

## **Web 2.0 and the Visually Impaired Learners**

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**Introduction:**

The emergence of Web 2.0 technologies has created opportunities for the visualization of much information on the web. It is, therefore, one of the empowering sources for learning, or so-called e-learning 2.0 (Downes, 2005). Educators are starting to explore the potential of blogs, media-sharing services and other social software - which, although not designed specifically for e-learning, can be used to empower students and create exciting new learning opportunities. During the past few years, Web technology has been rapidly developed in order to increase its functionalities and design; however, this might indirectly increase more barriers to another group of users. To put it differently, 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. The way this information is presented may mean that it is difficult, or impossible, for people with various forms of disability to access it. A visual on a screen is of no use to someone who is blind.

Nonetheless, there are many solutions for this problem today and hopefully even more in the near future.

This paper will start with the general idea that links the Web 2.0 to the impact of online communication and interaction on persons with disabilities. Then the necessary information about the computer/Internet use and the visually impaired will be described to serve as background knowledge for educators and practitioners in the mainstreamed settings. Next, we will move on with practical implications of Web 2.0 toward visually impaired learners. In this section, a definition of accessibility will be discussed as well as its impeded features that prevent these groups of people to access web sites. A final section provides a roundup of worrying trends that have arisen from the Web 2.0. After that, some solutions to these problems are proposed.

**Impact of online communication and interaction on persons with disabilities:**

Bowker and Tuffin (2003) had conducted studies that aim to explore the cultural world which disabled people access when they participate in online conversations. Findings reveal that the visual anonymity associated with online interaction, which lacks of social context information (including status cues and non-verbal behavior) in online communication, encourages more equal levels of participation. People with disabilities have the potential to participate in social interaction beyond the stigma of a disabled identity.

Such positive findings for online environments is at least partially due to the fact that visual ontology powerfully affects how bodies may be seen and judged. Through the online communication, the physical differences are neutralized by the visual anonymity. The lack of visual cues may be interpreted as the “non-disclosure” and the disabled gain a sense of personhood within an able-bodied framework or “normality.” To put it simply, this demonstrates that the non-disclosure was operated to preclude negative reactions and prejudice against disabled people. The Internet’s potential helps eliminate discrimination that exists in the context of a real-world social environment in which discrimination still prevails. Therefore, the disabled are more likely to achieve equality. Moreover, the idea that identity can be constructed according

to the demands of the situation is a powerful framework for disabled people, because it permits a creative space for developing ideas about the self (Bowker & Tuffin, 2003).

### **The impact of computer/internet on the visually impaired:**

Before starting the discussion, I offer a brief definition and explanation of visual impairments in order to enhance understanding of it.

The term 'visual impairment' covers a wide variety of conditions; some present since birth and some resulting from gradual deterioration of sight. Visual impairments include low vision and blindness, or there are many aspects of seeing. Low vision is used to describe a loss of visual acuity while retaining some vision. "Blindness, on the other hand, usually refers to a complete lack of vision. People who are considered "legally blind" may have some useful vision." (World Health Organization, 2002; DO-IT Disabilities, Opportunities, Internetworking, and Technolog project, 2005).

From the above definition, it is understood, in order to qualify as visually impaired, an individual does not necessarily need to be blind or have really severe loss of vision. These visually impaired people, therefore, depend more on receiving information from other sources other than their sight. For instance, computers have increasingly played a great role as the tools for communication. The Internet or WWW is a valuable source that responds to this special need. In addition, Web 2.0 technology allows the blind not only to receive information, but also offers them to easily exchange their opinions with the wider world.

Apart from the benefit of information access, computers and the internet also have a great benefit in terms of social interaction. Computers and the internet help the visually impaired have a greater sense of community and of social networks than they had previously been able to do (Gerber, 2003). Besides, it is obvious that computer-mediated communication (CMC) plays a great role in assisting them to access information independently. Unlike in the past, most of the visually impaired had to depend on others, especially family members and friends, as the important resources (Williamson et al, 2001). Nevertheless, in order to make use of those devices, assistive technology is extremely essential. The primary examples of these technology and equipments are magnification programs for the computer screen, synthetic speech systems, optical character recognition (OCR), Braille display, note takers, and so on. Moreover, Internet via the Web would be a great resource; the visually impaired can gain access provided by this communication channel if only it is made compatible to available technologies which enlarge text or convert the information to audible or tactile media. Recently, a haptic interface has become popular and can be an alternative.

Having known broadly the roles and impact of computers and the Internet on the visually impaired, next I will examine the specific use of such technologies in a real context.

### **Practical implications of Web 2.0 toward visually impaired learners:**

It is claimed that the Internet or Web is a major medium for e-learning. Moreover, with high functionalities of the Web 2.0, learners can use this medium as a tool to effectively

increase their learning both in the formal and non-formal education. For learners with visual impairments, as stated earlier, the Web 2.0 contributes to the equal access to information. In addition, it helps to promote social interaction among these people in the mainstream society. On the other hand, the design of the Web 2.0 and many online courses actually erects barriers to participation by students with disabilities (Coombs, 2000). This leads to the concept of accessibility. The accessibility and usability are critical issues for users with visual impairments, and it is widely discussed in the Web development community as will be described in the next section.

### **What is web accessibility?**

Web accessibility means that “people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web” (Web Accessibility Initiative, 2008). A far wider remit is taken than saying that a Web site is accessible simply because any potentially excluded group *can* access it. An accessible web site must be sufficiently flexible to be used by the assistive technologies. To put it simply, an accessible Website 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. 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 (Zajicek, 2007).

