



Enabling or disabling technologies? A critical approach to web accessibility

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technologies?

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Abstract

Purpose – The purpose of this article is to analyse the continuing problem of web accessibility for disabled people as a critical information systems issue.

Design/methodology/approach – The ways in which the web is used by disabled people, and problems that can arise, are described and related to the development of critical disability theory from older models of disability, including the medical and social models, noting that the social construction of disability model may tend to mask the embodied, lived experience of disability.

Findings – The lack of interaction of the critical disability approach and dominant discourses of web accessibility and internet studies, particularly in relation to embodiment, is a major contributor to the continuance of an inaccessible Worldwide web.

Research limitations/implications – The paper does not offer a comprehensive set of web accessibility issues, concentrating instead on the most common problems as exemplars.

Practical implications – The paper raises awareness of web accessibility.

Originality/value – The paper brings the topic of accessibility of technology by disabled people into the critical information systems arena and also incorporates social construction of disability and theoretical considerations of embodiedness in its analysis.

Keywords Worldwide web, Social inclusion, Disabilities

Paper type Viewpoint

Introduction

[...] the current weakness of critical research does not stem from its methodological unaccountability but from the limited contributions it has achieved in relation to substantial social issues regarding the spread of ICT (Avgerou, 2005, p. 108).

Walsham (2005, pp. 112-3) argues:

[...] a critical stance is focused on what is wrong with the world rather than what is right. It tends to focus on issues such as asymmetries of power, alienation, disadvantaged groups and structural inequality.

In this paper we argue that one such important social issue in relation to ICT which might benefit from the spotlight of critical IS research, and which, in turn might usefully inform the further development of critical IS, relates to the continuing problem of web accessibility, or, more properly, web inaccessibility for disabled people.

Until recently, critical IS has been dominated by an interest in the theories of Habermas although it is acknowledged that these are notoriously difficult to apply in a practical setting (Adam, 2002). Part of the problem lies in the way that Habermas's approach looks towards universalizing experience which masks the different ways



that different groups may experience oppressive practices. This is contrary to the critically inspired work of writers from areas such as feminism, queer theory, race and disability studies (Butler, 1990; Goggin and Newell, 2003a; Parker, 1999; Sullivan, 2003), where identity politics comes to the fore in recognizing the varieties of oppression and that totalizing discourse may mask these. Recently, critical IS researchers have recognized that the field of critical IS is beginning to accept broader definitions of critical and that encouraging a breadth of critical approaches would be beneficial in strengthening the armoury of critical IS research, not least in the important project of connecting theory and practice (McGrath, 2005). Hence, we aim to contribute to the broadening of critical IS by analysing the experiences of a particular group in relation to ICTs.

Taking one very important area where a group of people are currently excluded, namely web accessibility for the disabled, we argue that this is an important case study for the development of critical IS in that it provides a concrete example of a structural inequality where critical theory could be used to argue for a material difference in relation to the use of ICT.

For this paper, the area of critical theory we bring to the discussion is critical disability theory. Our approach mirrors that of feminist writers who argue that those who are in a “subaltern” position excluded from dominant groups, for instance, women, are in a better position to articulate emancipatory values which will ultimately lead to better knowledge, especially for themselves (Haraway, 1991; Harding, 1991). This echoes older Marxist thinking which looks to the proletariat for a truer picture of the world. Yet such a position makes no truth claims, rather it is arguing for the knowledge of oppressed groups to be taken seriously, to be seen as on a par with the knowledge of other groups, especially those enjoying a hegemonic position. Therefore, whilst we acknowledge the role of good technical design, we see the seeds of emancipation from bad design and oppressive practices lying in the hands of oppressed groups rather than privileging the position of the designer.

Our research approach reflects our personal histories as researchers in this and related areas. One of us (Adam) has researched gender issues in IS and computer ethics with a knowledge of digital divide literature, critical information systems and social shaping of technology and was struck by the parallels between rhetoric on women’s and disabled people’s access to digital technology. The second author (Kreps) is an active web developer with specialist technical knowledge of web accessibility, whose own research into cyborgism had led him into the disability studies field, with a particular interest in disabled access to ICTs. Our research is based in the UK, nevertheless we include discussion of European, US and Australian policy.

