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EMBRACING LEARNERS WITH DISABILITY:
WEB 2.0, ACCESS AND INSIGHT

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Like web 2.0, a participatory culture is central to university life. Several theorists have recognized the importance of digital technologies in including students with disability. Mainstream accessibility measures are beneficial to both students with disabilities and those without. Data for this paper is entirely crowd sourced from web 2.0 platforms and explores the ways students with disabilities are using mainstream accessible web 2.0 technologies – file sharing, Facebook, FourSquare and blogs – to foster inclusion. By utilizing the knowledge of the crowd this paper seeks to empower the disability narrative. People with disabilities are not just assisted by web 2.0, they are innovators of it.

> It wasn't until I reached university that I realised that my disability was a problem. Prior to university, I didn't have many problems in terms of my disability – I had supportive teachers who went out of their way to ensure that I was not excluded by virtue of my hearing impairment... I tried to change the learning environment to ensure that students with disability had the same access to the learning environment as their non-disabled counterparts, but did not have much success. Sometimes, I considered dropping out of uni, but I persevered. However, I left uni with a dearth of self-confidence. (Saab 2011)

INTRODUCTION

Up until the latter part of the twentieth century, those who were designated as disabled were mostly denied access to a mainstream education. With increasing numbers throughout the 1990s, moving into the second decade of the 21st century, university students with disability are an established and growing minority. In the United States they make up about 6% of the student population while in Australia they number 4% (DEST 2007). From a charitable ethos of "helpful" or kind staff "helping out" students with disability, an environment has emerged whereby these students can expect and demand support through dedicated disability offices. However, as the above student's experience demonstrates, this is not always the case because inflexible practices and people continue to inhabit academia.

Several theorists have recognised the importance of the Internet to students with disability. While Li and Hammel (2003) suggest it can offer innovative ways to bypass the effects of impairment that can prevent a student from participating, Mullen et al. (2007) believe participation on the web can allow a neutrality of identification to allow the student with disability to blend in as though not disabled. Finally, Alltree and Quard (2007) argue that adjustments introduced to assist students with disability have far reaching benefits for the non-disabled population also and Wood (2010) cautions that students with disability would benefit the most from engagement with technologies that provide learning opportunities yet inaccessibility often excludes them. These examinations provide a good starting point for an investigation of the inclusion of students with disabilities in tertiary education; however, in

this paper I wish to expand the theorization to look at more recent web 2.0 technologies now available to students with disability through the mainstreaming of accessibility measures and the ways that these students and their allies are innovating their use to facilitate greater inclusion of people with disabilities in University life.

Extending my previous argument (Ellis 2010) that any investigation of the ways digital technologies assist individuals with disabilities must consider the communicative work people with disabilities are undertaking on the web, this paper utilises the knowledge of the crowd, to empower the disability narrative, to see how students with disabilities are taking technologies designed for perhaps a more mainstream market and using them to their advantage. This situation is only available because accessibility is becoming mainstreamed. Looking at web 2.0 through a disability lens highlights the ways people can work together under this philosophical and technological concept to share ideas, information and creations while working with others for a specific purpose. This review paper foregrounds the social aspects of digital life, a concept particularly important to the inclusion of people with disabilities.

Universities foster innovation, they encourage students to become creative and critical thinkers. Like web 2.0, a participatory culture is central to university life, academically and socially. At university, students are encouraged to connect with others and engage with the community. It is vital that people with disability, already excluded in much of social and community life are not prevented from gaining a university education. While official organizations have emerged to address this, significantly, the participatory culture of an accessible web 2.0 allows people with disabilities the opportunity to innovate modes of inclusion via digital technologies themselves. At the Australian Tertiary Education Network on Disability's 2006 Pathways Conference, pioneering disability academic Christopher Newell gave a keynote address on accessible design as a way to include people with disability in life long education and training. He envisioned a world where the rhetoric would become a reality:

> I long for, I dream of, I desperately desire, a world where learners, academics and administrative staff with disability in higher education and training know that they are embraced, know that we are found to be part of the moral community and where when we speak of the nice, normal and natural we know that those of us with a diverse range of disabilities are included. I dream of a world where the power of narrative and dreaming helps to transform the world. (Newell 2006)

