Challenges and Opportunities

The Road Ahead for Disability in a Digital World

"In the rush to implement Web 2.0, accessibility tends to get pushed back on the priority list."

Sharron Rush, Executive Director of Knowability (quoted in Hasson, 2009)

"New technologies, without accessibility, are being introduced. Only when their use becomes widespread do we require accessibility. However, by then, retrofitting accessibility is more complicated, more expensive (sometimes much more expensive), and often less effective than if accessibility had been included in the original design and specifications. The same pattern is being repeated in ... digital rights management in digital media, Web 2.0, Next Generation Network (NGN), and digital television."

(Vaughn, 2006)

We began this book with the often-cited Tim Berners-Lee quote regarding the importance of accessibility in order to create the most powerful web experience possible. Although a well-known quote that has been described as causing web developers' "eyelids to droop and their thoughts to turn to that cute in Accounts with the tight jeans" (Lawson, 2006), it has not been similarly overused in disability, media, and cultural studies. While these disciplines and the cultural investigation of the web in the emerging field of internet studies have focused on the creation of a digital divide based on culturally specific yet arbitrary standards of humanness, a consideration of disability as it is socially created is conspicuously absent.

In their book Digital Disability, Goggin and Newell (2003) lamented the lack of disability theorization within the discipline of internet studies. In a later article they took the study of disability to task, suggesting that it should start interrogating digital technologies (2005a). We have sought to close these intersecting
gaps throughout this book and consider the issue of web accessibility from a disability/media studies framework. Our focus has been specifically on web 2.0 technologies as these have posed both increased opportunities and greater challenges for people with disability. Web 2.0 is a more complex, graphic, multimedia-rich interface than the earlier text-intensive web experience. Although as Wood (2010) notes, there were no accessibility guidelines in place at the web’s conception and it developed accordingly, specifications can be added to web 2.0 applications to ensure they allow adaptive technologies a way to interpret dynamic elements.

We begin this final chapter by drawing out Tim Berners-Lee’s 1997 quote to give some further context on his goals for the web and what that means for the future. Berners-Lee’s vision for accessibility included not only people with any kind of disability/impairment but also others who may be affected by other disabling elements including a digital divide along class and regional boundaries:

The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect. The IPO (International Program Office) will ensure the Web can be accessed through different combinations of senses and physical capabilities just as other W3C activities ensure its operation across different hardware and software platforms, media, cultures and countries. (Berners-Lee, 1997)

Berners-Lee made this proclamation when he launched the International Program Office for WAI. Throughout this book we have addressed accessibility in its broadest sense, as a way to access the web regardless of impairment, browser, or device. The idea of web accessibility is to remove barriers. These barriers may be related to disability, however, increasingly, are also of concern to people attempting to access the web from other devices such as mobile phones or portable digital assistants as well as for those using slower internet connections or older equipment.

Berners-Lee has been called to task on the difficulty of applying his vision of universality to web 2.0. This chapter charts the terrain ahead, looking at the potential developments that could both enable and inhibit the fulfillment of Berners-Lee’s perception of the power of the web. While forecasting the future of the internet is unreliable and has a tendency to create flame wars online, this chapter seeks to touch on the key areas that will impact on disability in the near future digital environment. These include the evolving regulatory framework that supports the internet, specifically the issue of DRM and its legal ramifications of copyright enforcement, the issues surrounding video captioning, and a new legal discourse in the revised Rehabilitation Act. We consider evolving trends in digital design and online activity that will impact on this area such as three-dimensional virtual worlds, augmented reality, and mobile access, and we highlight the importance of mainstreaming access.

Digital Rights Management (DRM)

DRM software and hardware controls the way digital information is accessed and reproduced. It can encrypt time limits, lock content to a particular device, and disable certain accessibility functionalities (Schiller, 2010: 42). In an attempt by publishers to deal with the copyright issues that come with moving media such as music, video, and books onto digital platforms, DRM software imposes limitations on the way this content is used, for example to ensure a digital file can be used only on one device or technology. However, this has proved a contentious issue. Just as the early web browser wars prevented “access by everyone” by refusing to adopt a common form of communication across browsers, the increasing use of mobile and portable devices are again splitting the universal nature of the web. With the emergence of the iPhone, Kindle, BlackBerry, Droid, and iPad, web content has the potential to become “device specific” (Pepitone, 2010).