In what follows, we briefly describe the continuing problem of web accessibility, including a discussion of the role of the law and the rise of the web accessibility movement. The following section describes some of the ways that disabled people use the web and also ways in which web sites may be inaccessible to people across a spectrum of disabilities. Then we describe the development of critical disability theory from older models of disability including medical and social barriers models, noting that technological design may be implicated in construction and maintenance of disability. Despite the strengths of the social construction model of disability, commentators argue that it is too strong and tends to mask the question of embodiment and the lived experience of disability. We see the interaction, or rather,

lack of interaction, between the critical disability approach and dominant discourses of web accessibility and internet studies as a major contributor to the continuance of an inaccessible Worldwide web. The final part of the paper explores the consequences of this lack of interaction.

Web inaccessibility

After more than a decade of development of the Worldwide web, despite the consolidation of web accessibility standards and despite the enactment of strong disability discrimination legislation in many Western countries, much of the web remains inaccessible to disabled people. There are 45 million people with disabilities in the EU, and the number of older Europeans is steadily increasing. Yet a recent UK study of accessibility of public web sites put a figure of less than 20 per cent on web sites which meet even the most basic accessibility standards across a spectrum of disabilities including hearing, motor and sight impairment (DRC, 2004). The picture across Europe, according to a recent study of EU public sector web sites, is no better (e-Government Unit, 2005). Although we will not explore this in detail in the present paper, given that the web is increasingly used for the provision of goods and services, education and information, work and socialization, this suggests that many disabled people remain denied access to a technology that could be beneficial to them and which other groups of people take for granted. Given the enactment of legislation, increasing awareness of equality and diversity issues and increasingly widespread adoption of equality and diversity policies (Hoque and Noon, 2004), it is surprising that this situation persists.

Legislation

Disability discrimination legislation is clear in its coverage of the web. For instance, in several Western countries, including the US, UK, Australia and countries in the EU, legislation has been enacted to ensure that individuals are not discriminated against on the grounds of disability, gender, race, and, more recently (at least in the UK), age. In each of these regions where legislation is in force, to prevent discrimination against the disabled, this legislation is widely interpreted as mandating the use of accessibility techniques on the web.

In the US, the Rehabilitation Act of 1973 was updated in 1998 and “Section 508” states specifically that Federal agencies’ electronic and information technology should be accessible to people with disabilities. Section 508 uniquely spells out specific requirements of federal web sites to ensure their accessibility to disabled users, though this falls short of the benchmark accepted elsewhere and applies only to federal, and not private sector web sites. In the UK, the Disability Discrimination Act (DDA, 1995) came into force in phases over a period of almost ten years. October 1999 saw the provisions in Part 3 of the Act apply, making it unlawful to discriminate against disabled people by refusing them service, providing service on worse terms or providing a lower standard of service. It also requires service providers to make reasonable adjustments to the way they provide their goods, facilities and services to make them accessible. According to the Code of Practice issued by the newly founded Disability Rights Commission in 2002, the owner of a public facing web site is a “service provider” under the terms of the Act, and must therefore comply with the law.

In the UK, and across the whole of the EU, where similar legislation is either already or soon to be put in place, it might be said that not only is it a legal requirement that web sites be accessible, but that making information available through an accessible web site is a recommended means of complying with the legal requirement to make information accessible to disabled people in a general sense. The issue of the web being the recommended means of providing a service, in general, and, more particularly, for disabled people, is very important. This signals that, in Western societies, no longer are we to regard the use of the web, in the pursuance of every day life, as a kind of optional extra. Rather, it is to be seen as a central component in the provision of a range of services, and legislation promotes its use for the social inclusion of disabled people. This important legal point was reinforced in the following case.

Throughout the world, as disability legislation is relatively new, there have been very few court cases, as yet, which specifically test the legislation in regard to web site accessibility. So far, the Australian Disability Discrimination Act (1992) is the only legislation globally which appears to have been tested in court with regard to web accessibility. An Australian court found that the Sydney Olympics Organising Committee (SOCOG) had been in breach of the Australian Act by failing to provide a web site to which Mr Maguire (a blind Australian) could have access (DRC, 2004, p. 3). This was especially significant as the SOCOG heavily promoted their web site as the official source for news, information and transactions about the Olympics. However, they had not checked the site against web accessibility guidelines and Mr Maguire and others were unable to use it. When it was brought to the organisers' attention they argued that it was too costly to make their site accessible. The case was heard by the Australian Human Rights and Equal Opportunity Commission who found against SOCOG (Goggin and Newell, 2003b). It is difficult to overstate the importance of this case, as its result established once and for all, the right of disabled people to have access to web sites.

In another case (Goggin and Newell, 2003b), a number of blind people invoked the Americans with Disabilities Act to force AOL to make their sites accessible. This pushed AOL into appointing accessibility officers and smartening up its image in regard to disabled customers.

