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# Combating eDiscrimination in the North West

## Final Report


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# Contents







# Executive Summary


The Combating eDiscimination in the North West project examined over 100 websites advertising job opportunities both regionally and nationally, and found the vast majority to be largely inaccessible. Professional standards, such as using valid W3C code and adhering to the W3C Web Content Accessibility Guidelines, were largely not followed.

The project also conducted interviews with both public and private sector web professionals, and focus groups of disabled computer users, to draw a broader picture of the accessibility of jobs websites.

Interviews with leading web development companies in the Greater Manchester region, showed that there is a view there should not be any additional cost in making websites accessible, as the expertise to create a site professionally should be in place from the start, and that accessibility will follow from applying professional standards.

However, through the process of trying to create a website for the project, with such a company, it was found that following professional standards is not sufficient to catch all the potential problems, and that user testing is an essential adjunct to professional practice.

## The main findings of the project are, thus, that:

- Most websites in the job opportunities sector are not following professional standards of web development, and are largely inaccessible

- Professional standards of web development need to be augmented with user testing to ensure proper accessibility

# Background

Discrimination against disabled people exists in many forms. For many in the disability movement disability is structurally created by a predominantly inaccessible built environment which discriminates against people with impairments.

Discrimination exists in the labour market as much as in the built environment. According to the Shaw Trust, www.shaw-trust.org.uk, the largest UK provider of supported employment services for disabled people, nearly 1 in 5 people of working age (7 million/19%) in the UK are disabled, 50% of disabled people of working age are in work, compared with 80% of non disabled people of working age. In the UK, since the latter half of the twentieth century, successive governments have presided over an increase in the unemployed disabled population which, through initiatives including 'New Deal for Disabled People' (NDDP), the present government is currently attempting to reverse. Discrimination also exists, however, in the electronic environment. eGovernment has brought most public services to the web. However, disabled people can be, and often are excluded from the World Wide Web even if they own or have access to a computer. For example, all job centre plus offices are now fitted with employment search facilities which allow job seekers to access the web. However, the access interface is a touch screen which discriminates against those with visual and dexterity impairments. Hence the structural creation of disability is still present and in many cases acts against social policy goals of improving opportunities for disabled people to compete equally in employment markets. Even if accessible hardware is available, further barriers are often found as a result of inaccessible web design.

The Disability Rights Commission (DRC) report, published in April 2004, entitled "The Web: Access and Inclusion for Disabled People: A formal investigation" concluded that, "81% of websites failed to meet the most basic criteria for conformance to web accessibility guidelines." In November 2005, the UK Presidency of the EU published a report, "eAccessibility of public sector services in the EU," (eGovernment Unit 2005) which concluded that only 3% of EU public sector websites passed that minimum Level A criterion. Both the EU and UK official benchmark for an accessible website is Level AA of the W3C's WCAG – a standard requiring a fundamental shift in web-authoring techniques, compared to the relatively cosmetic improvements required by Level A.

Accessible material online, furthermore, needs to be addressed at the authorship level as well as in web design. For example, screen readers pronounce the phrase 'AA' as 'aah'. A more accessible rendering of the term 'AA' would be 'double A'. Clearly the issue of making the web accessible requires confronting on several levels. The principal focus of this research is web accessibility in relation to employment issues. Thus a significant aspect of the research is to determine the accessibility of employment related web sites.

National job-hunting portal Totaljobs.com offer a 'text-only' version of their otherwise completely inaccessible site, whilst the popular www.monster.co.uk job hunting website now offer http://www.access.monster.co.uk/, which is an 'accessible' (to Level A) version. But 'text-only' and Level A 'accessible' versions of websites are of little help to many disabled users. In the North West, neither www.northwestjobs.co.uk nor www.jobs-nw.co.uk seem to have made any effort at all at eAccessibility. www.nweo.jobs-gopublic.com - the North Western Local Authorities Employers Organisation, claiming to be the UK's leading website for Public Sector careers, has seemingly made no effort at all at eAccessibility. Public sector employment as a proportion of total employment was 21 per cent in the North West region in June 2005, (http://www.statistics.gov.uk/cci/nugget.asp?id=1292 ).

Michael Anyadike-Danes' November 2005 report for ERINI (Economic Research Institute of Northern Ireland), entitled "Some labour market dimensions of disability in regional perspective", finds that employment rates for disabled people in the North of England, Wales and Northern Ireland, are massively worse than in the South – some "50 percentage points adrift".

It is quite evident, therefore, that there is discrimination against disabled people in the employment sector, that one form that this discrimination takes is in the Digital Divide created by inaccessible online resources for Jobseekers, and that the North West is a particular focus of this problem.