### **Web 2.0 and E-learning for visually impaired learners:**

In terms of e-learning, the concept of web accessibility includes other Content management systems (CMS) (e.g., WebCT Vista, BlackBoard, Lotus Notes, Moodle, FirstClass, VirtualU, Desire2Learn, etc.) and other e-learning systems, (e.g. virtual learning environments, digital repositories, multimedia, web portals, discussion boards). As a result, learning technologists play a great role in developing their web sites and systems to be accessible. Below are some guidelines and principles for web accessibility.

### **Accessibility guidelines and standards:**

Currently, there are a lot of both national and international guidelines, standard, and legislation to insure the rights to access information of persons with disabilities. The most well known and perhaps influential accessibility guidelines are the Web Content Accessibility Guidelines (WCAG) developed by the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C) (Brewer, 2004). A list of checkpoints is provided that explains how the guidelines apply to typical content development scenarios. Each checkpoint also has a priority level assigned based on the checkpoint's impact on accessibility. The guidelines also define three "levels of conformance" where at Conformance Level "Triple-A" all Priority 1, 2 and 3 checkpoints are satisfied. The guideline is based on the concept of “universal design.”

Regarding law and legislation, a number of countries have influenced the accessibility design practices of both education and non-education organizations. In the United States, perhaps the most influential legislation has been the 1998 amendment to the Rehabilitation Act (US Department of Labor, 1973), called Section 508, which includes guidance for determining the accessibility of information technology as well as enforcement procedures. Section 508 requires federal agencies to purchase electronic and

information technology that is accessible to employees with disabilities. In addition, to the extent that those agencies provide information technology to the public, it too has to be accessible by persons with disabilities.

### **The unresolved issues and worrying trends:**

Although there are many principles and guidelines on accessibility, the study conducted by the United Nations found that 97 percent of the websites tested from 20 countries did not comply with basic accessibility regulations, despite disability legislation existing for over half a decade (Nomensa, 2006).

In the case of Web 2.0, many devices and advanced technologies have been developed in order to increase functionalities, visual appearances, and ease of use, just to name three. Examples of Web 2.0 integrated technologies are asynchronous JavaScript and XML (Ajax) and video streaming, and devices which support Web 2.0 such as iPhone. While the design of all these applications and associated devices is striking, it also generates accessibility problems. The iPhone, for instance, has obvious implications for those with vision impairments when there are no physical markers to point towards the phone's functions (Crichton, 2007). These technological barriers are briefly explained below.

### **Ajax**

Nowadays Ajax is currently used in various places, such as in Gmail, Google Apps, and some systems used in the workplace to dynamically create pages (Ajax Matters). This causes a real issue for the visually impaired user because a screen reader is unable to track the relevant bits on the page that move (Almaer, 2006). In addition, pages that use Java are also difficult; it can sometimes be got around with the Java Access Bridge. A solution for building accessible Web 2.0 sites is to follow Hijax principles (Keith, 2006), which allow Ajax type dynamic Web pages but enables more accessible development.

### **Incompatible products**

In an ideal world, all Web pages should be able to be accessed by any assistive device. However, there are numbers of web sites that do not allow such technologies to be connected. Even if those are accessible web sites, there is no guarantee that innovative products, such as mobile devices, can be used by the visually impaired (Ellis & Kent, 2008). It is hoped that mainstream manufacturers will be able to come up with solutions to these problems. One recommendation is to follow the universal design concepts and accessibility guidelines.

### **Video streaming and multimedia**

In the present time, videos are being used more and more in Web 2.0 either to augment or instead of other web content such as YouTube. Additionally, information which is presented simultaneously makes it difficult to interpret using Braille or speech or access using scanning (Treviranus, 2007). This is one of the greatest problems for the blind and deafblind people. The increased use of this media means they are becoming less and less able to access the web. We need to ensure that people do provide text alternatives.

### **Verification codes**

Due to the security measure, many web sites require users to put graphical verification codes in order to protect against the fraud access. Such codes can be a barrier for the visually impaired users since these graphical characters can not be read by the screen reader software. Additionally, reliance of too many blurred or hard to read graphics can be problematic for users with low vision. Occasionally, a sound recording is provided for blind users such as in Google or Facebook. This audio system can help to solve this problem, but sometimes, the sound quality is very low and is hard to identify.

### **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 (Seymour & Lupton, 2004). In the case of visually impaired communities, discussion topics are more likely to deal with eye care, assistive devices, and mainstreamed technologies. It would be better if these forums include sighted people, or are open for the broader society.

### **Conclusion:**

The above issues are only some problems and concerns that arise from Web 2.0 development. It is undoubtedly that the numbers of inaccessible features are definitely increasing day-by-day. Although most problems can be solved by following principles of accessibility guidelines and standards, the bottom-line issue is the awareness of web developers and stakeholders who are dealing with the design and have primary control over these features. A good design can not only make visualization accessible, but can also make the information more accessible.

Web 2.0 is available to be used by people in their everyday lives. It also has the potential to open up the world to people with disabilities, and is often presented as a way to eradicate disability as it is socially constructed. On the other hand, it can cause great barriers and inequality if this medium is inaccessible. The Internet cannot be fully accessible until disability is considered a cultural identity in the same way that class, gender and sexuality are. Accessibility is a universal design issue that potentially benefits both those with a disability and the wider community. It requires collaboration from the relevant sectors in order to promote full inclusion in the society.

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