Such recourse to the law is explicitly urged by disability pressure groups. For instance, the Chairman of the UK Disability Rights Commission, Bert Massie, stated in his introduction to a recent DRC (2004) report, that: "the industry should be prepared for disabled people to use the law to make the web a less hostile place." These are strong words; they exhort disabled people to look to the law if their needs are not met.

This signals a key moment in critical discourse about disability in relation to ICT which may be contrasted to older critical models in IS. The liberator or emancipator is not the developer of technologies – here web technologies – nor the critical IS researcher. Indeed, designers of technological systems are part of the culture which constructs disability and which casts disabled people as deficient (Goggin and Newell, 2003a). On the one hand, this may involve technological designs which are difficult or impossible to use. On the other, it may involve designing technologies – especially for disabled people – which have the effect of separating them from other users and casting them as deficient against "normal" users. A better designed product may have been readily usable by a wide spectrum of users without setting apart some group against a tacit norm. This suggests that emancipation, or at least the seeds of

emancipation, lies in the actions of disabled people, identifying themselves as an oppressed group with a set of rights, who wish to pursue their rights to full access to ICT. This also signals that the law may be pressed into service in the critical project, particularly if it is well-designed legislation with “teeth”.

The web accessibility movement

In parallel with legislative moves in relation to disability, which, by extension, are now being applied to the web, a distinctive movement for standardization and accessibility of the web has been spawned. The story of this movement, with the surrounding attempts to standardize the Worldwide web is complex and controversial and we do not attempt to convey all its nuances here. Instead, our discussion focuses on the development of the relevant web technologies and the consolidation of the web accessibility movement.

The story is one of standardization or lack of it and starts with HTML (hypertext mark-up language), a language with a troubled history. In its earliest days it was a new tool created by Tim Berners-Lee at the CERN laboratories in Switzerland to assist in data sharing between the computers at the centre. Based upon SGML, it was a miniature, simplified version of that highly complex mark-up language. But Berners-Lee soon had other plans for it. Taken up by the Worldwide web Consortium (W3C) – the body established by Berners-Lee in 1994 to try to marshal the phenomenal growth of the web his mark-up language had spawned – HTML was to undergo a profound reinvention (W3C, 2004).

HTML 3, a formal recommendation of the W3C in the mid-1990s, contained a wide range of new visual formatting properties, in response to the increasing interest in what could be achieved presentationally on the web. Yet, following this, while Netscape and Microsoft vied for control of the web with their own, proprietary, unwieldy new versions of HTML, and others busied themselves with ever more complex and cumbersome plug-ins which visitors to web sites were increasingly encouraged to download and install into their browsers, the W3C began creating a new foundational language for the future of the web: extensible mark-up language (XML) (W3C, 2004).

XML is at the heart of Berners-Lee’s concept of the semantic web, his wish, through the universal application of rigorously quality processed international standards for code languages, to see machines talking to one another on our behalf. Thus, the trajectory of the W3C’s versions of HTML lifted the language from its SGML origins and shifted it across to this new, XML foundation, first through the publication of HTML 4, and then XHTML. Both these new kinds of HTML, published in the late 1990s, came in two flavours: strict, and transitional. The former flavour had stripped out all of the visual formatting and presentational elements introduced in HTML 3, paring the language down to a more robust version of the earlier, more structural HTML 2. Visual formatting was now to be achieved exclusively through the use of a new W3C technology, cascading style sheets (CSS). The transitional flavour of these new versions of HTML allowed web designers to continue using older, HTML 3 visual formatting code until such time as the makers of browsers had caught up, and were properly supporting the use of CSS. The differences between HTML 4 and XHTML1.0 were minor, consisting mainly of some more rigorous rule-based practices in the latter rather than in the former, geared toward making the code more XML friendly. Finally,

in the summer of 2001, XHTML1.1 was published, with no transitional version. The transition from SGML to an XML basis for HTML was complete.

Parallel with these developments, the W3C undertook an exercise entitled the Web Accessibility Initiative, (WAI) which in 1999 published its Web Content Accessibility Guidelines (WCAG). As part of the initiative, alongside stripping out the visual formatting from HTML, new elements and attributes were introduced into the code to help make it more accessible to disabled people. "The power of the web is in its universality," as Tim Berners-Lee famously stated, "Access by everyone regardless of disability is an essential aspect." Thus, HTML 4 and XHTML 1.0, published the same year, contained these elements in both Strict and Transitional flavours, as does the now completely XML based XHTML1.1.

