Web 2.0: Hype or Happiness?

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ABSTRACT
Web 2.0 has initiated a new age of Web interaction. Countless everyday activities such as seeking information, shopping, filling in forms and making appointments can be done effectively and often more cheaply on the Web. However many of the new community sites, and other Web 2.0 sites, do not promote accessibility in terms of inclusivity. They are built for, and are of most benefit to, young socially integrated people who own their own laptop and live in a world of readily available radio LAN and fast access broadband. However many older or disabled people are living on low budgets and do not have access to such things.

Those for whom the Web is inaccessible for whatever reason will become increasingly excluded from mainstream life if it is not made accessible to them. This paper argues for a holistic approach to accessibly which addresses all aspects of the user's life. It tracks the impact of the advent of Web 2.0 on Web accessibility in its widest sense. It starts with a definition of accessibility, which in this context means apart from physical access, inclusion and acceptability. Through the use of case studies it examines worrying trends brought about by Web 2.0, and positive signs of improvement in accessibility, due to Web 2.0.

Categories and Subject Descriptors
H 5.4 [**Hypertext/Hypermedia**]: *User Issues*

K 4.2 **[Social Issues**]: *Assistive Technologies for Persons with disabilities*

General Terms
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1 INTRODUCTION
Web 2.0 has initiated a new age of Web interaction. Countless everyday activities such as seeking information, shopping, filling in forms and making appointments can be done effectively and often more cheaply on the Web. Those for whom the Web is inaccessible for whatever reason will become increasingly excluded from mainstream life if it is not made accessible to them.

This paper argues for a holistic approach to accessibly which addresses all aspects of the user's life. It aims to track the impact of the advent of Web 2.0 on Web accessibility in its widest sense. It starts with a definition of accessibility, which in this context means apart from physical access, inclusion and acceptability. A far wider remit is taken than saying that a Web site is accessible simply because any potentially excluded group CAN access it. For older adults in particular they also have to WANT to access it. Web 2.0 is there to be used by people in their everyday lives. Physical accessibility is only the start of accessibility, and Web 2.0 is only accessible if excluded groups want to use it and it also benefits them.

This paper uses case studies of community sites to highlight the changes that have come about as a result of Web 2.0. Accessibility has a wide definition in this paper which also asks how much Web 2,0 has aided inclusivity and promoted the cause of accessibility. Several Web sites are cited as examples but it is acknowledged that this is far from a complete list. They also, I am afraid, reflect to a certain extent the cultural perspective of the author.

The specific needs of users who might require accessibility measures are examined individually with relation to Web 2.0. These are visually impaired people, disabled people in general, older people and those in the developing world. It is acknowledged however that there is considerable overlap between the groups.

A final section provides a roundup of, *Worrying Trends*, which need to be addressed, and *Positive Signs*, that have arisen from Web 2.0.

2 ACCESSIBILITY: WHAT IS IT?
Effort, Interest and inclination – An accessible Web means that the Web can be used by all, but it must also mean that it is easy to use by all and should not be labor intensive or arduous. It can also mean desirable because if a user gauges that a device or feature will take a lot of energy and effort to get working then it becomes undesirable and hence inaccessible. Accessibility should not mean that the user will be able to use some software if they spend two days wrestling with it and learning how to make it work.

Inclusivity - A community Web site is accessible if it includes the user in its group and the user wants to be included. If you are excluded from a service then it is not accessible to you. If you do not relate to that which is being provided then you could argue that it is not accessible to you.

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Anticipating the benefits - Older people, the group with which I work, suffer from a lack of technical knowledge and an inability to envisage the benefits they might gain with more involvement with Web 2.0. For them an accessible site would be one where they can see the benefits and which would encourage them to make the extra effort to use it. For younger people new technology often has a coolness factor, the latest mobile phone is a good example, and they talk about technology quite actively in social settings, which has the effect of encouraging experimentation. Older people are less likely to form such groups and are therefore less likely to anticipate the benefits of Web 2.0. or even know what is out there. However it is also notable that older people experience peer group pressure as they age, in perhaps an even more competitive way than younger people. There is nobody more determined to master a technology, such as email, than an older person who considers them self to be more able (or younger) than a friend that has already achieved it!