With the increasing popularity and choice of electronic book readers and online video content, companies are using DRM to force consumers to stay with a particular brand. The example introduced in Chapter 2 of DRM wrapped onto Apple iTunes music to ensure music could only be accessed using Apple hardware illustrates a highly successful implementation of DRM. Publishers trying to establish a viable ebook industry are using DRM to avoid such breaches in copyright that were rife during the formation of the downloadable music industry. DRM software was developed to protect copyright of music works, however, ten years on, the technology, or at least its intended application, has failed. Publishers are learning from this — the first MP3 players had no DRM installed; ebook readers have had it built in from the beginning.

Wrapping DRM onto electronic books protects the copyright of authors and publishers. However, unfortunately for consumers, and especially people with disability, there are competing ebook formats and DRM schemes. DRM is essentially a lock-and-key system — when consumers pick a particular brand, they are limiting what information they are able to access. For example, an ebook purchased from Amazon.com can only be read on the Amazon-branded ebook reader — the Kindle.

For many users, this is frustrating. For users with disability, it can render the product next to useless. Drawing on the example of Adobe and DRM that we first introduced in Chapter 1 in relation to Dmitry Sklyarov’s technology to circumvent it, accessibility issues specific to Adobe’s use of DRM relate to the ability to change settings. Color and contrast settings cannot be changed according to individual tastes and screenreaders are blocked from accessing the information. There is also no inbuilt text-to-speech option. While a magnification range does exist, it is limited and a mouse must be used to copy text into screenreading programs as there are no keyboard shortcuts. These DRM measures disable
those people with a number of impairments. As we outlined in Chapter 1, some basic accessibility measures include allowing exclusive use by either keyboard or mouse, as well as functionality to allow zoom function and text-to-speech (Techdis, 2010).

The increased digitization of information represents a fantastic potential for people with disability to access information in flexible ways, however, the use of DRM complicates this. Although allowing publishers to enforce copyright restrictions, DRM can also prevent lawful and fair use of the material such as accessing it in different formats using adaptive technologies. Many eBook readers come with a read-aloud voice output feature but publishers use DRM to disable this function in order to sell the print and audio rights of books separately. As the book is also DRM-protected to prevent it from being accessed on another device, a screen reader cannot read the content either. A study by TAP Information Services found that DRM on recorded books prevented access by the majority of people that they surveyed with both vision and physical impairments (Houghton-Jan, 2007: 54).

As DRM limits content to a narrow group of users and could potentially become increasingly restrictive, new measures are needed to impose accessibility. Ideally, access should be built in to players, such as the text-to-speech functionality. However, a better solution would be to make the interface accessible to allow people with disability to use their own tools of access. These assistive technologies are already individualized and allow for choice. This accessibility 2.0 strategy is more cost-effective for the producers — for example, including a Braille display on every e-reader is neither practical nor necessary.

Steve Jobs (Apple CEO) declared in Thoughts on Music (2007) that the future of DRM could take three different routes. First, DRM could continue on its current path with different organizations adopting different proprietary features, in essence forcing consumers to do what the disparate companies wanted them to. In that environment, consumers would have to choose which content they would limit themselves to or find they needed to purchase multiple branded hardware. Alternatively, Apple could strive for interoperability by licensing its DRM “fairplay” technology to its competitors; however, Jobs saw security risks with this. Finally, DRM could be totally abolished (Jobs, 2007). In this article, Apple appeared to be speaking out against DRM, however, the suggestion of charging a DRM license fee to competitors — and likewise the extra cost invoked for consumers in purchasing higher-quality DRM-free music from iTunes — suggests otherwise. Interestingly, and to much criticism, Jobs did not suggest a collaborative development of a non-proprietary DRM schema (Houghton-Jan, 2007: 54). Such a schema could potentially satisfy the industry’s requirements to protect their copyrighted material and also allow greater accessibility for people with disability.

Attempts by people seeking to transfer an eBook to a portable device such as a daisy reader or a refreshable Braille reader are complicated and often prevented by DRM. As such, the DAISY Consortium Board of Directors (2007) have passionately spoken out against the use of DRM because it prevents the legitimate access and manipulation of digital data by people seeking to access publications using assistive technology. Daisy is an audio format that is used by people with vision impairment to access text material. For example, newspapers are available daily via dedicated websites for people with vision impairments such as the RNIB or Vision Australia. Daisy audio is usually accessed using portable devices similar to the iPhone but designed specifically for use by people with vision impairment who can use large keys and audio to insert notes and jump from section to section.