The WAI also published, in the following years, the Authoring Tool Accessibility Guidelines (ATAC), and User Agent Accessibility Guidelines (UAAG) (W3C, 2004). It is these standards for those making web sites, the software tools many use to make them, and the browsers through which they are accessed, that have since 1999 been increasingly applied by organisations around the world, and have been accepted by governments in numerous countries, as the *de facto* global standards for web accessibility. The battles between Netscape and Microsoft came to an end, in no small way encouraged, if not coerced by the efforts of the advocacy group, the Web Standards Project, spawned in 1998 by Jeffrey Zeldman and colleagues, (Zeldman, 2003). It is to their credit that the makers of browsers now pride themselves on their support for and compliance with the standards set by the W3C.

The WCAG provide a set of guidelines for creating web pages that are accessible to all, regardless of sensory, physical, or cognitive ability. To provide web developers with a graded approach to the implementation of accessibility, three "levels" have been defined: Priority 1, 2 and 3, also labelled Level A, Level AA and Level AAA. The first level, Level A, covers items on web pages that must be made accessible in order for individuals with disabilities to access the content at all. The second level, Level AA, includes items on web pages that should be made accessible to allow a wider group of users to access the content. The third level, Level AAA, describes items on web pages that can be made accessible to allow the widest amount of individuals with disabilities to use the site. (For the full WCAG visit the W3C web site at: www.w3.org/TR/WCAG10/full-checklist.html.) Most governmental directives specify Level AA as the minimum requirement, although the pre-WCAG US Section 508 falls somewhat short of this.

The EU Council and Parliamentary resolutions specify the W3C's web accessibility standards, mandating compliance, Europe-wide, with WCAG Level AA. (Council of Europe, 2003) Indeed, the EU recommendations are not only for the adoption of the WAI Guidelines but for the use of XHTML and XML in the construction of web pages. The eGovernment agenda across Europe, as evidenced in such mandatory standards for the UK public sector as the eGovernment Interoperability Framework (e-GIF) (eEnvoy, 2004) similarly require use of XHTML, XML, and compliance with the WCAG Level AA, for all public web sites. The EU, in short, have adopted the W3C's project of the Semantic web wholesale, preferring to side with Berners-Lee's non-proprietary, non-profit-making association of experts, rather than the likes of, say, Microsoft, or AOL. The European Parliament, in its June 2002 resolution on public web sites, makes frequent reference to "pure standards like (X)HTML and XML", calls the WAI

Guidelines “the global standard for the designing of accessible web sites”, and makes specific criticisms of what it calls, “producer-dependent solutions” (EU Parliament, 2002).

In this brief, albeit complex, history we are describing a classic tale of “free market” profit-making versus non-profit making non-proprietary regulation. However, this reinforces the claim that the question of web accessibility is best seen as a socio-technical problem where the technical development and standardization must go hand-in-hand with critical discourses. Web accessibility cannot be seen as a purely technical question because it is not an independently measurable attribute. Even to talk of web accessibility implies a tacit theory or theories of what counts as accessible or inaccessible to particular groups of people. Critical approaches point towards the ways in which the blanket term, “web accessibility” may be unpacked. In European terms the pendulum has swung markedly towards regulation and standardization. Given the active approach that disability discrimination legislation requires, this would seem to be a very positive move in achieving accessibility. Unfortunately, these positive moves are undermined both by the quantity of old style HTML sites still in existence and additionally by the reliance on automatic checkers.

How is the web accessible or inaccessible?

In this section, we outline a number of problems in regard to web inaccessibility. As we note, the problems of inaccessibility are further compounded by a reliance on automatic checkers, which cannot possibly verify the accessibility of a web site without a human check.

There are a range of situations in which differently-abled people may find trouble accessing the web. Visually impaired people often use speech synthesis software that reads out the text on web pages. “Screen readers” and “voice browsers” are perhaps the most commonly known “assistive technologies” used by disabled people to surf the web. But the coding of web pages is crucial if these assistive technologies are to make sense to their listeners. The “semantic” information must be available to the assistive software separately from the graphical representation made available to sighted users of the web. This, unfortunately, is all too often forgotten by an industry wedded to the “graphical paradigm”. The IMG element of HTML, for example, is used to place an image on a web page. The ALT attribute of this element was introduced in HTML 2, for web authors to provide a text equivalent for images. The RNIB (UK based Royal National Institute for the Blind) recommend five words, e.g. ALT = “dog leaps for a stick”. Speech synthesis software reads the ALT text. (Automated checking software will accept ALT = “image.jpg” in the code, as a valid ALT attribute. Not exactly helpful.) If the dog is leaping for a stick over a canal, and the paragraph of text below the picture is about how funny it is that the dog gets wet, it may be necessary to describe the picture in more detail. The LONGDESC attribute of the IMG element, introduced in HTML4, allows web authors to provide the URL of a page where a longer description may be found. (Automated checking software of course cannot tell if a graphic requires a LONGDESC or not.)

