experiences. This holistic approach offers flexibility by considering the context and user-involvement rather than an objective test of whether a particular set of guidelines has been followed.

The forthcoming WCAG 2.0 is more general and seems to support practices similar to a holistic approach and stakeholder involvement but so far WCAG 2.0 is untested. One of the things Fanou's project will seek to achieve through research is to provide evidence in support of a holistic stakeholder involvement approach. Other questions to be answered are:

- What works and what does not?

- What features should a system for learning disabilities have?

- Can our specific group of learning disability users really use such a system?

- Will they benefit from it?

The project will also explore a set of best practices for the building and operation of such systems that might be transferable.

The project interprets "One World One Web" as acknowledging that the world has a great diversity, which must be targeted if computer designers and developers are to be realistic, pragmatic and practical. Learning disabilities are part of this diversity.

7. COMMISSIONING WEB SITES AND THE HOLISITIC MODEL

The previous section has outlined an approach to the development of a Web service for users with learning disabilities which emphasises the importance of engaging the target user community in the early stages of the design process. The major challenge is to define a process for embedding the holistic model in the development processes of Web sites more generally.

While the present guidelines seek to offer checklists for capturing issues around design and content related to individual disabilities. This may mean adding alternative text for those who have visual impairments or do not understand graphics. The holistic approach aims to encourage Web site commissioners and developers to think about their users' skills or characteristics (Draffan & Rainger, 2006) [11] related to particular electronic media and specific contexts. This requires a more positive approach to the processes involved with guides to what is on offer, rather than attempts at describing what is already available e.g. alternative text for a constantly changing Second Life scenario. The obvious benefit for those auditing or testing digital resources for accessibility could be evaluated by the acceptance of increased user choice and the possibility of enhanced usability. In this case, it may be an option to have an interactive on-line audio debate or podcast that offers the best alternative interaction. This could also be seen as a proactive approach to AccessForAll. Best practice across the disability spectrum has shown that what may help one group, such as the blind, in the example provided, may also help others with specific learning difficulties, who may also prefer an on-line discussion rather than a purely visual experience. Just as the development of past guidelines has demanded the collaboration across communities, so the holistic model requires a similar approach to develop satisfactory best practices.

7.1 Beyond the Web

A relevant argument was put forward in a report titled 'eAccessibility of public sector services in the European Union' in 2005 [4]. It showed how "in a multi-channel environment, it (on-line services) has the clear potential to increase accessibility and inclusiveness of a service to those excluded from traditional forms of interaction with public authorities - and to deliver real benefits to those who use public services the most." In an environment in which delivery channels other than the PC can be used to enhance the accessibility of resources, there is a need to (re-)assess the approaches which have traditionally been taken to the development of accessible Web sites and the ways in which Web developers claim conformance with an accessibility guideline.

7.2 The Limitations of WCAG-Based Assertions of Accessibility

Logos to show that Web sites are WAI compliant to Level 1, 2 and even 3 have often appeared at the bottom of Web pages to indicate the ability of an assistive technology user (such as someone who is blind using a screen reader) to access the content. The sites may be easy to use and offer direct access to the

information supplied, although Phipps (2005.) [19] has called into question whether the assertions made by the presence of logos are reliable. He points out that "*After undertaking an audit of UK educational websites that claimed Bobby Approval, TechDis found that only 50 percent of the websites achieved the minimum level of compliance required for Bobby Priority 1 Approval*". On the other hand, Tesco and others have shown how their businesses have benefited from this type of conformance. It is important to also consider what happens if the aim of a Web site is not so much to promote business as to encourage interaction, enjoyment and a rich media experience.

Imagine the phone is replaced by the podcast and Digital TV by a video and you have the beginnings of a Web 2.0 type Web site where exclusion zones are occurring unless there are captions or alternative texts available for those with hearing and visual difficulties. Add to this 'multi-channel' environment the heady mix of social interaction, pop-up applications, plug-ins and a choice of browser for viewing. In this case, those using assistive technologies have to become expert, agile technology users. There are no WCAG-based logos to say the degree of effort needed to use a site by different access devices.

It is also becoming clear that the guidelines for accessibility offered by W3C and the automated checking tools are beginning to fail Web designers. This paper has demonstrated that it is not enough just to have guidelines for the Web resources but there is also a need to meet compliance within the developer tools provided for Web designers. However, there is now the ability to mix technologies and form what are often called 'mash-ups'. No single design program can be expected to highlight all the problems when it comes to the final outcome and its impact on usability and accessibility. As the designers become ever more agile in their use of software, there are no WCAG-based logos to make them aware of the difficulties that may arise

7.3 Looking to the Future

If current approaches in the specification of accessible Web sites are flawed, what alternative approaches should be taken? The authors' experience suggests that there is not a single specification, or set of them, that can be prescribed for accessibility. The approach that appeals to the more experienced mind is one that operates on a repertoire of techniques, policies and specifications that are worked upon freshly in each new situation. The results of this expert approach cannot be mandated as the relevant expertise cannot be distilled but the practice of consideration, and exploration can be mandated. The authors are inclined to the view that it is more the processes undertaken by authors or not, that are responsible for many accessibility problems. This suggests a process-oriented approach to accessibility rather than one based on strict technical adherence to technical specifications.