The device-specific nature of DRM likewise poses problems for libraries who, by definition, seek to make their collections usable by the widest possible audience, including people with disability. It is not in any library’s interest to offer device-specific material for loan, particularly when technological advancement is so rapid and uncertain. There is real danger that by selecting a specific device all of a library’s digital collection could be unusable within ten years (Houghton-Jan, 2007: 54).

The Legal Ramifications of DRM

The very use of DRM in today’s digital world is in many ways confounding — web 2.0 favors technology above the level of a single device. WCAG 2.0 likewise encourages robust technology that allows access in a number of ways. Under the Digital Discrimination Act (Australian Government (1992b) and other laws that mandate against disability discrimination, DRM could be unlawful as it limits access to information on the basis of a person’s disability.

There is a widespread lack of understanding in relation to accessibility, adaptive technologies, and standards that mandate accessibility. While many web designers fail to put accessibility into place due to lack of awareness, publishers may actually circumvent accessibility in their attempt to protect digital files from piracy and copyright violation. Accessibility features may be available in the original software, however, DRM and the format of many ebooks allow publishers to disable these accessibility functions. Publishers are both suspicious of the disability community and their demands for accessibility and uninterested in this potential market.

There is also confusion over whether audio rights are needed for text converted to speech (Huddy and Swan, 2006). Uncertain publishers will often turn text-to-speech options off just in case (Kerscher and Fruchterman, 2002). Amazon famously disabled the text-to-speech function on the Kindle following (false)
claims from the Authors Guild that this function violated copyright law. In recognition of the benefits new technologies have on the lives of people with disability, a coalition of people with disability protested, urging Amazon not to “disable the Kindle” (Jones, 2009). With less than 4 percent of books being produced in an accessible format (World Blind Union, 2008), preventing the ability of people with disability to lawfully access written material goes against the interests of authors, publishers, and booksellers — not to mention people with disability. DRM limits the usefulness, convenience, and engagement of existing legal rights (Clark, 2003). It is not just an accessibility issue; it confuses all customers. Musicloud, a European online music store, claims that three out of four calls to their customer service line are about DRM (Fisher, 2007).

The ramifications from the implementation of DRM represent one of the most obvious examples of ableist assumptions generating disability for people with different impairments. While the rights of the owners of copyright are already enshrined in law, as are the penalties for breaching these rights, the addition of these technical complements to existing legal structures as a side-effect renders the now “protected” content inaccessible for people who make use of additional assistive technologies. This situation is then made worse by the addition of laws that criminalize attempts to circumvent these restrictions, such as those used to prosecute Dmitry Sklyarov, and threaten legal sanction on others who would try to overcome these socially constructed impediments to access.

The ongoing tightening of this preventative legal framework, particularly the adoption of the “three strikes” policies recently embraced in France and New Zealand (and under discussion in the United Kingdom and Australia) is particularly troubling. Under this type of legislation, a household accused three times of breaching copyright through the internet can have their Internet connection severed. Leaving aside the obvious issues of natural justice and collective household punishment, these laws will have a disproportionate impact on people with disability who may have a much higher reliance on the Internet than their non-disabled peers. These types of regulations also serve as a disincentive to attempts to make content more accessible.

DRM stifles innovation and digital creativity. It also has the potential to prevent the notion of community accessibility that we introduced in Chapter 3. Community accessibility allows the network of web users to initiate accessibility options as a way to contribute to the creation of content. Accessibility measures such as the third-party Twitter platform Accessible Twitter or Virtual Ability on Second Life would not be possible, if Twitter and Second Life had restricted access to their content with DRM.

It seems strange that such advantage is given to large corporations to further enforce their existing copyright holdings, particularly in light of the negative consequences, while the enforcement of laws and regulations relating to accessibility and the human rights of people with disability relies on the diligence of individuals and organizations outside of formal law enforcement to bring complaints and civil actions. This hierarchy is clearly illustrated in the muted effect of the DDA on the implementation of different DRM processes.