The user's life - I also plan to look at accessibility and Web 2.0 from the perspective of the user rather than the technology. This means looking at people's lives and gauging how accessible and also how possible Web 2.0 features might be for them, this is particularly important for older people, who show considerable resistance to Web usage.

3. Web 2.0 PHYSICAL ACCESSIBILITY

A major challenge with Web 2.0 is the use of Ajax [1] (Asynchronous JavaScript and XML) to dynamically create pages, although JavaScript was also used in Web 1.0. Two significant problems are (1) alerting the user that the page has been updated, and (2) if JavaScript has been turned off then calls to the server will not be made. It is hoped that both browser and screen reader manufacturers will be able to come up with solutions to these problems but this will take time.

A solution for building accessible Web 2.0 sites is to follow Hijax principles [8] which allow Ajax type dynamic Web pages but enables more accessible development.

An added factor with Web 2.0 applications is that they allow Web content authoring and therefore require accessibility in Web authoring. They are therefore subject to not only the Web Content Accessibility Guidelines [16] but also the Authoring Tool Accessibility Guidelines [3] as well as.

So the accessibility of Web 2.0, like Web 1.0, relies heavily on the motivation of Web developers to develop accessible sites according to Web Access Initiative (WAI) [15] guidelines. There is however an increased awareness of the anti discrimination legislation these days, and maybe that will make the difference. There are more companies out there offering their services to make sites accessible, and most importantly making Web site providers aware of the legislation, and they sometimes use quite threatening scare tactics. "You could be breaking the law …" etc.

4 THOSE WITH VISUAL IMPAIRMENT

4.1. Physical Accessibility

For those with a visual impairment the Web presents considerable challenges. The view of Donna Smillie Senior Web Accessibility Consultant at the Royal National Institute for the Blind (RNIB), UK is that "we will see a reduction in the accessibility of sites as Web 2.0 technologies and functionality are implemented. Because it can involve more complex programming and interactions between browser and server, there is a risk that functionality will initially be implemented in ways which cause problems for those using assistive technologies such as screen readers. Some web developers still struggle with issues as simple as providing meaningful ALT text for images! However awareness of accessibility is generally higher than in the past, so we hope that developers will be more likely to factor in issues relating to accessibility when developing new applications and functionality, and be less likely to either leave them out altogether or only consider them as a last minute afterthought. But, while I would hope that the number of developers who will bring an awareness of accessibility issues to their work in this area is going to be higher than with previous advances in web technologies, I rather fear that the number of those who have little understanding of accessibility or who take the view that incorporating real accessibility is going to be too time consuming and difficult will be significant"

4.2. Community Sites for Blind Users

Web 2.0 supports many community sites for blind or visually impaired users, which address a range of needs. Two sites which reflect different approaches are described here, with a view to assessing their accessibility in the widest sense.

The BCAB email list - The British Computer Association of the Blind (BCAB) [5] site posts items of interest to blind computer users including conferences and useful organizations. They are also active in organizing e-petitions for the Prime Minister using the on-line Petition System. Current petitions seeking signatures are:

- Encourage publishers to make more titles available as talking books
- Give all blind people the right to learn Braille
- Provide the higher rate of Disability Living Allowance for people who are registered blind

The BCAB mailing list membership is free, although other organizations such as Radar [12] require a subscription and offer more services. The mailing list is very lively with as many as thirty emails per day when a particular item is of interest to several people. When people email in technical questions they tend to get answers straight away, thus providing an invaluable service.

For example one member had a strange noise in her computer and many fellow members devoted a considerable amount of time to suggesting what the solution might be. One even sent a zipped file of the noise that a failing hard drive might make, which she then couldn't open with her software, which prompted a new flurry of emails with helpful suggestions. The list certainly feels like a community and is very friendly and helpful. Responses are quick and the feeling is of a lively and supportive group of people, who are working together sharing knowledge around blind access to computing. To my knowledge, unlike other sites for blind users, there is no audio interaction where you can get to know people through their voices, and the members' personas are encapsulated solely by their emails. Nevertheless the site has a strong feeling of community and one certainly gets to know certain individuals.