## Barriers online

An inaccessible website is one which simply does not make the information it contains available to those with a range of impairments. An inaccessible website is like an elevator with no voice-over, or a building with no ramp access to a raised front door. An inaccessible website with employment opportunities or advice on it discriminates against people with impairments and disables them by refusing them access to that information. As the DRC Report alluded to earlier makes clear: "In contrast to other information media, [the web] is, with the benefit of assistive technology, potentially tolerant of impairment. Inclusive website design makes it easier to use these alternative means of access, without making a site less attractive to unimpaired users. Irresponsible and inconsiderate design, on the other hand, not only puts disabled users at a significant disadvantage but can make life unnecessarily difficult for everyone, whether disabled or not." [DRC 2004]

eDiscrimination is a complex area, but the following examples may assist with understanding the problem: Those using screen readers or voice browsers to listen to websites require alternative text with images, labels on form fields, and headings on data tables. Without these imagery is completely inaccessible, forms prohibitively confusing, and data tables meaningless. Those unable to use a mouse to navigate around a webpage require careful coding of the page to ensure 'device independence' is a feature of any interaction. Mouse-only interaction discriminates against such users. Many websites, nowadays, are transactional, offering the user search facilities, the opportunity to complete financial transactions, obtain particular documents, etc etc. Such tasks formed part of the research undertaken for the DRC's report. Success or failure with a range of such tasks was tested with regard to a range of 100 websites. "Blind users constituted the most disenfranchised group studied in this Formal Investigation," with only a 53% success rate, but all impairment groups taken together achieved only 76% success rate. [DRC 2004]

# Aims

The project aimed to research barriers to employment faced by disabled people in England's North West. It focused on the accessibility of employment information and application processes, online, to disabled people. This has lead to policy recommendations and guidelines designed to improve employers' websites and disabled people's access to work, included in this report. This in turn should lead to greater numbers of disabled people working in the region.

**Objectives:**
In consultation with users of adapted computer equipment, the project's objectives included:

- To discover what employment related websites are used and identify any problematic issues related to accessing the sites.
- To audit a representative sample of employment related websites for compliance to accessibility standards.
- To engage with regional public and private sector organisations to determine how they define 'web access' and what steps can be taken to improve web accessibility.

These three objectives were met.

- Over 30 disabled individuals took part in user testing, focus group discussions, and interviews, from which personal experience of disabled people's use of jobs websites was ascertained and recorded.
- Over a hundred local, regional and national online employment resources were subjected to a rigorous IT audit against the globally agreed standards of web accessibility.
- Five regional web-design companies and six regional public sector organisations provided interviews.

Additionally, one of the five web companies was commissioned to produce an accessible website for the project, which could:

- be updated and maintained by our blind research assistant using his assistive technologies.
- would include a 'model' online job application which could be accessed using screen reading software.



This part of the project provided a great deal of insight, and an entire chapter of the final report, revealing gaps between what the globally agreed standards, adhered to by the best web design companies, and the reality of accessing websites using assistive technologies. These gaps were overcome by working closely with the company, and involving external disabled user testers as well as the experience of our in-house blind research assistant, resulting in further recommendations for policy that are included in this Final Report.

# Theoretical debates over the causes of disability

The issue of how to engage disabled people in work has been a concern for government, business, and not least disabled people themselves for over 100 years (Danieli and Wheeler 2006). Certainly following the rapid and substantive rise in the disabled population as a consequence of the second World war, structural interventions were introduced to assist more disabled people enter the workforce enshrined in the 1944 disabled persons employment act (Tomlinson 1943). However, these structural attempts largely failed (Hyde1996), resulting in an increasing disabled population outside the labour market and dependent on state benefits (ibid).

In the mid 1970s, a combination of the effects of war, politics and economic policy once again affected the size of the disabled population in many Western industrialised countries (Bell 1993; Bowitz 1997; Catalano & Kennedy 1998; Riphahn 1997; Snower 1995). One event which had the secondary consequence of increasing the numbers of disabled people unable to find work was the decision by OPEC (the association of major oil producers) to quadruple the price of crude oil and reduce output (Turner 2001). These actions were taken due to the disenchantment of (primarily) Arab oil producers with the support given by many Western countries to Israel preceding and during the Arab/Israeli war of 1972 (Turner 2001, 311-13). The effect of the increased price and reduced supply of 'crude' was to plunge many Western economies into recession (Bell 1993; Powell 1995; Snower 1995). For many organisations, such a recession resulted in restructuring, downsizing or even closure (Powell 1995). In such economic circumstances, the outcome was increased numbers out of work.

One labour market exit strategy was to enter disability rather than unemployment benefit systems (Toynbee & Walker 2001). There were several stakeholders who could benefit from such a decision. Government could find unemployment levels remaining relatively low (Toynbee and Walker 2001 ). For individuals, invalidity benefit (IVB) provided a higher level of income than unemployment benefit (Ward 1996) which, some have argued, conferred the perception of social stigma and lower status on its recipients (Argyle 1989). The relative benefits offered by the exit-route from the workforce to invalidity also served the interests of employers. Resistance to losing their jobs, particularly amongst older workers, could be reduced when workers were presented with a more acceptable exit strategy than unemployment benefit (Snower 1995). So, faced with job losses, many individuals accepted invalidity benefit as the most appropriate Labour market exit strategy (Disney & Webb 1991; Molho 1991). Claimants of IVB rose from 505,000 in 1977 to 1.77 million by 1995, costing the Treasury an increase in IVB benefit payments from £678 million in 1971/72 to £7.75 billion in 1994/95 (Ward 1996). Hence it is possible to increase the size of a disabled population without there being a parallel increase in levels of impermanent. In this instance, disability becomes a product of economic and political rationality rather than a directly attributable consequence of an individual's medical situation.