**Video Captioning**

AbilityNet’s (2008) accessibility review of social networking sites found that all of the five websites reviewed allowed users to upload video content. However, none outlined the importance of including captions and only one had an option to upload a transcript. The video file-sharing site YouTube failed a basic level of accessibility, with problems occurring in relation to hardcoded text size, AJAX (Asynchronous JavaScript and XML) during the registration stages, thumbnail images without alt text and Captcha (AbilityNet, 2008). However, as we mentioned in Chapter 3, YouTube has more recently made their content accessible with the inclusion of captioning as part of the standard toolkit. These captions are another example of technology introduced to aid people with disability that have been seen to have wide-ranging and unanticipated benefits for the wider community. The advanced search capabilities linked to captioning are increasingly important in the development of video technology. They also allow translation into other languages and make it easy to jump straight to the required section of a video.

However, who should be responsible for the creation of captions in online videos — the site such as YouTube which provides the platform or the average user generating content? When Berners-Lee was questioned by video bloggers as to whether they needed to provide captions in order to make their content accessible, he suggested “community captioning” in the spirit of web 2.0 where the web community provides captions after the video-blogger makes a posting (Outlaw, 2006). This solution embraces the collaboration that underlies web 2.0 and highlights the importance of corporate leaders and television networks in setting the example by broadcasting online captions.

While the major television networks currently provide inaccessible online video content, some independent content creators and television networks include closed captions in their online videos. In addition to the obvious benefits for viewers with hearing impairment, there are also economic benefits as captions mean a video is more likely to show up in a search result. As a result of this technology, textual search in video is likely to become a standard feature (Joyner, 2010). There is also the option of including a “Closed captioning is brought to you by…” message within the video in a similar way to TV closed captioning advertising opportunities (Whitney, 2009).

Again, while most beneficial to people designated “disabled”, closed captions can potentially assist other groups. The Australian Government’s (2008) review of Access to Electronic Media for the Hearing And Vision Impaired found that captions were used by viewers of television, DVD, and cinema who: are deaf; have
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a hearing impairment, are learning English; are developing literacy skills; and/or are viewing content in a noisy environment, such as a club or gym. The review was prompted by changes in media consumption and access. While independent media outlets and communities of bloggers are embracing video captioning online, networked television has not been as quick to adopt this feature of accessibility and the potential benefits. The online realm — although being revolutionized by network television in many ways — is exempt from closed captioning laws that mandate captions be available on television.

Closed captions were not widely embraced by television producers nor audiences until they became required by law. The United States' Television Decoder Circuitry Act 1990 mandated that every television set made or sold in America had to have an in-built closed caption decoder chip unless the screen was smaller than 13 inches (Robson, 2004: 47). This law was designed to work in conjunction with the ADA to drive the uptake of captioning on television. Prior to the Act, captioning was an expensive process for both the networks and for deaf people who had to pay for more specialized technology. In Australia, closed captioning was mandated for free-to-air television under the Broadcasting Services Act 1992; this worked in conjunction with the DDA as it promoted equal opportunity and made disability discrimination unlawful.

While the Broadcasting Services Act mandates that national broadcasters must provide captions for television programs aired during prime time (6 p.m.-10:30 p.m.), some programs are exempt, including; programs not in English or mainly not in English; non-vocal music-only programs; incidental or background music; live sport coverage with unscheduled extended coverage that displaces a news program; and programs broadcast on digital channels during the simulcast period.

Thus, again, new technology (specifically digital television) is being introduced without accessibility measures in place. Online video platforms utilized by television networks are likewise exempt. Attempts to reverse these exemptions are underway — the Twenty-first Century Communications and Video Accessibility Act of 2009 is before Congress in the United States at the time of writing. Introduced in 26 June 2009, the bill seeks to ensure that people with disability are able to access the full range of communication and video programming available as a result of advances in internet-based technology (Library of Congress, 2010). The bill recommends that a schedule be set up to establish a deadline for the provision of closed captioning of online video content. However, in the context of television, the deadline was ten years — even if the bill were to pass, closed captions will not be widely available immediately. Further, exemptions will likely include user-generated content. Again, this demonstrates the ways new technology fails to embrace accessibility, even when regulation is in place.

Several issues have emerged in relation to the wording of the actual bill and the impact this will have on the quality of captioning in the near future. The bill itself deals with a number of issues including timelines, schedules, exemptions, and pre-programmed and live video. If passed, all online video, with the exception of user-generated video, will be required to include closed captions. It is anticipated, however, that if the networks lead the way with captioned video then the importance of this accessibility issue will be recognized by the average video blogger. The bill is progressing and has been referred to the House Committee on Energy and Commerce.