The correct, accessible coding of web pages is often crucial for people using the web. A blind accountant will require properly coded data tables, for example, so that the screen reader will read out the headers of each row and column before the contents of

each cell of the table. Consider a table where the first row is a list of years, and the first column a list of months (Table I).

If poorly coded, this table would be read out merely as a series of table-cell contents, e.g. “Month, 2000, 2001, 2002, Jan, 14 per cent, 23 per cent, 35 per cent” etc, whereas a properly coded table would be read out as, e.g. “Jan 2000: 14 per cent, Jan 2001: 23 per cent, Jan 2002: 35 per cent,” making much more sense to the accountant! Similarly, properly coded abbreviations and acronyms include their expansions, ensuring that there is no room for confusion.

But it is not only the visually impaired who come up against problems accessing the web. A deaf student, for example, needs text captions accompanying audio in multimedia files being accessed by other students. A journalist with repetitive strain injury, using keyboard shortcuts to protect a sensitive wrist, will require device independent controls – keyboard equivalents for mouse commands coded into the hyperlinks and other functionality on the page. A pensioner with any one of a number of age-related conditions, managing their personal finances, may require plain text, rather than the graphical text which pixellates when they are using magnification, keyboard short-cuts because their hand-tremor renders the mouse useless, or controls to stop any scrolling text that moves too fast for them. A dyslexic school pupil will need web pages whose presentation is controlled by an external cascading style sheet that can be swapped for a more suitable one on their own hard-drive.

Forms on web pages enable interaction for a wide range of purposes, from simple feedback to complex transactions. Speech synthesis software reading out the text beside form fields, so that visually impaired users know where to input their details, rely upon new elements in HTML4 to ensure that the right labels are clearly associated with their corresponding input fields. A poorly coded form, whilst clear to sighted users, might easily lead a visually impaired user to type the expiry date of their credit card into the security ID input field, their post code into the county field, and so on.

Automated approaches to checking web pages against the WAI guidelines, as mentioned above, have proliferated. Bobby, once the most popular one, is now renamed WebExact. The W3C maintain a list of such tools on their web site (WAI, 2004), but are careful not to endorse any of them, and, somewhat tellingly, they do not provide their own software tool to check web pages against their accessibility guidelines.

The ALT text problem is one of the key problems experienced by blind users in the UK’s Disability Rights Commission survey of web accessibility, which involved a user panel of disabled people and which found less than 20 per cent of web sites meeting the most basic accessibility level (DRC, 2004, p. 29). The same fundamental problem of web sites lacking alternative text for imagery was found in the survey of EU public web sites undertaken as part of the UK Presidency of the EU 2005 (e-Government Unit, 2005). This means that is it likely that many web sites have apparently been approved as accessible and will have the Bobby icon or similar, whilst they continue to be inaccessible to many users. Hence, the “ALT text” problem is a good representative

Month	2000 (%)	2001 (%)	2002 (%)
Jan	14	23	35
Feb	15	24	34

Table I.

example of the many web accessibility guidelines which genuinely cause problems to certain groups of disabled users and, for which, we contend, automatic checking can never prove adequate and cannot replace the need for human check.

But the problem is not only that automated approaches to checking web pages for accessibility are insufficient and unable to substitute for a human check, it is also that the existence and proliferation of such software has, in certain respects, actually hampered the global project of making the web more accessible. False stamps of accessibility impede the process of genuinely making the web more accessible.

Critical disability theory

Against this complex picture, where legislation actively promotes the rights of disabled people to access the web, where cases are being brought to court, and where there are strong moves towards technical standardization and accessibility of the web, although hampered by over reliance on automatic software checkers, critical disability theory may provide an active voice in pulling together the strands of the web accessibility problem.