It was against this background of rising levels of disability that New Labour swept to power in 1997 and argued for the greater social inclusion of disabled people. This was to be achieved primarily by improving their opportunities to gain paid work in open employment (Brown 1999; Harman 1997; Mandelson & Liddle 1996). Since this concept of social inclusion through paid work remains present government policy it is important to consider its underlying ideology and how this has influenced the mechanisms that are currently in place to assist disabled people to break away from state-dependency and achieve social inclusion through paid work. The electoral success of 'New Labour' has been attributed to the party's rejection of many traditional outmoded 'Old Labour' ideologies. These include a move away from central government control of the economy (Coote 2001); an ideological shift away from a commitment towards

public ownership (Giddens 1998), and a weakening of the once close links to the trade union movement (Driver & Martell 2000). This ideological shift, often referred to by New Labour as 'modernization' has been criticised by some as a move away from collectivism towards individualism (Lavalette & Pratt 1998: 246). This move towards individualism, however, does not mean that the structural effects of policy are of no concern, since funding for many areas of social policy is dependent on projects being monitored to ensure the desired structural policy outcomes are achieved (Prideaux 2001). Many who support this modernization process argue that 'New Labour' has attempted to 'strike a balance between economic success and "social inclusion", the market and the community' (Toynbee & Walker 2001; Driver & Martell 2000).

Social inclusion is often thought to be synonymous with excluded citizens finding paid work (DSS 1998). The mechanisms chosen to deliver work opportunities were primarily filtered through training schemes and education (Hyland 2000a, 2000b; Hyland & Merrill 2001) and, theoretically, improved training should increase opportunities to participate in open competition for jobs (Brown 1999; Harman 1997; Mandelson & Liddle 1996). The aim of 'New Labour' was to forge a new relationship between social inclusion, citizenship and State. This move towards proactive citizenship was a pivotal concept in what has been termed 'The Third Way' (Giddens 1998). 'The Third Way' directly links the State to equality and social inclusion, arguing that '"the social investment state" defines equality as inclusion and inequality as exclusion' (Giddens 1998: 102). Some have argued that scepticism towards the State's ability to provide efficient solutions to social exclusion has also moved the focus away from state intervention towards partnerships (Popple & Redmond 2000). Partnerships are considered by the New Labour Government to be the most efficient use of state and market resources to deliver social inclusion (Compact 1998) and these partnerships have primarily been made between public, private and the voluntary sector (Wickham Jones 2000).

It was against this background of individual responsibility and partnership that the government's cornerstone project 'The New Deal' was launched to combat social exclusion (Carter & Greco 2000; Foley & Martin 2000; Miller 2000; Welch 1997). £5.2 billion was raised early in New Labour's first term in office (HMT 1997) through a one-off windfall tax on the privatized utilities (Drake 2000). Money was allocated into a series of New Deal programmes, which aligned policy with Third Way principles.

In addition to New Deal for Disabled people (NDDP) other New Deal programmes included those for the young unemployed (Miller 2000; Ritchie 2000; White 2000); the long term unemployed (Layard 2000; Peck 1999), and lone parents (Hales 2000). Of the total financial commitment to the New Deal programmes, £195 million was earmarked for New Deal for Disabled People (Drake 2000) the ethos of which was outlined by Harriet Harmon, Minister for the Disabled at that time, who stated:

"This announcement will give a significant boost to those disabled people who want to work. This government wants to give marginalized and excluded people a hand up not a hand out". (DSS 1998)

From commissioned research the government had identified in excess of 1 million working-age disabled people who wanted to work (NDDP 1999). It was argued that if these unemployed disabled people could be assisted into employment, several benefits would accrue.

The financial burden of incapacity benefit would be reduced as workers migrated into work and began paying taxes; individual disabled people would enjoy an increase in their income; they would achieve a greater degree of independence from state benefits, and feel more socially included (AccountAbility 2004). Additionally, a strong case has been made that organisations can benefit financially by employing disabled staff (AccountAbility 2004; DRC 2004; Evans 2001; Spechler 1996). For example, Evans lays out the best practice for employing disabled people. He makes the business case that failure to use this talent-pool fully is a cost to business not only in terms of promoting one's company as socially committed but also because it does not exploit the untapped potential of disabled people (Evans 2001). Spechler provides a number of case studies on business profitability that was achieved by employing disabled people, including benchmark examples of positive impacts on quality and employee and customer relations (Spechler 1996). These texts reflect the recommendations set out on the websites of prominent UK bodies including the Disability Rights Commission (DRC 2004) and the Employer's Forum on Disability (AccountAbility 2004). However, policy and a few positive cases, encouraging as they may be, should not be misinterpreted as the general case.