Also an academic with a disability, Newell saw the creation of accessible technologies as a political move in actually embracing the inclusion of students with disabilities. The universal design of technologies so that they can be used by the greatest number of people without need for adaptation was especially important. Recent mainstream accessibility measures such as those introduced by Apple, Facebook, and Google have changed the way web developers and the general public view access for people with disability. No longer is it something extra, unnecessary, special – accessibility is something everyone can benefit from (Ellis and Kent 2011). Mike Calvo, a blogger with vision impairment suggests this is particularly important to students because they are increasingly encouraged to multitask throughout their education. For example, screen readers designed to assist people with vision impairment now included on Apple products such as the iPhone and iPad will become increasingly important to the mainstream population:

> if we can find our tunes eyes-free, we are going to want to do many other things eyes-free. And that means a future where blind people like you and me no longer have to struggle for accessibility just moved a whole lot closer (Calvo 2008)

Throughout this paper I acknowledge the chequered history of the web in excluding people with disability but celebrate the current accessibility turn, and examine the ways people with disabilities are using mainstream web 2.0 applications, to reflect on the opportunities this provides for students with disabilities to participate in a tertiary education. Borrowing from Newell's (2006) argument that the power of narrative transforms the world, data for this paper relies on reflections posted by students with disabilities on a number of web 2.0 platforms.

I begin this paper with a consideration of the increasing importance of collaborative web 2.0 applications to University education. Just as the number of students with disabilities enrolled at University has increased, the general student population is becoming more diverse with students regularly balancing any number of competing demands. Alternative pathways to entry are also increasingly common to attract these groups.[1] Educators are finding that incentives designed to improve access for students with disability actually improve the educational experience for many students negotiating study with competing demands. For example in 1998, Lectopia – the lecture recording and distribution system – was introduced in Australia at the University of Western Australia (UWA) to enable students with disability better access to lecture materials (Ellis & Kent 2008). The system has now been broadly embraced by a diverse student population in many universities. Effective disability policy that provides support and resources for students with disability often has an added benefit for everyone. As the lectopia platform moves into providing transcripts of lectures, people with hearing impairments are able to access the material independently and can now search for key words along with nondisabled people benefitting from the technological advancement.

Legislation such as the Disability Discrimination Act 1992 and the Disability Standards for Education 2005 influence disability service provision at the tertiary level. Most Australian universities mandate disability policies and publications that proceed from the definition of disability discrimination outlined by the Disability Discrimination Act 1992. Under these regulations, the university cannot treat a student with disability less favourably than a student without. Where disadvantage does exist, reasonable adjustments must be adopted to compensate. The second section of this paper therefore moves to consider the importance of providing accommodations for students with disabilities and highlights the role of universal design in whether a student can access the information necessary to complete a university degree.

These accommodations, while vital to the student with disability, are frequently stigmatized and regarded as onerous and unnecessary for the wider student population, thus I seek to demonstrate in the third section of the paper the importance of mainstreaming accessibility. Through a number of case studies I explore the ways students with disabilities, as innovators of web 2.0, are using web 2.0 communications platforms to complete a tertiary education.

WEB 2.0, COMMUNICATION AND INCLUSION IN EDUCATION

According to John Jennings (2007), an "always-on" Internet connection transforms the learning experience and improves inter-institutional collaboration, existing service provision and significantly, enables wider access to an education. With a greater number of people attending university and accessing a wider breadth of information, broadband has become a significant resource in modern education. Instant access to previously unavailable information and databases has and will continue to transform education for all students (Dempsey 2005).

Ongoing research at UWA demonstrates that students expect an increasing use of ICT throughout their degrees, either provided by their lecturers or used during private study or group work. While lectopia, WebCT, and powerpoint were the most used, increasingly students and lecturers are turning towards blogs, discussion boards, and social networking (Cluett & Skene 2009). With the majority of students owning a computer and mobile phone along with the widespread availability of the Internet, students today have advanced skills in ICT and expectations regarding their use in education as well as their own innovations in how to use the technology. Educators likewise seek to exploit this and see new technologies loosely defined as web 2.0 as particularly suited to the educational experience and thus seek to experiment with user generated content .