However, the following example demonstrates how confounding it actually is that all networks and programs do not offer online video captions. The network PBS Kids caption all of their online video content. As captions are required on broadcast tapes, PBS Kids use these program tapes that already have embedded captions in their online video player. This proves their claim that children with disability are an important part of their audience (Whitney, 2009).

When Netflix aired The Wizard of Oz online to celebrate its seventieth anniversary, they did not include closed captions. Captions for this film are widely available on both DVD and television versions of the film. The Director of Communications at Netflix was also alerted to the potential problem of uncaptioned video by the National Association of the Deaf (NAD). The NAD describe the lack of response from Netflix as evidence that people who are deaf or hard of hearing are not valued members of the Netflix audience (Haller, 2009a).

It must be argued that there comes a point where "lack of awareness" can no longer be a viable excuse, particularly when accessibility measures are already available but simply not used for any justifiable reason. If a more accessible version of the film was already widely available to Netflix then, just as PBS Kids do for their audience of deaf children, it should have been used. Likewise in Australia, a large portion of television shows are offered for download after they have aired on television. Despite the availability of captioning, already created for the television broadcast, none of the downloadable programs have captions. Yet several of these, including the popular programs Sea Patrol, Kath and Kim, and Thank God You're Here are later released on DVD with both captions and audio descriptions (Media Access Australia, 2008).

Marlee Matlin, Hollywood actress and caption patron has used Twitter to raise awareness of the issue of captions on internet videos. Heavily involved in the momentum that led to the development of the Television Decoder Circuitry Act in the 1980s and 1990s, Matlin maintains that the achievements that Act are being undone by the dearth of uncaptioned online video content available by means of Apple’s iTunes amongst other online avenues. Although iTunes was the first to offer digital downloads of captioned movies, they are not mandatory (Haller, 2009b). As this mode of dissemination gains in popularity, then captions need to be mandated to enable accessibility for all.

In a welcome recent move, YouTube has announced all videos uploaded to its service since April 2010 are now available with captions provided by its
voice-recognition software (Stelter, 2010). While this service is currently limited to videos in English with a clear soundtrack, it is nonetheless an encouraging step in the right direction.

A New Legal Discourse: The Revised Rehabilitation Act

Along with these calls for an accessibility standardization of DRM and a mandatory online video captioning bill before the Senate, Section 508 of the Rehabilitation Act 1973 is also under review at the time of writing. The Rehabilitation Act was established in 1973 to prevent discrimination on the basis of disability within federal agencies or programs receiving federal funding. Section 508 was established to update the Act in 1998 in response to changing technology to require federal agencies to make their electronic and information technology accessible to people with disabilities. Section 508 was again updated in 2002 to include User Agent Accessibility Guidelines for web browser developers following the rise in inaccessibility issues during the browser wars. Evaluation and update at regular intervals is written into the Act. The most recent review seeks to reconsider these regulations in light of a fundamental shift in the way the web is used. While Section 508 does not require private companies to make their sites accessible to people with disabilities, it is hoped that the federal government represents such a large potential customer base that private companies will likewise embrace accessibility.

The proposed changes to Section 508 of the Rehabilitation Act and Section 255 of the Telecommunications Act, which, as mentioned in Chapter 1, are two separate guidelines. The refresh is an attempt to encourage web developers to keep disability/accessibility in mind from the design phase rather than go about retrofits and looks at the ways technology are used rather than delineating between types of products:

Requirements have been reorganized according to functionality instead of product type since many devices now feature an array of capabilities and applications. The released draft includes proposed revisions to various performance criteria and technical specifications that are designed to improve accessibility, add clarity to facilitate compliance, address market trends, and promote harmonization with other guidelines and standards (Access Board, 2010a).

A committee has been established by the United States' independent federal agency Access Board to oversee the review process. This committee has recommended changes to the structure and the content of both Sections 508 and 255 in response to technological innovation and market changes (Boswell, 2008: 23). The update has followed a rigorous review process consisting of public discussions (via public forums and a discussion paper), focus groups, as well as corporate consultation. The process began in 2006 when the Access Board established a 41-member cross-section of stakeholders to comment on the guidelines as part of a Telecommunications and Electronic Information Technology Advisory Committee (TEITAC). In 2007, the American Foundation for the Blind (AFB) joined the process through which consumers, industry, and government agencies prepared recommendations to the Access Board. A range of interest groups were consulted including representatives from industry, disability interest groups, academia, as well as national and international accessibility consultants from both public and non-profit agencies.