Research has identified that disabled people are twice as likely as their non-disabled peers to be out of work (DRC 2004), with one third of those who find work becoming unemployed within the following year. Of those who become disabled during their working life, one in six lose their jobs during the first 12 months after becoming disabled (Burchardt 2000). So there appears to be a problem in translating the rhetoric of social inclusion through paid work for disabled people into a working reality. There is a contradiction here between the benefits for government, disabled people and employers. Published statistics on the success of government policy towards the employment of disabled people revealed that targets were missed by some considerable amount. For instance, figures show that only 5% of disabled people involved in NDDP have found permanent jobs. From July 2001 to September 2002 1,400 disabled people worked for more than six months after getting help. Furthermore, just 6,099 people were helped into any form of work - far short of the target of 90,000 set (Calvi 2003).

Although to a neutral observer the gap between the rhetoric of social inclusion through paid work and the reality of continued exclusion for many disabled people may appear puzzling, for many in the disability movement this apparent contradiction can be easily understood once different models of disability are considered and the causes of disability are examined. Hence, for the disability movement, the issue has become a political struggle against dominant (mis)understandings of disability which, they argue, are the cause of oppression and discrimination against disabled people. So what follows is a brief summary of the underlying principles of these models.

## Models of disability

Many in the disability movement argue that there are just two competing models that attempt to explain the causes of disability (Abberley 1987; Barnes 1990; Campbell & Oliver 1996; Finkelstein 2001; Oliver 1990; Swain et al 1993). The first is referred to as a medical model of disability and argues that disability is caused by impairments – physical, sensory or mental - which are located within the individual body. The second is a social model which argues that disability is a social construction caused by social and environmental factors such as people's attitudes towards disability and the social construction of physical environments which meet the needs of non-disabled people and disregard those of the disabled.

These two models are seen by many to be mutually exclusive and they lead to very different policies and practices in achieving equality for disabled people. The former model focuses on 'curing' the individual while the latter requires changes in the social and environmental factors which cause disabled people to experience their impairment as disabling. Generally it is argued that historically the medical model has been hegemonic and that this has led to the exclusion of disabled people from both material and social benefits (Finkelstein 2001). In order to ensure the inclusion of disabled people into society it is argued that the social model should become the dominant understanding of disability. This change in understandings has become the causus belli of the disability movement.

Disability can affect many aspects of an impaired person's life, and since the 1960s there has been increasing focus on specific issues, particularly that of the problem of independent living (Brisenden 1986; Dejong 1983; Finkelstein 2000; Morris 1993). This research is concerned with one aspect of disability that has a serious impact on the ability to live independently: the employment of people with impairments. As has already been shown, this subject is highly political (Blair 1997, 1998a, 1998b; Brown 2000; DSS 1998;

Harman 1997; Giddens 1998; Mandelson & Liddle 1996; New Statesman 2004) with some authors now arguing that the social model of disability should be placed at the centre of employment policy because it offers greater opportunities for disabled people to find paid employment (Barnes 1999; Drake 2000; Hall 1999; Roulstone 2000).

Consequently, the research conducted for this project inevitably has an overtly political dimension at the centre of which are the claims embedded in the social model that concern the 'real' causes of disability. Recently, some academics have argued that the adoption of the social constructionist account of disability that underpins the social model is insufficiently sophisticated to explain fully the phenomenon of disability (Shakespeare & Watson 2002), caused principally for many by the neglect in the social model of any sociology of impairment (Abberley 1987; Hughes 1999, 2000, 2002; Hughes & Paterson 1997; Paterson & Hughes 1999).

Others have challenged the validity of the two mutually exclusive models – medical versus social - posited by social model adherents (for example, Lowe, 2001). Whilst more recently, the entire concept that the social model of disability can encapsulate the experiences and discrimination faced by impaired people has been challenged (Shakespeare 2006). However, for the purposes of this research, a social barriers model of disability has been adopted and applied throughout because it can aide the identification of disabling barriers and thus assist assigning causal links to their creation. A brief discussion of why and how this methodology was applied follows in the next section.

# Research methods for disability research

In the last section the question of what causes disability was addressed and the concept of opposing models i.e. social versus medical was considered. The often heated debate over the veracity of models of disability is still ongoing (Shakespeare 2006). Hence it becomes difficult to determine in any particular set of circumstances where a social barriers approach identifies the causes of disability, or the medical consequences of an individual's impairment contributes towards an inability to participate in any form of social interaction. For example, there would be difficulty in arguing the inability of a person without sight to gain the full experience of a visual arts display was not caused by their medical condition.

Although audio and tactile alternatives may provide a general description of the art installation, they cannot simulate the visual aspect and impact intended by the artist. Hence drawing simplistic dividing lines between the social barriers approach and the medical consequences of impairment is often a problematic 'Gordian knot' for researchers.