Businesses and other organisations have been able to lift their achievements in terms of quality when they review their practices against a set of standards for such practices, as specified by the ISO 9000 standards, for example, and claim that they had reached a certain level of quality performance. The anticipated and valued side-effect of following the practices is a better quality product or service, of course. In supporting accessibility, businesses and organisations need processes that encapsulate best practices.

Currently it is not possible for organisations or individual authors to assert their proficiency in accessibility: developers who tender for work and win contracts by pointing to previous work cannot

guarantee accessible future work but they can commit to follow best practices, but in most places there is no recognition of such practices. Best practices, according to the authors, must take into account all relevant digital and other resources, not just Web pages, as well as the authoring and user agent tools, but importantly, also the ways in which consumers may wish to interact with any proposed content. Ways of interacting include the interfaces that users may adopt, and the type of interaction the users may choose. This best practice would not limit access to content to a particular environment, such as Facebook or Second Life, but offer those among others as possibilities. Similarly, interfaces would not be prescribed: Second Lifers meet within an environment but how they control their activities within Second Life may vary according to the interface they choose to use, and these are proliferating as developers realise the popularity of Second Life and the diversity of purposes, contexts and facilities change. The children's programming language Scratch (2008) [24] is being used to drive characters in Second Life, for instance, in exploratory work at MIT.

Experienced developers will not ask what do I want the users to do without also asking, what will the users want to do? Both questions provide a balanced approach to content publication and service provision. In many case, it will be found that a minority of people will follow a planned approach to content or services. Many, instead, arrive within a context from an external source such as a search engine. Others engage with an extract that comes from a context they have in general chosen to ignore although they want the specific piece they dynamically extract to their chosen context.

8. FURTHER WORK

The BSI PAS 78 "Guide To Good Practice In Commissioning Accessible Websites" [3] published in March 2006 was developed to ensure that the commissioning processes for the procurement of Web sites addressed the accessibility aspects. Although the document highlights the importance of WCAG in this process, the document did not mandate conformance to any particular WCAG priority level. In addition, the document recognised that although formats such as PDF and Flash have been deprecated by many involved in Web accessibility work, many services make use of such formats. The document provides advice on how to ensure Flash and PDF were used in accessible ways.

As described by Kelly (2007) [16], the underlying philosophy taken in the document reflects the user-focussed approaches inherent in the holistic model. In order to avoid the problems suffered by the WCAG 1.0 guidelines, the BSI PAS 78 had a life of only 2 years explicitly defined in the document. On 18th February 2008 an announcement was made on the E-Government Bulletin [13] that work would be starting shortly on an update to the specification. In particular the new version would seek to make use of WCAG 2.0 and the challenges of documenting best practices for accessibility in the rapidly changing context of Web 2.0. The authors of this paper will be seeking to embed the holistic model in this document in order to maximise the impact and take-up of this approach.

The AccessForAll metadata has not yet been fully developed. There are new types of resources being considered as the approach spreads from the description of purely digital resources in a digital environment to physical resources being described and ephemeral objects such as events. The challenge is to find ways of defining and using metadata to allow continuous improvement of resources and services. For example, if someone publishes a new

interface to Second Life that is suitable for people using a single switch, but that is not an official part of the standard Second Life system, how does a user find such an interface? The first step, of course, is for it to be described in a well-defined and published language, but discovery will also be a problem, at least for a while.

The authors acknowledge that the holistic and contextualised approach to Web accessibility described in this paper will not have the appeal of the checklist approach supported by use of automated accessibility checking tools. This latter approach is more easily implemented by content creators, as well as being easy to document in tender documents when commissioning Web sites ("the Web site must conform to WCAG AA guidelines").

The approach does reflect the complexities of addressing accessibility issues however, and in the light of experiences gained since the simple WAI model and WCAG guidelines were first developed, the authors believe it is now time to move on from a position which focuses on the resources in isolation from how the resources are being used.

In many respects, this move away from a checklist reflects the growing maturity of the Web accessibility environment. Indeed, there are parallels with other approaches to best practices for enhancing user experiences: when learning to write papers, reports, PowerPoint presentations and even fiction, simple guidelines may be produced which can be helpful for beginners. Over time, expertise alerts users to occasions in which it is appropriate to break such guidelines in order to enhance the experience for the target audience.

In addition, the authors recognize that an approach that does not depend on explicit guidelines can be disconcerting for some users. The forthcoming WCAG 2.0 guidelines arguably will raise similar concerns. The WCAG 2.0 release will therefore provide a valuable opportunity to not only promote the new guidelines, but also a model that recognizes and considers the context in which the guidelines should be used.

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