Medical and charity models of disability have, hitherto, been the dominant models of disability (Fulcher, 1989). The medical model of disability emphasizes impairment as loss where the deficit is seen as belonging to the individual and where the presumed status and neutrality of professional medical judgement takes disability out of the political arena, emphasizing its supposed nature in terms of personal issues for medical judgement. Alongside this, health research about disability, where most research funding is directed, has been dominated by a positivist approach which looks to searching for cures, ways of reducing impairments and assessment of clinical interventions (Oliver, 1998). Oliver (1998, p. 1447) notes that disabled people have begun to influence scientific research but positivist researchers often resist involving subjects for fear of bias. Yet, at the same time, paradoxically, scientific researchers use terms such as “suffering” and “victim” which are far from neutral.

The charity model sits squarely alongside such a view in assuming that disabled individuals are to be the objects of pity and are requiring of charity rather than necessarily having a set of rights within the welfare state and within government policy (Goggin and Newell, 2000). However, more recently, alternative models of disability have come to the fore. It is notable that disabled people have a strong voice in constructing alternatives and this contrasts sharply with earlier medical and charity models where the construction of disability was in the hands of the scientific, medical expert.

A more radical approach is represented in the social or social construction of disability model (sometimes termed the social barriers model) which emphasizes that locating disability in the individual as opposed to society is a political decision, which further suggests that disabled people may have a set of distinct rights (Abberley, 1990). The social approach is interpretivist in that it looks towards the interpretations of disabled people, as to their experiences. This acknowledges that, under the medical model, a medical professional may be called upon to make a medical intervention into the life of, say, a Down's syndrome baby, with profound ethical implications, with relatively little understanding of the reality of disabled people's lives (Oliver, 1998).

Reinforcing the social view of disability, anthropologists and historians note that different types of disability are produced and recognized in different societies.

Additionally, as Oliver (1998, p. 1448) points out, disability is big business. "Disability becomes a commodity and a source of income for doctors, lawyers, rehabilitation professionals and disability activists."

Disability, itself, is clearly a contested and problematic term. As attitudes change towards more tolerance if not always better understanding (as the example, below, on cochlear implants, demonstrates), so does terminology deemed acceptable. For instance, there are a whole host of words, once commonly used but which would now be regarded as offensive. Some terms, such as "handicapped" have more recently been dropped from general use. It may be that "disability", as a term may disappear as it carries an implication of being measured against some norm of ability. The term "differently abled" is sometimes used and may be seen as preferable to "disabled". Yet "differently abled" also implies being different to some norm of ability, so this term is not unproblematic. This suggests we would never be able to agree a neutral term – all language is politically charged. Individuals may resist being lumped together as a group and being defined by disability. For instance, one might regard oneself as, say, a woman and mother as much as one might regard oneself as wheelchair user. Nevertheless, a key political strategy to press for change involves identifying oneself as a member of a group of people who have similar issues and concerns. Hence, the identity politics of disability remains important.

This also signals that a key part of such identity politics may involve resisting the technologies of normality. A particular view of what is regarded as normal may be tacitly inscribed (Akrich, 1992) in the design of a technology where it is assumed that technology is an equalizer, smoothing out difference when, in fact, its design might ignore or exacerbate difference. A critical information system would be suspicious of the application of technology as a cure all for inequalities. In particular, so called "enabling technologies" may be inscribed with a view of ablebodiedness which may cut across the wishes of certain groups of people not to be measured up against a supposed norm and found wanting.

The cochlear implant for the deaf is a prime example of the potential problems of technological fixes which are inscribed with a norm of ablebodiedness. On October 4, 2002 a Michigan Circuit Court judge ruled that a mother had a right to refuse elective cochlear implant surgery for her sons. In the court case, there was considerable argument concerning the attempt of one State agency to force upon the boys (temporarily in their custody) what is supposedly an elective surgical procedure. The mother, on one side, was happy with her own and her sons' deafness, and an "expert witness" on the other side, stated that without cochlear implants a deaf person's brain cannot develop, a view which appalled many disability rights activists.

As one reporter noted:

People identified as being unable to think correctly (or at all) are disabled by our society almost unthinkingly, denied the chance to make decisions that those around them simply assume are theirs. And the connections many people make between mastery of spoken language and cognitive skills have been criticized by deaf and hard-of-hearing people for years ... If the boys' present and future disadvantages were attributed to our hearing-dominated society rather than to their own deafness (and their deaf parents' acceptance of their deafness), teaching them pride in who they are and the skills to struggle would make more sense. Many people who do hold the institutions of the hearing majority responsible (including some who regard cochlear implants as a good thing in some cases) are vehemently opposed to [the position of the "expert witness."] ... But because the people who

brought the case forward blame these disadvantages on the boys' inability to hear rather than on society's insistence on hearing as a prerequisite to full membership, cochlear implants are seen by many people as a solution to disability. Denying the children implants looks like condemning them to a lesser life (Montgomery, 2002).