However, in ICT research constructive methods can be designed if the terms 'disability' and 'impairment' are separated and treated as different concepts. The consequences of an individual's impairment can sometimes involve the use of adaptive equipment to interact with computers and other ICT's. So speech synthesis can assist visually impaired people access computers by generating spoken output as opposed to using text on a VDU screen. Similarly, people with severe dexterity restrictions can input data onto a computer using speech recognition equipment. Such systems are designed to overcome the consequences of impairment and are often produced and continually evolve through specialist manufacturers. This research has not been informed by this aspect of ICT design. Rather, it concentrates on the disabling affects of the production of inaccessible web content and design. In other words, this research analyses the disabling barriers caused when web material excludes people with assistive computer equipment from accessing that material. In this regard, the research follows more closely a social barriers model where disability can be defined as the design of web materials which disables impaired computer users. So the pivotal methodological concept placed disabled computer users as knowing subjects in the research process.

Hence the methodological approach taken places disabled users in the role of research designers, testers, evaluators, and finally analysers. The prime reason for this somewhat unconventional approach is based on the fact that because of the multitude of methods of accessing the web, both in terms of adaptive equipment and more standard methods used by a wide variety of people with varying types and severity of impairments, then the level of experiential knowledge held could only be expressed by placing such users at the central core of research activity. This approach could be regarded as closely aligned to the emancipatory disability research agenda (Oliver 1992; Oliver 1997; Oliver and Barnes 1997; Zarb 1997; Barnes 2003). At the core of emancipatory disability research is the concept and role of experiential knowledge in the research process. As one of the research team has a severe visual impairment, and self defines as disabled, then it is appropriate here to consider the role of experiential knowledge more closely and determine how research methodology was not subjected to undue bias based on the disabled researcher's experiences.

## The place of experiential knowledge in disability research

The role of experiential knowledge has become a key methodological issue for the disability movement regarding how valid research on disability should be conducted and by whom it should be done (Barnes 1996; Branfield 1998; Oliver 1992; Oliver & Barnes 1997; Stone & Priestley 1996).

Experiential knowledge is an important aspect of social research which requires that attention be given to the notion of identity. This has been a concern for researchers for some time in relation to the question of how to produce valid knowledge (Collinson 1992; Parker 2000; Stanley & Wise 1983). In this context identity relates not only to the identities of both researcher and researched but also to the relationship between researchers and the topic of research.

One central aspect of writings on identity and research concerns the means of generating rapport between researchers and researched, as rapport can allow access to knowledge which researchers may otherwise not have access to. One means of promoting such a rapport is by matching some aspects of the identities of researchers and research subjects. For example, some have argued that the degree of trust and disclosure is increased in feminist research when researcher and researched are the same gender and that prescriptive methods for conducting such research are often inappropriate (Oakley 1981). However, others question 'woman' as a unitary category, arguing that identities are viewed as multiple, and can vary in relation to context, place and time, which includes the research process (Cotterill 1992; Edwards 1990).

Similar arguments appear within disability research with disabled people also differentiated by many demographic variables including: gender, class, ethnicity, sexuality, age and so forth (Duckett 1998; Humphrey 2000; Morris 1993; Shakespeare 1997; Vernon 1997). However, many supporters of the disability movement have generally elevated a homogeneous concept of 'disabled' as the defining feature of identity for disability research. For some the outcome of privileging experiential knowledge is to argue that only disabled people should conduct research on disability (Branfield 1998). Others take a more pragmatic line acknowledging the assistance available from non-disabled researchers whilst arguing that disabled people should be an integral component in all stages of the research process by altering the social and material relations of knowledge production in a new emancipatory disability research agenda (Barnes 1996; Oliver 1992; Oliver & Barnes 1997; Stone & Priestley 1997; Zarb 1997). These authors promote emancipation for disabled people through the adoption of concepts enshrined in the social model of disability. One implication of conducting emancipatory disability research in accordance with the social model is that once the social and material relations of knowledge production are altered to allow disabled people equal access to the research process they are then able to make an epistemological choice of research methods without recourse to any limitations imposed by impairment.

As a member of the research team defines himself as a blind person who is confronted by very specific disabling barriers, he is able to claim the necessary 'cultural competence' required to do disability research, and thus meet one criterion of the emancipatory disability research agenda. However, in his case, simply altering the social and material relations of knowledge production did not provide equal access to all the methodological prescriptions because some consequences specific to impairment affected the methods he was able to adopt to conduct this research. For example, the construction of graphical representations of audit compliance statistics.

An example of how the involvement of a disabled researcher affected the initial research design can be observed in the way the formulation of what constitutes disability inside ICT's has been adopted by the research team. Many traditional methods of assigning group membership towards disabled people are achieved by considering classifications based on impairment definitions. In both the UK and USA, this practice is demonstrated in their relative pieces of anti discrimination legislation: the Disability Discrimination Act (DDA-UK) and the Americans with Disabilities Act (ADA-USA) respectively. Similarly and unsurprisingly perhaps, the International Classification of Impairments, Disabilities and Handicap, by the World Health Organisation adopts the same traditional understandings. This in turn raises the question of why, and what difference to ICT research is achieved by adopting alternative methodological approaches?