Web 2.0, or the "read-write" web is taking the use of ICT in education to a more immersive and collaborative level particularly with the availability of an always-on, low-latency network broadband connection. The difficulties with these platforms, experienced by students with disability, demonstrate the potential problems of bringing web 2.0 tools into the academy. When design is disabling some students are unable to navigate these environments, while

others are forced to reveal their impairments. Despite this, the use of web 2.0 in education may be beneficial – the ability to manipulate digital content in ways that suit the user's learning style is particularly useful to students with disability:

> Once a piece of information or content is digitised its form is significantly transformed. Whereas a work written on a page is locked in that format, once a word is a digital file it can be transformed to suit any person trying to access it. It can appear as the written word, it can be automatically translated into another language, it can be interpreted as an image, it can be shown in sign language and it can be displayed on a Braille tablet. Once that file is connected to the internet all these different modes of access can take place simultaneously, all over the world. This information can be requested through a traditional keyboard, by speech, through eye tracking software or by moving any of a number of different mouse devices. Making that content accessible is a choice. Making it inaccessible is also a choice. (Ellis & Kent 2011)

Despite the strong rhetoric that digital information will automatically liberate students with disability, many will struggle with content that is inaccessible by design (Martínez-Cabrera 2010). Universal design (see Newell 2006) to allow access using a number of different methods is paramount to the inclusion of students with disability who often make use of adaptive technology.

ACCOMMODATION AND ADAPTIVE TECHNOLOGY

The inclusion of students with disability involves more than providing a space where they don't need to declare their impairment as many of the disabling problems of the "real world" are reproduced on the Web in the form of inaccessible interfaces. University administrators and academics should ensure digital content can be accessed in many different ways as Ellis and Kent (2011) describe above. Students with disabilities will often make use of adaptive technologies such as dictation software:

> One thing that has helped me quite a bit as a blogger, writer, grad student and person with chronic pain subject to flare-ups has been speech-to-text software. The basic idea is fairly self-evident: You install the software, plug in the headset that comes with it, open up the word processing program of your choice, and start talking. (Annaham 2010)

Or screen readers and Braille displays to access ICT:

> I have been using braille all my academic life, I write much more quickly and smoothly in braille. Only in braille can I write fast enough to keep up with my thoughts ... I write anything significant, such as essays … in braille first, then transfer them over to my computer (using JAWS) if I need to do so. That said, I have become much more proficient at typing since I started uni, and can almost keep up with my thoughts typing as well. ... I just prefer Braille because I have been doing it for so much longer, and use it more naturally. (Personal communication.)

In order for these students to be included in the online educational experience, the sites and technologies used must be accessible and allow for the use of adaptive technologies. While, for a long time, interfaces and programmes were inaccessible by design, accessibility is now being built into the design of mainstream, popular products such as Apple and Google. Paralleling the increasing visibility of students with disability who rely on adaptive technology (Westin 2005) to compensate for their impairments has been the wide spread uptake of ICT amongst the student population. Mainstream accessibilities measures are beneficial to both students with disabilities and those accessing the web from mobile devices.

Although structural measures are in place to enable the full participation of students with disability in the tertiary arena, many students find that their presence in the University classroom is resented and themselves resent the amount of personal information they must share about themselves to large numbers of academic and administrative staff:

> Don't think that we're special people asking for special treatment. If schools were not made to systematically exclude us, we wouldn't have to share so much personal information because we wouldn't need accomodations. Accomodations (*sic*) are one way that we can change normal schooling so that we can learn and express our knowledge, because we want to learn, but accomodations can't do everything for us. (Dene 2008)

As educational institutions come to increasingly rely on web based resources, mainstreamed accessibility would be truly inclusive and address many of the issues outlined by this student. A course that is planned to be inclusive of all people (including educators who may have a disability) is much more effective than courses that undergo a belated accessibility retrofit:

> Students need to be able to concentrate on course material day one – not be trying to figure out how to use the workbook that is inaccessible to a blind student or track down a key needed for a service elevator for a physically impaired student to get to a class. The web designers, administrators and other decision-makers should have to navigate their campus while simulating a variety of disabilities – – they have no idea of the hell they put students through. (tbstoller cited on Parry 2010)

In the realm of online academic engagement, accessible design also offers greater academic insight. For example, alternative (alt.) text, as it describes what an image is attempting to communicate within the context of a site, allows both access by a screen reader and provides other learners with additional course information. Courses should be made accessible from the beginning because most students, regardless of disability, find fully accessible courses easier to understand (Edmonds 2002). While demands for accessible content can and should be made, students with disabilities, like students without, also value making innovative use of existing technologies, in order to effect social change. The next section will consider the innovative ways various web 2.0 platforms are being used by university students to access academic resources, navigate the physical campus, and engage in social connections as well as disability activism.

INNOVATIVE USES OF WEB 2.0 IN HIGHER EDUCATION

ACCESSING INFORMATION – BOOKSHARE

Accessing information can be a problem for students with disabilities, especially when alternative formats are required:

> Whereas a sighted student can go to the library, read a book for three hours and put it back, I would have to borrow the book, organise for it to be read onto tape and then listen to the tape. This all took twice as long and at the end of it, the book may not have contained the desired information anyway. (University of Queensland News 1997)

While digital documents on the Internet are celebrated for allowing people with disability access to information, in a way not possible with hard copy books, this can be a complex process as digital documents often need to be converted and corrected by a sighted person before they can be accessed using adaptive technologies (Ellis & Kent 2008). This also happens in isolation, with a number of different Universities converting books for their individual students without sharing that resource. As the conversion process is a lengthy and onerous task, many students with disabilities receive their course readings very late in the semester. Web 2.0 technologies harness everyday experiences and build on current knowledge and foreground the sharing of ideas amongst groups of people. Web 2.0 is communicative, collaborative and documentative (Poore 2008) and has prompted the creation of and connections between a number of databases and reference libraries such as the Gutenberg Project and Bookshare which benefit students with disabilities requiring alternative formats or who use adaptive technology.

Bookshare.org is a free academic resource for US students with disabilities that is revolutionizing education for eligible students. The searchable database offers 90,000 digital books, textbooks, teacher-recommended reading, periodicals and assistive technology tools (Bookshare 2010). Volunteers scan and proofread books and then upload them to the library. This has significantly increased the amount of books available to students with disabilities:

> I found out about Bookshare through my assistive technology teacher. My first thought was that it was a gift from God because no longer [would] I have to get … three books that I wanted to read at one time, I could just put them on my Braille note and listen to them, or read them on my Braille note. I call it the blind man's laptop because everything that you find on a laptop is on this. You can have a place where you type your documents called keywords, you have media player on here, a file manager, a book reader which reads the books you download from Bookshare. We have Internet, emails, where you can check your email. It's very much like a laptop. (Bookshare 2009)

When a single page of text converts to several pages of Braille, a system where text books can be downloaded and read from a computer using whatever the user's preferred method of output is particularly attractive. Doubly so when there are a number of different types of alternative format required, for example one student may need large print, another audio, and another again, Braille. The database can also be accessed by a large number of students at different academic institutions. The innovation of connection and collaboration as illustrated by the Bookshare platform and database enables the inclusion of students with disabilities. Connection at University however involves more than academics and in the next section I consider the relevance of social networking and Facebook especially in fostering connections for students with disabilities.

SOCIAL CONNECTIONS AND ADVOCACY – FACEBOOK

For Lisa Cluett (2010), social networking sites such as Facebook, provide universities a flexible way to establish a virtual presence and connect with their students, particularly during the orientation process. Cluett who established a Facebook page at UWA in 2009 believes these sites create a university community by connecting students with each other and to staff and support services. This in turn creates a sense of belonging and captures emotional "intangibles".