In 2009, the Access Board received the report prepared by the AFB as a result of the consultation process with these stakeholders. On 25 March 2010, the California State University Northridge (CSUN) Conference on Technology and Persons with Disabilities gave positive feedback to the Access Board and highlighted the urgency of updating the regulations in light of the changes in the way the web and telecommunications are used. As a result of convergence, groupings initially established in Section 508 (and outlined in Chapter 1) are no longer relevant. Telephones are no longer exclusively used to make a telephone call to another person; they are now also a device used to access email or participate in social networking. Instead of separating software and web applications, the feedback was to look at how products are actually used:

Several new categories were recommended including:
- General Technical Requirements
- Requirements for Hardware Aspects of Products
- Requirements for User Interfaces and Electronic Content
- Additional Requirements for Audio-Visual Players or Displays
- Requirements for Audio and/or Video Content
- Additional Requirements for Real-time Voice Conversation Functionality
- Additional Requirements for Authoring Tools (TEITAC, 2008)

These new categories recognize convergence and the overlap that now exists between Sections 508 and 255. Although checklists can potentially stifle innovation within a rapidly advancing area, clear standards for compliance remain important. The committee recommends the provisions address specific technical approaches in the vein of accessibility 2.0:

All of these provisions ... describe the required types of accessibility features. Some refer to specific accessibility features that are known to be both feasible and effective. Federal agency compliance with the procurement process will encourage and give incentives to manufacturers [sic] and providers to meet and hopefully exceed these requirements, and will help foster innovation and improvement in accessibility (TEITAC, 2008)

It is anticipated that the updated guidelines will provide practical information regarding accessibility as well as foster the potential for innovation and new
technology. The significant changes in the way the web and other telecommunications are used could not have been accurately predicted ten years ago and so any changes to the guidelines must, like WCAG 2.0 and accessibility 2.0, allow for previously unthought-of and exciting new technologies as they will undoubtedly have an impact on the ways people with disability access the web. Current trends such as mobile access and augmented reality also suggest accessibility will become mainstreamed.

**Trends In Digital Design and Online Activity**

Predicting what will happen with rapidly evolving internet technologies, portals, and platforms is notoriously unreliable. However, there are several emerging design trends gaining increasing currency that we predict will be central to the web's development in the mainstream as well as in virtual reality as a way to social network. These include mobile access, augmented reality, the increasing use of keyboard shortcuts, and other accessibility features such as voice commands and zoom.

While accessibility in web 2.0 is of most benefit to people with disability, especially those with vision impairments, to older people and to people in the developing world, the recent trend toward mobile applications and internet usage suggests the majority of internet users would benefit from accessibility options (Zajic, 2007). The mobile versions of the Facebook and Amazon pages provide better accessibility and allow a greater ease of use when viewed in conjunction with screenreading software. They are less cluttered and more intuitive for users with print impairments and people using smaller mobile screens.

These accessibility features will become increasingly important as the general population moves toward adopting mobile media. The importance of web 2.0 platforms to our daily lives can't be denied; however, increasingly, new media theorists argue we have actually moved past web 2.0. We see an interesting link between the predicted future of the web and accessibility options for people with disability as text-to-speech and text-recognition software, virtual worlds and avatars dominate most people's perceptions about the way forward (Pegrum, 2010).

We also predict a future web where accessibility is important and adds to optimum functioning. Standards and accessibility will become increasingly important to the mainstream as the web continues to change the relationship between our bodies and the way we navigate the world. The mobile web, in particular, has been credited with changing the relationship between the body and the world it inhabits by allowing ever-present interaction within both the actual and virtual world (Richardson, 2007: 205). The mobile phone has become a kind of prosthesis, a way of being in the world (Richardson, 2007: 206); the same

is true for mobile internet connections. Mainstreaming accessibility initiatives to enable a greater and more constant web connection relies on disability as a narrative prosthetic. While Mitchell and Snyder (2000) use this concept to demonstrate the importance of disability to the development of western literature, its relevance can also be applied to the internet and web technologies as more accessibility features are mainstreamed for the convenience of all.