The most fundamental and wide ranging aspect is to be found by considering how disabled research stakeholders determined the site of disability. This is a critical factor in research, after all if the site of disability is a place of contention, then methods to remove disability also become problematic. Again, traditional understandings often regard disability as a functional aspect of impairment; ergo an impaired person is disabled. Again, this research has rejected this simplistic schemer. Instead, disability is not related to impairment, rather disability is defined in terms of computer users. In other words, the research rejects any notion of 'computer users with disabilities'. This may appear a semantic point, but one we believe is core to readdressing concepts of eDiscrimination. There are no computer users with disabilities, because the term places the disability firmly as a function of the person. Rather, disability is rooted inside inaccessible ICT design. The theoretical implication of this construct moves the 'problem' of inaccessible design away from impaired computer users and firmly towards systems designers who create disability by not building ICTs for all by default. Another means of conceptualising the issue is to consider that the output from any computer is inaccessible without adaptive equipment. For most people, this adaptation is achieved through a visual display unit. By concentrating on this dominant access technology, design for alternative access methods including screen readers, text magnification, and non mouse use to name a few, has meant that such alternative means to gaining access have been regularly consigned to a secondary, specialist, non standard market. This returns us to the point that the linguistics of disability becomes important in understanding its construction. Because the concept of universal design has not been generally adopted in ICT circles, then the issue of disability is often regarded as specialist, outside the 'norm', and is resplendent with terms including 'adaptive' and 'accessible', which in reality mask the obvious point that initially design was discriminatory and not based on universal principals. Although this argument may appear academic and rooted in linguistics, our research has revealed other aspects of accessibility which may not have been considered by more traditional research methods.

One issue which often appeared and was considered as problematic for user testers was E Accessible material online. Consideration is required at the authorship level as well as in web design. For example, screen readers pronounce the phrase 'AA' as 'aah'. A more accessible rendering of the term 'AA' would be 'double A'. Clearly the issue of making the web accessible requires confronting on several levels.
The principal focus of this research is web accessibility in relation to employment issues. Thus a significant aspect of the research is to determine the accessibility of employment related web sites. Hence a sample of over 100 employment related websites have been audited for the project to check compliance to accessibility guidelines. The results of this technical audit are given in section xxx. Once the audit was completed, this provides evidence of the degree of non compliance to accessibility guidelines. Yet in itself an audit does not determine whether or not websites were capable of being used by disabled computer users, something the research was designed to establish. However, before asking user testers to access any specified commercial website, it was decided that in the first instance a simple test webpage would be created on the project website to ensure user testers had basic skills which could complete simple tasks such as selecting options, entering data, reading specifications, copying and pasting, and submitting forms. Clearly the project required a fully accessible website where the competence of user testers could be judged.

## Producing an accessible website

Section 10 analyses in detail the difficulties encountered in producing a usable website. This debate will not be repeated here, however, the inability to produce a project website did affect the methodology adopted and so this aspect will be discussed. The original proposal was to initially ascertain the ability of user testers on the project website to gauge their general competence in using internet resources. The test site was arranged so that the initial stage of joining the project required user testers registering on the site. From here a series of simple check boxes were provided for people to answer general questions such as 'do you define yourself as disabled? (See appendix xxx for full list of questions). After completing the registration and answering the series of questions, user testers were then invited to download a simple curriculum vitae, read a job and person specification, and then apply for the sample job to the project. The project website was commissioned with a web development organisation who had won awards for the accessibility of their work. Their brief was to create the project website to standard accessibility guidelines, making both the user interface and contents management suite (CMS) fully accessible. It was important that the CMS was accessible as one of the research team is a screen reader user and would be required to manage and add material to the site. The agreed delivery of the site was to have been summer 2006. However, the site was not ready for launch until mid November 2006, too late to complete the project on time. Hence a contingency strategy adopted a secondary method.

From early 2006, two national organisations concerned with the welfare and rights of disabled people had agreed to join the research and invite a sample of their clients who were computer users to join the project as user testers.
One organisation had predominantly visually impaired clients who provided a range of different methods of computer access including screen readers, text magnification, and in some case a combination of both. The second organisation could provide user testers with mobility and dexterity difficulties together with people who used speech recognition software. In total this amounted to 30 user testers with a broad range of experiences and methods of accessing computers.