Students with disabilities in particular benefit from structured and unstructured transition initiatives like Cluett's UWA Facebook page. Despite a history of inaccessibility (AbilityNet 2008), Facebook is now considered the most accessible social networking site . Other benefits for people with disability include:

> an opportunity to break stereotypes, exchange support and reduce isolation. Facebook also offers a free method of publicizing helpful disability organizations, books, products — and the people behind them. Advocates view it as a powerful tool for social change. Throw in the fact that it's just plain fun, and suddenly you have a lively, integrated community that's been hard to achieve in the physical world. (Dobbs 2009)

There are several Facebook groups specifically dedicated to students with disabilities. Some, such as *Glasgow University Disabled Students Society* are devoted to specific universities and provide students with information about how to access disability support services. Others, for example *Students for Disability Awareness*, are broader and seek to foster disability activism and social justice. One of the most well-known disability Facebook groups (see discussions in Ellis & Kent 2011 and Haller 2010) is *The Official Petition for a More Accessible Facebook*. The group was started by a student and prompted Facebook to address many of its accessibility problems (Ellis & Kent 2011).

WAY-FINDING – FOURSQUARE

Li and Hamel (2003) cite actually navigating the physical University campus as a powerful site of exclusion for students with disabilities and suggest technology as a way to mitigate this by allowing students to work from home. However, if people with disabilities always stay out of sight, disabling physical environments are unlikely to change, further excluding people with disability. Digital technology is now providing a way to enable people with disability greater access. Several iPhone applications (apps) such as the location based social networking app FourSquare have pioneered this phenomenon. Community accessibility (Ellis & Kent 2010) where other users contribute to a database of knowledge regarding the accessibility of certain locations is having an impact on way finding for people with disabilities using FourSquare. FourSquare is reported to enable students with vision impairment a way to navigate around university campuses (Parry 2010). This revolution in way finding is possible because it was made accessible and also invites the participation of the wider community:

> Foursquare is a city guide, friend finder, social network, game, and various other things. Essentially with a compatible phone like an iPhone the GPS finds nearby locations and you check in to the location using the app. Checking in just means you are saying that you are at the given location. You can also see where your friends are in your city and around the world though various screens and optional push notifications. For instance, if I saw that [a friend was close by] I could (from the Foursquare app) send him a text message, call him, or communicate via Twitter to …see if he wanted to have lunch or a coffee. Each venue can also have tips which users add. This is an area where foursquare can be used as an accessibility wayfinding tool. For example, I was just at the Coolidge Corner station on Boston's green line. I added a tip to the venue stating when you get off the train which side of the tracks had even numbers on the street and which side had odd numbers. Thus if another user accessed the stations tips, either while on the go or through the web site, they would see that navigation tip which I added. (Mika cited on Shandrow 2010)

Web 2.0 is characterised by networks that get stronger the more people in and contributing to them. Accessibility on web 2.0 applications gets stronger when the community of users becomes involved (Ellis & Kent 2011). Following this user led revolution; there is now a National Institutes of Health/National Eye Institute funded project in development at the University of Massachusetts Amherst that provides students with vision impairments audio instructions as a navigational aid (Callahan 2010).

INTER-INSTITUTIONAL COLLABORATION – BLOGS

Wikis, blogs and other user generated content are embraced within academia because of the strong rhetoric that the current generation of students are digital natives and that these sites can be easily accessed by anyone with an Internet connection. The use of online social network sites has been shown to be beneficial within the requirements of a university education . Significantly for students with disabilities, these sites reduce social exclusion and increase independent study. However, Foley and Voithofer (2008) argue that the example of students with disability shows that social computing environments are not always easily accessible.

While prolific disability and feminist blogger Chally uses wikis, text message and email to interact with other Sydney uni students or collaborate on projects, her blog *Zero at the Bone* provides her significant opportunity for inter-institutional interaction to engage in social justice work and participate in online disability activism:

> My blog work is very important for connecting with other people with disabilities interested in social justice. I don't interact with disability justice work a lot offline, because I usually don't have the time and energy to get out there and work in

> community what with all the pressures of my disability and the rest of my life! With blogs, I can sit at home in my own comfort zone and have amazing discussions. With students in particular, sometimes I'll blog about university accessibility issues, and we connect over that. There are lots of students in disability communities on the Dreamwidth platform, too, for instance. There's a lot of opportunity for discussion! (Personal communication.)