In the previous chapter, we suggested that persistent online three-dimensional virtual worlds represented the future of the web. If web 2.0 relates to user-generated content, software as a platform, and users acting as co-developers, then the future will expand the emphasis on multimedia to initiate a new level of collaboration. Advances in three-dimensional processing will give rise to innovative applications such as massive multiplayer mobile games. In virtual worlds, there will be new types of traffic demands and network constraints.

Most people are attracted to the blending of the virtual and the real — possible on three-dimensional virtual worlds. These worlds are especially important to people with disability as they have the potential to decrease their isolation by means of immersive virtual communities. They facilitate social interaction, information-sharing, and allow a collaborative, experiential learning environment for students with disability. Indeed, it could be argued that they could be of most benefit to people with disability yet, ironically, inaccessibility often prevents access (Wood, 2010).

Where virtual reality overlays the real onto the virtual, augmented reality adds another layer to the real by providing more information regarding the environment that the person is in. Augmented reality applications have been developed for mobile phones that allow people an historical insight into how an environment that they are currently inhabiting used to look, for example an image of London during the 1800s overlayed on the present city, which can be "seen" on a mobile phone. These types of applications can also provide people with disability with an insight into the sense or experience that they do not perceive as a result of their impairment. It is now possible for people with vision impairments to "see with sound" as visual information is decoded by mobile phone applications and communicated audibly to users.

Recent developments on computer console games are allowing people to interface with games by virtue of their own movement, doing away with the use of traditional gaming interfaces long associated with platforms such as Sony's PlayStation and the Wii. Whether these will be adapted by more general computers — recreating the technology foreseen in Minority Report — remains to be seen, however, the medium-term potential for the integration of this technology alongside a further developed augmented reality platform, within a mobile telephone handset, paints a picture of both the challenges and opportunities that lie ahead for access for people with disability.
Mainstreaming Accessibility

Comments like “why would a blind person want to read” and the “troublesome” reputation (Wood, 2010) of accessibility measures that seem to only benefit a few people, suggest accessibility is somehow separate from web design and neither important for business reasons nor for all customers. However, what is considered an accessible retrofit in today’s web environment will become increasingly important for the average user of the future as people become progressively more mobile in their web use. This has important implications for the way disability is framed and understood in both the broader community and amongst web developers. As John Foliot suggests:

That the moment you start to ghettoize or sort of hold accessibility out at something special or different, sometimes you lose traction, you lose interest. But the reality is that accessibility and accessible web development, needs to be part and parcel of everything you do. It just needs to be part of the whole process. (Lembo, 2010)

Many technologies developed to enable greater participation of people with disability have become mainstreamed, for example predictive text, the telephone, and the phonograph (Reena, 2009). More recently, text-to-speech software, initially developed for screenreading use by people who are blind or have vision impairments, is being mainstreamed through the iPhone and GPS navigation devices. Kindle uses Nuance screenreading technology — Napdance was the first company to develop screenreaders for people with print impairments (Reena, 2009). Likewise, dictation software, having long been used by people with disability, has been appropriated by motorists seeking to speak commands to their mobile rather than use their hands. Text-to-speech and speech input are now hands-free in the future.

In another example, people with vision impairments who are unable to see a mouse onscreen use keyboard shortcuts or hot keys exclusively. However, many other software uses are also adopting built-in keyboard hot keys for convenience and speed — it’s faster as you do not have to remove your fingers from the keyboard. Audio web surfing often features in predicaments regarding both the future of the web and mobile media; this is a vital feature of accessibility software as utilized by screenreaders. However, McBain (2009) suggests audio web surfing will become utilized by the mainstream as people again seek to multitask while browsing:

people on the train with headphones attached to their mobile device while Text-to-Speech reads them the latest articles from their favorite sites. HTML5 is a step in an awesome direction with regards to easy reference points; header, footer, nav, section, and article could be logical jump-to points by audible instruction. Rather than reading and clicking, the audience can tell the browser where they want to go with spoken commands. (McBain, 2009)

These technologies, considered innovative and convenient by the non-disabled population, are only available to the mass market because people with disability push software and hardware companies to improve their products (Reena, 2009).