The method we had planned to adopt was firstly to hold standard focus group sessions (Bryman and Burgess 1999; Silverman 1997) in the premises of the two organisations. The focus group sessions were to be recorded for later analysis. At these sessions user testers were invited to express their experiences of using the internet and assisting in developing the research methodology. Additionally, they were invited to access the project website, take the accessibility test and then attempt to access two prominent employment related websites. The final aspect of the test was to record on the project website their experiences when interacting with the employment related sites. Although the sample was relatively small, nevertheless it would produce a broad range of user testers which would validate the methodology (Mason 1996: 84). However, because of the slippage in the delivery of the project website, holding the focus group sessions was also delayed to a point in September 2006 where the method was abandoned and user testers would be asked to access two employment related websites and report back their experiences at the focus group sessions.

Once again, the planned methodology did not take place. Although the organisation which assisted visually impaired people could provide 11 user testers, the second offered only 3 disabled computer users all of whom had visual impairments and used the same screen reader equipment. Due to the costs of holding focus groups, and the fact that the organisation could not provide the breadth of computer users with varying access equipment, it was decided not to engage the second organisation. This produced another problematic issue for the project, how to involve a wide variety of people who accessed the internet using differing methods. The means through which this was achieved became a snowballing sampling method (Mason 1996:103).

As has been already noted, one of the research team has a severe visual impairment and it was through personal contacts developed over previous years that the sample size was met and with the required variety of access methods to meet the research criteria. The geographic spread of the sample population together with problems of transport meant this larger group could not be drawn together for any focus group discussions. Instead, individual's were asked to access the employment related websites and then provided with a series of questions relating to their experiences in using the sites (See appendix xxx for questions). Any issues which arose with individual user testers were then resolved either through email correspondence or telephone. This additional source of research data was saved directly on computer or transcribed then saved for later analysis. Additionally, 12 organisations from the private, public, and not for profit sectors were invited to participate through semi structured interviews (Bryman and Burgess 1999).

The semi structured interview was used to enable a two way discourse to emerge between researcher and subject of research (Mishler 1986). General themes were introduced by researchers which enabled interviewees to expand on their understandings of the subject area, and also introduce alternative issues which they deemed relevant to the point in question. Hence although the interviewer provides the initial themes to be discussed, the semi structured approach allows interviewees to deviate into other areas which researchers may have either not considered important or simply missed.
This allows research subjects the space to amend the research questioning into what they consider more relevant areas. By commencing semi structured interviews based on explicit themes also facilitates later analysis by introducing discreet sections for analysis.

Thus there are several different strands to methodology adopted for the research. The technical audit provides evidence of the degree of non compliance to accessibility guidelines. The involvement of disabled computer users allows a practical response to be developed regarding the affects non compliant websites have on different access methods. Interviews with professionals in industries concerned with developing websites provide an insight as to why inaccessible websites are produced, and examines the validity of arguments used. The final question which should be addressed is did the disabled researcher subjectively influence the project? That is, did his experiential knowledge of the topic area distort the research. The research is lead by disabled people and is guided and amended based on the comments and participation of ^ disabled computer users. Throughout the planning stages, disabled computer users were consulted and provided input which guided the methodology. This induces a continuous process of reflection and change (Trauth 1997), which helps mitigate any subjective bias by disabled researchers. In essence, the researchers apply reflexive practice by confronting one idea or train of thought with another (Alvesson and Skoldberg 2000:247).

## Project research

In 2006 the Informatics Research Institute at the University of Salford won an award from the European Social Fund (ESF), to research barriers to the inclusion of disabled people in labour markets caused in part by inaccessible web content design. Since the present government came to power in 1997, one principal policy commitment was to provide the opportunities for an estimated 1 million unemployed disabled people to gain equal access to employment opportunities (NDDP 1999). More recently, in what could be regarded as an

unconnected policy agenda, government commissioned the Gershon report which identified potential significant savings from the public sector through efficiency gains and the increased use of advanced technology in the delivery of public services (Gershon 2006). Partly in response to Gershon, many public sector organisations have embarked on a programme of transferring their services onto the web. This includes employment advertisements, job and person specifications, and an increased use of online application forms. Yet if web materials are not produced in accessible formats, then the result will be that many people with impairments seeking employment will find themselves disabled by inaccessible web design. This research will determine the extent of such eDiscrimination in the North West of England and develop 'best practice' strategies to assist the removal of any disabling barriers encountered. The North West of England has been chosen because parallel economic research has identified this geographical area as one which records high levels of unemployment amongst disabled people. Michael Anyadike-Danes' November 2005 report for ERINI (Economic Research Institute of Northern Ireland), entitled "Some labour market dimensions of disability in regional perspective", finds that employment rates for disabled people in the North of England, Wales and Northern Ireland, are massively worse than in the South – some "50 percentage points adrift". When these factors are combined, the drive to increase employment opportunities for disabled people, the potential cost savings from Gershon based on increased use of ICTs, and the disproportionate exclusion from labour markets of disabled people, what becomes clear is that unless ICT systems are designed with universal access at their core, then eDiscrimination will be embedded inside systems and act against both social policy goals and concepts of equality in many areas of digital communications. This potential for embedding a digital divide which can act to disenfranchise and increase social exclusion for many disabled people has been acknowledged both in the UK and more widely in Europe.