Members of BCAB have different levels of computer familiarity and it is certainly not just for techies.

This site is has several sighted participants, and is therefore not exclusive or serving any form of sub-culture. Some sighted people ask for members of the blind community to test software for accessibility and recently there has been much discussion over

a questionnaire posted by an unfortunate university student. He requested members of the list to fill in a questionnaire after trying out some on-line shopping sites, which he said would take only fifteen minutes. He was left in no doubt as to the time it takes for a blind person to try out an unfamiliar on-line shopping site and also informed that his on-line questionnaire was inaccessible, in the nicest possible way of course. This is a Web 2.0 facilitated group at its best, working to promote access for blind and visually impaired people.

ZoneBBS – ZoneBBS [20] offers a different type of community site for blind users. Everyone has a cool pseudonym and members can optionally provide personal details. They can also optionally record an introductory audio file, which makes for a far more personal experience. The chat room is known as the lounge and when you log on you can tell who is in the lounge and how long they have been there. Members share a lively social and often quite personal interaction rather than passing on information, as in the BCAB list, and it is obviously used a lot.

The atmosphere on the site is of a group of friends just hanging out, saying any old thing and spending time together. ZoneBBS therefore is supporting social accessibility and contributing something extra and valuable to the members' lives.

5 DISABILITY IN GENERAL

Ouch! [10] is a Web site from the BBC which in its own words aims to 'reflect the lives of disabled people right here and now in the third millennium'. They emphasize that they are not a help and support site but more a lifestyle site.

It does actually feature quite a lot of useful information, but the most noticeable aspect is the humor on the site, which is pretty black. For example the blog is edited by Crippled Monkey. The podcast in particular sends up disability in a way that would be unacceptable from a nondisabled person, and the site creates a community of disabled people whose culture is unlikely to reach the outside world. Wouldn't it be better if this humor were presented in mainstream BBC output so that undisabled people could have a better understanding of the attitudes of disabled people, rather than being hidden away in a specialist area of the Web?

6 OLDER PEOPLE

Older people are a special group because many of them have lived their lives in a world without the Web. It is hard for them to see the benefit of many Web services and they lack the resources to get going on the Web. For them therefore the Web can often be inaccessible.

They also socialize in different ways. Young people tend to be 'up for' trying new things, meeting new people, looking at images of other young people and are interested in establishing an identity for themselves within their peer group. Older people are less interested in 'seeing' people, and being seen than younger people. As one subject said "Why would I want to look at their old faces?" This may also be due to visual impairments but is also, in my view, because they are less interested in the way that society perceives them.

My experience of older people is that they value old friends and are lest likely to 'invest' in new relationships or new technologies. As one of my subjects said 'there is so little time left you don't want to waste it learning new things that might prove not to be useful.

6.1 Critical Mass

I have spent some time introducing Skype [13] to older people who regularly phone relatives abroad, using the old technology and clocking up considerable bills. Apart from the effort required to learn how to use Skype we find that their Skype Contact List is very small or in many cases empty. A critical mass of people on Skype is needed to make it worthwhile. I also suggest that they might like a Webcam to see their relatives as they speak and, as mentioned earlier, there seems to be a general feeling that when you are older you are not so interested in seeing people or people seeing you. This is significant for a Web that is becoming more visual. Will the number of older users dwindle further with the increased use of unsuitable types of media, and the critical mass of users for older people's community groups be even harder to achieve?

6.2 Technology Acceptance Models

The previous sections contain mostly anecdotal evidence concerning older peoples' acceptance of new technologies. It is useful here to consider some of the features of Technology Acceptance Models (TAMs) for a more formal approach to technology acceptance. Older people experience a range of age-related impairments including degradation of cognitive ability, hearing and sight and significantly they experience a loss of energy, which not only impacts their computing ability but their ability to cope with life in general. This affects their willingness to engage in new technology [18]. Technology Acceptance Models are theories that model how users come to accept and use information technology [6],[17]. They suggest that that acceptance is related to concepts of acceptability, usefulness, or utility and also the effort required to complete the task They also provide a useful framework for exploring the reasons why older people are often reluctant to engage with new technologies in terms of Perceived usefulness (PU) "the degree to which a person believes that using a particular system would enhance his or her job performance" and Perceived ease-of-use – (PEOU) "the degree to which a person believes that using a particular system would be free from effort". Both PU and PEOU are particularly relevant to the study of technology acceptance in older adults as they, as users, have considerably more problems to overcome in terms of their age related impairments.