For Chally, avoiding the situation Foley and Voithofer (2008) describe is paramount and she maintains a commitment to accessibility on her blog:

> Where accessibility is treated as a hypothetical a lot of the time (we don't need a ramp, we've never had anyone who uses a wheelchair in here!), basic ethics as well as personal friendship means that I couldn't make my blog inaccessible in good conscience. I try to reflect regularly on what I can do to make my blog more accessible, and take into account every suggestion. I've had to stop using the blockquote function as the blockquote colouring in my blog theme is light grey on a white background. I had tried changing this by forcing it through HTML, but that affected the colouring on my RSS feed, which of course many readers would use as their own accessibility tool (you can modify textcolouring, sizing and so forth in your feedreader). It's a pity, because this is the most accessible theme I could find that fitted my purposes on my blogging platform, Wordpress. I transcribe or describe videos, I describe images, I use descriptive text (or include title text) in my links: I do whatever I can think of to make my blog an easy reading experience for all my users. (Personal communication)

Thus there are many different ways to include and exclude people with disabilities on web 2.0.

CONCLUSION

People with disability and educators are often "early adopters" of new technology seeing the potential benefits of these technologies within their lives. This is most true of ICT; the web has been variously described as "opening a new world" for people with disability, a "solution", and an exciting mode of inclusion (Ellis & Kent 2011). Likewise, the web 2.0 pedagogical benefits for learners and educators are celebrated in terms of opportunities for collaboration, communication and documentation. Technology allows flexibility and is a key driver in trends of flexible learning. Ironically however, with the move to web 2.0, learners with disability who potentially benefit the most from these platforms experience disabling limitations . Educators and policy makers need to be aware of digital disability and approach disability from a social perspective. Students with disability must be included in this potentially revolutionary environment. While my focus in this paper is on students with disabilities as innovators of web 2.0 technologies, integral to this discussion is the mainstreaming of accessible technologies.

Throughout *Disability and New Media*, a book I recently coauthored with Mike Kent, a number of ways the web is disabling for people with disabilities are identified. As educators, we found the example of students with disabilities particularly illustrative. We recognized that the web was increasingly important within university education and highlighted several platforms including virtual worlds, social networking, ebooks and some learning management systems, as inaccessible for students with a variety of disabilities. However, several high profile companies including Google, Apple and Facebook announced mainstream accessibility measures as we were completing our research, and we ended the book with "more hope than trepidation" (p 146). Many technologies including text-to-speech and dictation software are now released on devices designed for a mass market such as Amazon's Kindle and Apple's iPhone and iPad. Reena (2009) claims that these innovative and convenient technologies are available to the mass market only because people with disabilities pushed for innovation and improvement. In this way accessibility does not pertain solely to disability and benefits other groups of people.

This paper is an extension of that hope and recognizes that both mainstream accessibility measures as well as community accessibility is having a positive impact on the inclusion of students with disabilities. By drawing together insights from people with disability across a number of web 2.0 platforms including, blogs, discussion forums, email, Twitter, Facebook and YouTube, I have sought to focus on communication as innovation and foreground the actual lived experience of students with disabilities prompted, by web 2.0, to collaborate and innovate.

REFERENCES

Facebook. 2009. "Glasgow University Disabled Students' Society." Retrieved 7 January 2011, from http://www.facebook.com/?ref=home#!/pages/Glasgow-University-Disabled-Students-Society/251335775415.

Facebook. 2011a. "The Official Petition for a more Accessible Facebook." Retrieved 7 January, 2011, from http://www.facebook.com/?ref=home#!/group.php?gid=2384051749.

Facebook. 2011b."Students for Disability Awareness " Retrieved 7 January, 2011, from http://www.facebook.com/?ref=home#!/group.php?gid=5491879327.