However, there are still potential threats to accessibility ahead. Google released its increasingly popular web browser Chrome for the Mac operating system in mid 2010. As noted in Chapter 2, the latest versions of this operating system have given priority to accessibility functions. Unfortunately, none of these features are available when using the Chrome browser. When this was raised in the Mac-cessibility Network blog (Lioncourt, 2010), a comment was posted by someone claiming to be from the Google Chrome development team:

I’m a developer on the Google Chrome team. I agree with you that accessibility is important. In fact, I don’t think you’d find anyone on the team who disagrees. When you say that Google “broke, disabled, or chose to remove” accessibility support, you’re not correct; the truth is more complicated. … Doing this in a secure, performant way that still makes both the browser and the screen reader work properly is a very difficult task. Someone is currently working on precisely this task, but we didn’t want to delay the release of milestone 5 for the Mac (or other OSes) until this was done. (Posting quoted in Lioncourt, 2010)

This reads like the response to the decline in accessibility in Internet Explorer 4.0 when it was launched back in 1997. Since the end of the browser wars in the 1990s, the increased competition from browsers such as Firefox, Safari, and now Chrome have challenged Explorer’s dominance — this rivalry may encourage further innovation, but may also turn out to be to the detriment of an accessible web environment.

Conclusion

Berners-Lee’s vision for accessibility included both people with any kind of disability/impairment and other people experiencing social disablment, a group now known as the digital divide. While the importance of accessibility is gaining currency within web design and the future of the internet, disability studies still have much work to do in considering how technologies are designed to reflect the ablest oppression of the analog word. Digital information — and the flexible way it is accessed — should not block out people with disability. In many ways, digital technologies should be the answer to a number of access issues — as Finkelstein suggested, it should become a third stage of disability and precipitate a change in practices and ideas.

However, the same old challenges have followed alongside the opportunities for participation made possible in the digital era. As web design has moved away from the promise of access by anyone regardless of disability, the medium
itself has come to play a more prominent role as part of participation in broader society. The digital world is at a crossroads. It can continue to move away from universal design principles, while at the same time increasing the social and economic costs to those who are then excluded. Or it can move back toward universal design and access by encouraging the work done by people with disability to develop better, more flexible, and customizable technology which can be mainstreamed to benefit everyone.

There has been a paradigm shift in the way accessibility is valued in the general community. Perhaps the greatest awareness can be attributed to the well-publicized accessibility overhaul by Apple, Microsoft, and Google in relation to their most recent products, the latest version of Chrome hopefully being only an exception to this trend. Social networking sites and communities of accessibility advocates, such as the movement to make Twitter more accessible as we discussed in Chapter 3, have helped to raise the level of accessibility awareness in the general community.

While community and large corporations are important in raising the visibility of accessibility, a regulatory framework must also exist and evolve alongside these rapid advances in technology. The updates to Section 508 of the Rehabilitation Act and Section 255 of the Telecommunications Act underway in the United States at the time of writing seek to guide the implementation of accessibility within a paradigm of use rather than technology. Calls to abolish, or at least significantly curtail, DRM and to caption online video will benefit a large number of groups and should not be thought of as something specific for the disabled.

In a semiotic sense, the fact that accessibility allows greater “mobile” access provides an interesting moment of contemplation — civil rights discourses of disability have long aimed to reduce inaccessible environments and allow greater flexibility. As more people both with and without disability seek flexible and mobile access, accessibility will become a universal goal, not a disability-specific one. Accessibility can potentially hold a central position, with mainstream benefits, as the web moves beyond web 2.0.

In addition to the move toward a mobile web with greater integration between the analog and virtual worlds highlighted in this chapter, many also talk about the growth of the semantic web, long championed by Tim Berners-Lee, as the potential future direction for the World Wide Web and new media. This potential new architecture can provide the technological framework to open up further accessibility possibilities for people with disability and the broader community (Kouroupetroglou et al., 2006). This approach is also closely tied to the processes advocated as part of accessibility 2.0 (Kelly et al., 2007).

In the concluding chapter of this book, we look to the future with more hope than trepidation. While the online environment continues to evolve, it is the use of agreed standards that have facilitated this growth. These in turn, if applied to universal design, will facilitate the participation in this environment for both people with disability and also for those without who are turning to newer technologies, such as mobile internet devices. The standards developed by the W3C in terms of internet accessibility for people with disability now form the basis of the standards being developed to optimize usability of the internet for mobile users. There is enormous potential for the online environment to mitigate for different impairments; however, questions must be asked as to how much of this potential will be realized and whether the existing position in relation to universal design will deteriorate further.