6.3 Remembering new features

The elements of age related impairment which impact most on computer use are memory loss and cognitive impairment. Memory and cognitive ability are especially required to learn how to use the new features in Web 2.0. Quite apart from the extra effort and energy required to download and learn new features, for example how to use Skype, older people know that they will not be able to remember how to do it again if they don't use it regularly. Short term memory is most affected by ageing, and learning by exploration relies heavily on short term memory. Learning something new just for the sake of it, unless you are very interested in the topic, is a young person's activity.

At Age Concern Oxfordshire where in the past I have been involved in teaching older people new Web tricks, we found that well written sets of steps are crucial, and used over and over again. The voice Web browser BrookesTalk adapted for use by older adults [19] was most successful [9] as it spoke them through their interaction at all points, telling them what they had just done and what things they could do next.

6.4 Web 2.0 and Social Integration

Web 2.0 has become part of the culture of a significant proportion of young people in the developed world. Facebook [7] for example which enables users to create a space, for themselves and about themselves, with photos, information and links to friends, enables subscribers to keep in touch with each other, and is widely used and integrated into social contact. At logon a list appears of news items about your friends, and what they are doing. Facebook provides a framework for social interaction, in the same way that people discuss the latest developments in TV soaps or the program Big Brother. The voyeuristic nature of Facebook interests young people who are curious about what other young people are doing and what they look like.

In my view the social and community activities provided by Web 2.0 are of much more interest to younger people than older people.

7 ACCESS FOR THE DEVELOPING WORLD

It is fair to say that most of the Web 2.0 facilities are aimed at the developed world. They require high speed internet access which is often not an option in the developing world, where even buying a computer might well be impossible, when we consider that half the world's population has never even used a phone. They also require high levels of literacy and most sites are in European languages.

Mobile phones require less digital infrastructure and less literacy and can be used in remote areas of the developing world. As when designing for older people, Web 2.0 technology providers should be careful to match provision with the real needs of the most disadvantaged in the developing world. One successful application design [11] provides IT support for semi-literate Indian women living in rural communities, with their micro-credit activities. Here a group of village women pool their hard earned savings together to buy a useful item such as a sewing machine which they can use collectively to run a business and support their families. The strength of the system was that it closely reflected the layout of the paper based ledgers used by the women so that they could transfer their information easily onto the Web 2.0 application. Similarly

8 WEB 2.0 ACCESSIBLITY??

In this section I will list the worrying trends in Web 2.0 accessibility, together with the positive signs. I have collected together the verdicts of several people who have more experience than I of wrestling with Web 2.0 and also my own conclusions. This is not an exhaustive list and simply reflects how it seems to us.

8.1 Worrying Trends

The increase in the use of video on Web 2.0 is cited by Liz Ball who is deafblind, and uses Braille output, as causing one of the greatest problems. She says [4] '"Video is being used more and more either to augment or instead of other web content. It would be a tragedy if the increased use of video led to deafblind people becoming less and less able to access the web. We need to ensure that people do provide text alternatives."

Skype in particular and Web 2.0 in general is becoming more graphical and screen readers are having a hard time catching up, as reported by a BCAB member.

Many Web 2.0 facilities rely on fast download times, which are unattainable for many disabled people and older people who live on low incomes and rely on dial up. For them large downloads are very slow and therefore extremely expensive.

Dynamically created Web sites using Ajax are inaccessible. One solution is to create special HTML pages from them when accessibility is required. This means that accessibility becomes once more an optional extra rather than built in.