AbilityNet. 2008. "State of the eNation web accessibility reports: Social Networking Websites." *State of the eNation Reports* Retrieved 19 June, 2010, from http://www.abilitynet.org.uk/docs/enation/2008SocialNetworkingSites.pdf.

Alltree, J; N. Quadri 2007. Flexible study – what students do and what they want. Second International Blended Learning Conference. University of Hertfordshire**:** https://uhra.herts.ac.uk/dspace/bitstream/2299/1689/1/901872.pdf.

Annaham. 2010. (25 November). "In Praise of Text to Speech Software" Retrieved 7 January 2011, from http://disabledfeminists.com/2010/11/25/in-praise-of-speech-to-text-software.

Australian Government. 1992. "Disability Discrimination Act." Commonwealth Consolidated Acts Retrieved 25 June, 2010, from http://www.austlii.edu.au/au/legis/cth/consol_act/dda1992264/.

Bookshare.2010. "Bookshare: Books without Borders." Retrieved 7 January, 2011, from http://www.bookshare.org/.

Bookshare. 2009. "Blind Student Curtis Holman Demonstrates Bookshare " Retrieved 7 January 2011, from http://www.youtube.com/watch?v=fdxL88jXQjE.

Burgstahler, S;. Crawford, L. 2001. "Transition from Two-Year to Four-Year Institutions for Students with Disabilities." *Disability Studies Quarterly* **21**(1).

Cahill, M. and S. Hollier.2009. Social Media Accessibility Review - version 1.0. *Media Access Australia*.

Callahan, P. 2010. "UMass Amherst Scientist Helps Design System Using RFID Devices to Guide Blind Visitors inside Unfamiliar Buildings." Retrieved 7 January 2011, from http://www.umass.edu/newsoffice/newsreleases/articles/117625.php.

Calvo, M. 2008. "iTunes and iPod now accessible to the blind!" *Serotek* Retrieved 23 June, 2010, from http://blog.serotek.com/2008/09/ipod-and-itunes-are-now-accessible-to.html.

Chally 2011a. Thankyou! K. Ellis (email).

Chally 2011b. "Zero at the Bone: Keep changing the world." Retrieved 7 Janary, 2011, from http://zeroatthebone.wordpress.com/.

Cluett, L. 2010. (28-29 January). Online social networking for outreach, engagement and community: The UWA Students' Facebook page. Paper presented at the Educating for sustainability: the 19th Annual Teaching Learning Forum, Perth.

Cluett, L; J. Skene. 2009. "TechNODE bulletin 2009: an annual synopsis of student access to, experiences with and expectations of ICT at The University of Western Australia." NODE project UWA Retrieved 10 Septemnber, 2009, from http://tiny.cc/9uREu.

Commonwealth of Australia. 2005. "Disability Standards For education." Retrieved 5 July, 2010, from http://www.deewr.gov.au/Schooling/Programs/Documents/Disability_Standards_for_Education_2005_pdf.pdf.

Dempsey, N. 2005. "Speech by the Minister for Communications Marine and Natural Resources." National Broadband Conference, from http://www.dcenr.gov.ie/Corporate+Units/Virtual+Press+Room/Speeches/2005/Speech+by+the+Minister+for+Communications+Marine+and+Natural+Resources+Noel+Dempsey+TD+at+the+Nation.htm.

Dene. 2008. "Talking Back." Retrieved 7 January, 2011, from http://bcccblog.blogspot.com/.

DEST. 2007. "National - Equity Performance Indicators 2003 to 2007." DEST - Institution Assessment Framework Retrieved 17 September, 2007, from http://www.dest.gov.au/NR/rdonlyres/1C450DDA-BE41-4F69-8F91-087D3D23CEEA/26421/National_2007_combined.pdf.

Dobbs, J. 2009. "Why Does Facebook Matter?" Retrieved 7 January 2011, from http://www.newmobility.com/articleView.cfm?id=11499.

Edmonds, C. 2002. "Providing Access to Students with Disabilities in Online Education: Legal and Technical Concerns for Higher Education." *American Journal of Distance Education* **18**(1): 51-62.