Available and appropriate technology is an integral part of the social model of disability. Disability can be created both by a society that insists on a particular norm for full societal membership with its accompanying medical and technological procedures to attain that norm, as in the example above, not just by the more immediately obvious issue of designing technology in such a way that groups of disabled people cannot use it as in the example of web site accessibility. As Goggin and Newell (2000, p. 128) note: "Disability can thus be viewed as a constructed socio-political space, which is determined by dominant norms, the values found in technological systems, and their social context."

Contrary to the social model, one might argue that a poor technological design could engender a short-term impairment rather than a long term disability and that a "handicap" refers to the relationship between a person and their environment (Cook and Hussey, 2001). However, there is no clear distinction because if a technology persists in being unusable for years where it could readily be made usable, the difference between short-term handicap and long-term impairment is difficult to establish definitively.

The social or social construction model moves away from the idea of disability as individual deficit, locating it instead in terms of barriers in the social environment. "It is not bodily impairment as such, but rather social discrimination and biases that in fact produce "disability" (Guo *et al.*, 2005, p. 51). This conception of disability throws the question of disability back onto the social and physical environment rather than the individual and is potentially more radical than traditional medical views of disability.

However, Shakespeare and Watson (2002) argue that now the slogan "disabled by society not by our bodies", with a tendency to have the strong social model policed for "political correctness" in disability studies, threatens to be too rigid, too black and white, and threatens to deny the lived experience of people with bodies with their aches and pains and so on. Hence, although the vector of the social construction model has been radical, it is increasingly subject to criticism. Notably, Shakespeare and Watson (2002), contend that the time has come to move beyond the social model, which, at least in its British version, is too strong. This is because it attempts to sharply separate impairment, e.g. lacking part of a limb or mechanism of the body from disability, which is seen to be the restriction of social activity caused by contemporary social organisation. Hence, disability is defined in terms of social oppression not by the form of impairment. Undeniably, the social model has been liberatory in political terms for raising consciousness towards the removal of barriers both in the UK and in the USA, where a more civil rights inspired approach prevails, yet the reality of the lived body also needs to be accounted for.

In its relationship to the body there are some parallels to be drawn between the social model, in its strong version, and elements of contemporary feminism. The social model tries to bracket bodily impairment from disability. This parallels the efforts of early second wave feminism to deny any effects of biological difference between men and women (Evans, 1994). Although anxious to avoid biological determinism and essentialism, feminism now embraces the body in a more materialist and theorized

approach to bodily differences (Adam, 1998). Shakespeare and Watson (2002) are arguing for a similar intellectual process in disability studies so that a critical approach to disability will also be materialist in accounting for impairment as well as continuing to argue for the removal of social barriers. Again by analogy with feminism, if feminism sees no *a priori* and fixed distinction between sex and gender, as both must be amenable to social explanation, then disability theory should look to the breakdown between impairment and disability in arguing for social explanations of both.

This points to an issue that both feminism and disability studies must face, namely the centrality of embodiment. Indeed, we argue that a move away from strong, often bi-polar, social models (both in feminism and disability studies) towards accounts that also include embodiment, is part of the crucial move towards a critical model. A critical approach cannot be too relativist and disembodied in inspiration, and cannot sit entirely comfortably with a strong social model which is potentially too radical because then it becomes difficult to anchor the materialism of oppressive relations and to develop alternative emancipatory practices. An account of the material lived conditions of existence gives impetus to disadvantaged groups to come together with a collective critical voice.

The invisibility of disability in studies of ICT

Indeed, we believe that the lack of consideration of embodiedness in conceptions of the use of information and communications technology (ICT), in other words the way that much writing on the new cultures of technology has ignored the body, explains part of the reason why gender was initially ignored in the sociology of ICTs, and why disability continues to take a back seat in critical studies of ICT. We need to bring the body back into social models of difference and therein lies much of the potential for a critical voice.

This is especially important as disability has been relatively absent in writing on the “digital divide”. In particular, it is remarkable how little attention the academic wing of the digital divide discourse has paid to disability. Several major works on the topic either say little or include disability in a blanket of disadvantage as in age, race, class, disability etc. (Loader, 1998; Norris, 2001; Servon, 2002). In terms of the more policy oriented discourse, disability has begun to be included but only late in the day, e.g. disability was only explicitly considered in the fourth of the US government’s “Falling through the net” (US Department of Commerce, 2000) reports.