Ajax is turning up in new places. BCAB members report that Ajax is currently a real issue. There seems to be more about in various places, such as in Gmail, Google Apps, and some systems used in the work place. This is a problem because Jaws doesn't seem to be able to track the relevant bits on the page that move. Pages that use Java are also difficult; again this tends to be in business oriented applications, and can sometimes be got around with the Java Access Bridge.

Incompatible products. In an ideal world, all Web pages could be read by all screen readers. However it seems that even products which aim to help those who cannot see are battling with each other to produce their own system which may not be compatible with others.

Security headaches. BCAB members report increasing difficulty with logon, as service providers use special measures to avoid Web robot, or *bot*, attacks. When trying to join a Google group and other services, sighted users have to look at characters in a graphic and type them in. This is to make it impossible for *bots* to find the character. These characters cannot be read with a screen reader and are often deliberately so ambiguous that it is not easy to see them if you are visually impaired. Sometimes a sound recording is provided for blind users but certainly not always. Google has also put music or other sounds on this which made it very difficult to hear, presumably to make it more difficult for the *bot* to recognise the characters in the sound file as well! Keeping bots out also keeps blind users out.

Isolation of particular groups – while particular disabled groups can gain support and useful information from special community sites there is a danger of isolation. While Web 2.0 has enormous potential to bring people together it could encourage the formation of isolated groups that do not engage in mainstream activities and who develop their own sub culture which excludes others.

8.2 Positive Signs

New games site for blind people. Audyssey games [2] for example in existence since March 2006, is a site whose main purpose is to provide a place where anyone can learn about games which are specifically for blind people, or just happen to be usable by blind people.

Some cool gadgets often increase accessibility. Léone Watson herself visually impaired, from the Accessibility Research Programme at Nomensa makes the following point on [14]'a lot of access needs may be met by some of the cool, Star Trek style stuff going on, almost by accident. Microsoft's Vista, for example, comes with voice recognition software. People think it will be cool to talk to their computers, which has a knock on effect of improving accessibility.

The popularity of iPods has lead to easier audio streaming in Web 2.0. This means that suppliers are investing in more downloadable talking/digital books which benefits blind people. Also audio streamed blogs for blind people downloaded to iPods

Creating HTML from dynamically created sites may change the look of them but they are essentially the same pages. This is an improvement on the equivalent provision in Web 1.0, where text only pages are provided, which were often very different from the original pages, as people often forgot to update them when the original pages changed.

Supportive communities have been developed. Web 2.0 has enabled the development of cohesive communities of disabled people to support each other, pool ideas and information and campaign for better provision.

9 CONCLUSIONS

Counting the points in *Worrying Trends* versus *Positive Signs*, the number of points for concern appear greater in Web 2.0.

Many of the new community sites, and other Web 2.0 sites do not promote accessibility in terms of inclusivity. They are built for, and are of most benefit to, young socially integrated people who own their own laptop and live in a world of readily available radio LAN and fast access broadband. However many older or disabled people are living on low budgets and do not have access to such things. It will take more than simply conquering physical accessibility to make Web 2.0 accessible. We have to work on making it relate to the excluded groups, and find new ways of familiarizing these groups with what is on the Web and what it can do for them.

Increasing the accessibility of Web 2.0 for all groups who are physically, socially, or economically excluded should be addressed from several different directions.

Physical ability to access the Web is very important, but for older adults in particular, more is required. In my view training and familiarity sessions are fruitful as older people learn new things more slowly and are often isolated from new technologies. I have run sessions at Age Concern Oxfordshire and found that repetition in a non-threatening atmosphere can achieve a lot.

Web 2.0 goes some way towards social inclusion but there are still many people who cannot afford to use the Web. Economic factors are important and could be overcome if governments allowed grants for computers and digital infrastructures for disadvantaged groups.

With Web 2.0, accessibility remains dependent on the willingness of providers to take it seriously and adhere to the accessibility guidelines. This is gradually improving as providers become more concerned about legislation. However two things could accelerate this process. One would be a high profile court case which would serve to warn everybody of the consequences of providing inaccessible Web sites, and the other would be if Google made accessibility their number one search criteria!

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