Ellis, K. 2010. "A Purposeful Rebuilding: YouTube, Representation, Accessibility and the socio-political space of Disability." *Telecommunications Journal of Australia* **60**(2): 21.1-21.12.

Ellis, K. and M. Kent 2008. "iTunes Is Pretty (Useless) When You're Blind: Digital Design Is Triggering Disability When It Could Be a Solution." *M/C Journal* **11**(3 'Able').

Ellis, K. and M. Kent 2010. "Community Accessibility: Tweeters take responsibility for an accessible Web 2.0." *Fast Capitalism* **6**(2).

Ellis, K. and M. Kent 2011. *Disability and New Media*. New York, Routledge.

Foley, A. and R. Voithofer 2008. Social networking technology, NetGen Learners, and emerging technology: Democratic claims and the mythology of equality. American Educational Research Association (AERA) National Conference, New York.

Haller, B. 2010. *Representing Disability in an Ableist World: Essays on Mass Media*. Louisville, Avocado Press.

Jennings, J. 2007. "Broadband in Education." Retrieved 7 January 2011, from http://www.slideshare.net/seoinin/broadband-in-education.

Kylie. 2010. Interview request. K. Ellis (email).

Li, H; Hamel, C. 2003. "Writing Issues in College Students with Learning Disabilities: A Synthesis of the Literature from 1990 to 2000." *Learning Disability Quarter* **26**(1): 29-46.

Liccardi, I., A. Ounnas, et al. 2007. "The role of social networks in students' learning experiences." Working group reports on ITiCSE on Innovation and technology in computer science education Retrieved 23 June, 2010, from http://eprints.ecs.soton.ac.uk/14907/2/ITiCSE2007_WG4.pdf.

Martínez-Cabrera, A. 2010 "Web more accessible to those with disabilities." San Francisco Chronicle.

McGee, P; Diaz, V. 2007. Wikis and Podcasts and Blogs! Oh, My! What is a Faculty Member Supposed to Do? *Educause Review*. September/ October: 28-40.

Mullen, L., J. Beilke, et al. 2007. "Redefining Field Experiences: Virtual Environments in Teacher Education." *International Journal of Social Sciences* 2(1): http://www.waset.org/journals/ijss/v2/v2-1-4.pdf.

Newell, C. 2006. Keynote Presentation: Universal Design Embracing Disability in 2020: When Rhetoric Becomes Reality. *Pathways* 8.

Parry, M. 2010. "Colleges Lock Out Blind Students Online." Retrieved 7 January 2011, from http://chronicle.com/article/article-content/125695/.

Poore, M. 2008. Web 2.0, Net Gen life and learning: Implications for careers. Murdoch University. 1-2 December 2008.

Poore, M. 2010. "IT and ICT: Same Difference?" Retrieved 7 January 2011, from http://meganpoore.com/.

Reena, J. 2009. "How Tech for the Disabled is Going Mainstream". *Business Week*, McGraw Hill Companies Inc.

Saab, R. "Case Study: Rania Saab – Journalism & Law graduate with hearing impairment." Retrieved 7 January, 2011, from http://www.adcet.edu.au/View.aspx?id=5827.

Shandrow, D. 2010. "Please help make FourSquare More Accessible." Retrieved 7 January 2011, from http://groups.google.com/group/viphone/browse_thread/thread/de8839d6b6010b2e?pli=1

University of Queensland News. 1997. "Outstanding blind student to graduate with PhD." Retrieved 7 January 2011, from http://www.uq.edu.au/news/index.html?article=384.

Wood, D. 2010. "Communicating in Virtual Worlds Through an accessible Web 2.0 Solution." *Telecommunications Journal of Australia* **60**(2): 19.1-19.16.

ENDNOTES

1. The University where I work in Western Australia – Murdoch University – offers On Track, a pre University program to facilitate entrance of non traditional applicants or people who have had major disruptions to their life or study, including applicants with a disability. See http://www.murdoch.edu.au/Future-students/Domestic-students/Applying-to-Murdoch/Admission-pathways/Non--school-leavers/

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