If we accept the way that the digital divide has become a central plank in the “socially inclusive” policy discourse of several countries including France, UK and USA (Selwyn, 2004) then it is vitally important that disability be considered alongside other social issues in relation to access to the web.

Goggin and Newell (2000) note that disability rarely features in the more critical histories of the internet that are beginning to appear. Critical disability theory, therefore, continues to have little engagement with studies of the internet. This is problematic in that the internet has long been seen as a crucial site for the exploration and affirmation of identity (Turkle, 1996). Several key studies explore the notion of the cyborg, by now a well worn concept in internet studies (Haraway, 1991; Mitchell, 2003; Stone, 1995) which point to the difficulties, and even the undesirability, of demarcating between body and machine. Several prominent studies of the internet (Poster, 2001; Stone, 1995) draw on the by now, infamous story of the psychiatrist, Sanford Lewin,

who posed as a woman severely disabled after a car accident, in an internet chat room. Yet none of these studies grasps the nettle of thinking of embodiment and subjectivity from a disability perspective.

Goggin and Newell (2000) argue that the reason for the absence of disability from internet studies lies in the predominance of the medical model of disability. Hence, while gender and sexuality are beginning to be seen as social categories and therefore amenable to sociological analysis, disability continues to be left on the sidelines. The social model of disability helps to foreground the social construction of disability, but its strong version tends to mask questions of embodiment. An approach drawn from critical information systems is important for bringing disability into focus in studies of ICT use for three reasons. First, it can be used to challenge taken for granted notions of the trajectory of technology as unequivocally positive and the idea that a particular technology has to be adopted and used in a particular way. Second, this is important in regard to enabling technologies if these are designed in terms of some norm of ablebodiedness to which, it is assumed, everyone ought to aspire, and where the societal norm is actually reinforced by the prevalence of a technology, e.g. as in the cochlear implants example. Third, the critical approach exposes oppressive practices associated with the imposition of particular technological systems and offers the hope of emancipation in the hands of oppressed groups themselves.

Conclusion

In this study we argue that the problem of web (in)accessibility would benefit from a critical approach which must be married to continuing efforts in the technicalities of web standardization. A crucial part of the critical approach is that oppressed groups find a voice. In disability studies, by analogy with other areas such as feminism, this means having disabled people completely involved in the design and testing of web sites, and the development of web accessibility standards. A critical voice is being heard in relation to the strong demands of legislation, and the work of pressure groups such as the UK's Disability Rights Commission will continue to be important in maintaining this.

The surprising absence of disability from policy discourse on the digital divide and studies of the internet, Goggin and Newell (2000) explain by the continued hegemony of the medical model which does not see disability as a social category amenable to social explanation in the way that gender is now seen. We concur with this explanation, to some extent. However, it is clear, that gender is still not widely taken as social category in many studies in the business and management arenas, at least, and it is only by fairly hard fought battles that it is beginning to be seen as a social category in areas such as information systems (Adam *et al.*, 2004).

Some of the reason for the absence of critical consideration of disability in digital divide and internet studies, we see as a continuing ambivalence in these areas about embodiment, which mirrors a wider avoidance of the body in "cyberculture" studies (Adam, 1998). Some of that avoidance of the body can be seen in the way that traditional artificial intelligence (AI) ignores the body in its concentration on models of disembodied intelligence. Although we have not explored this in the present study, we postulate that some of the traditional AI "disembodied intelligence" problem is manifest on the reliance on automatic software checkers of web sites, where it has been

assumed that these can capture web site problems where, we argue, only an embodied human checker will do.

Additionally, whilst the social model of disability has been immensely influential in moving disability away from individuals towards looking at the creation of disability by social barriers, Shakespeare and Watson (2002) argue that the model is too strong and, we suggest, is threatening to add to the problem of disembodiedness in relation to internet studies as the material, lived embodied nature of life threatens to be eclipsed by a view which sees all the problems as social. Herein lies an element of ambivalence towards the adoption of new technologies as norms of ablebodiedness may be inscribed (Akrich, 1992) in technologies against which disabled users may find themselves always lacking. A critical information systems agenda would urge caution in assuming the equalizing potential of new technologies. A critical approach in relation to web accessibility for disabled people, therefore, must take account of all these elements, including technical web accessibility initiatives, legal discourse and internet studies to offer a voice to the disabled community to make web technology enabling rather than disabling.

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Further reading

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