The Disability Rights Commission (DRC) commissioned a report into web access for disabled people (DRC 2004), and concluded that, "81% of websites failed to meet the most basic criteria for conformance to web accessibility guidelines." In November 2005, the UK Presidency of the EU published a report, "accessibility of public sector services in the EU," which concluded that only 3% of EU public sector websites passed the minimum Level A criterion. Both the EU and UK official benchmark for an accessible website is Level AA of the W3C's WCAG – a standard requiring a fundamental shift in web-authoring techniques, compared to the relatively cosmetic improvements required by Level 'A'. However, although web content guidelines provide the technical details for constructing an accessible web site, which is a considerable step towards digital equality, the Salford research methodology places disabled computer users at the heart of discussions of access and their input has helped provide additional understandings regarding concepts of accessible design.

## Research methods

The methodological approach taken places disabled users in the role of research designers, testers, evaluators, and finally analysers. The prime reason for this somewhat unconventional approach is based on the fact that because of the multitude of methods of accessing the web, both in terms of adaptive equipment and more standard methods used by a wide variety of people with varying types and severity of impairments, then the level of experiential knowledge held could only be expressed by placing such users at the central core of research activity. One example of how this involvement affected the initial research design can be observed in the way the formulation of what constitutes disability inside ICTs' has been adopted by the research team. Many traditional methods of assigning group membership towards disabled people are achieved by considering classifications based on impairment definitions. In both the UK and USA, this practice is demonstrated in their relative pieces of anti discrimination legislation: the Disability Discrimination Act (DDA-UK) and the Americans with Disabilities Act (ADA-USA) respectively. Similarly and unsurprisingly perhaps, the International Classification of Impairments, Disabilities and Handicap, by the World Health Organisation adopts the same traditional understandings. This in turn raises the question of why, and what difference to ICT research is achieved by adopting alternative methodological approaches?

The most fundamental and wide ranging aspect is to be found by considering how disabled research stakeholders determined the site of disability. This is a critical factor in research, afterall if the site of disability is a place of contention, then methods to remove disability also become problematic. Again, traditional understandings often regard disability as a functional aspect of impairment; ergo an impaired person is disabled. This research has rejected this simplistic schemer. Instead, disability is not related to impairment, rather disability is defined in terms of the way ICT designers construct systems which prevent universal access for all computer users. In other words, the research rejects any notion of 'computer users with disabilities'. This may appear a semantic point, but one we believe is core to readdressing concepts of eDiscrimination. There are no computer users with disabilities, because the term places the disability firmly as a function of the person. Rather, disability is rooted inside inaccessible ICT design. The theoretical implication of this construct moves the 'problem' of inaccessible design away from impaired computer users and firmly towards systems designers who create disability by not building ICTs for all by default. Another means of conceptualising the issue is to consider that the output from any computer is inaccessible without adaptive equipment. For most people, this adaptation is achieved through a visual display unit. By concentrating on this dominant access technology, design for alternative access methods including screen readers, text magnification, and non mouse use to name a few, has meant that such alternative means to gaining access have been regularly consigned to a secondary, specialist, non standard market. This returns us to the point that the linguistics of disability becomes important in understanding its construction. Because the concept of universal design has not been generally adopted in ICT circles, then the issue of disability is often regarded as specialist, outside the 'norm', and is resplendent with terms including 'adaptive' and 'accessible', which in reality mask the obvious point that initially design was discriminatory and not based on universal principals. Although this argument may appear academic and rooted in linguistics, our research has revealed other aspects of accessibility which may not have been considered by more traditional research methods.

One issue which often appeared and was considered as problematic for user testers was E Accessible material online. Consideration is required at the authorship level as well as in web design. For example, screen readers pronounce the phrase 'AA' as 'aah'. A more accessible rendering of the term 'AA' would be 'double A'. Clearly the issue of making the web accessible requires confronting on several levels.
The principal focus of this research is web accessibility in relation to employment issues. Thus a significant aspect of the research is to determine the accessibility of employment related web sites.

National job-hunting portal Totaljobs.com offer a 'text-only' version of their otherwise completely inaccessible site, whilst the popular www.monster.co.uk job hunting website now offer http://www.access.monster.co.uk/, which is an 'accessible' (to Level A) version. But 'text-only' and Level A 'accessible' versions of websites are of little help to many disabled users. In the North West, neither www.northwestjobs.co.uk/ nor www.jobs-nw.co.uk seems to have made any effort at all at accessibility. www.nweo.jobsgopublic.com/ - the North Western Local Authorities Employers Organisation, claiming to be the UK's leading website for Public Sector careers, has seemingly made no effort at all at accessibility. Public sector employment as a proportion of total employment was 21 per cent in the North West region in June 2005 (http://www.statistics.gov.uk/cci/nugget.asp?id=1292), which provides some indication of the degree of eDiscrimination potentially facing disabled computer users. This research will provide an audit of up to 100 employment web sites to quantify the level of compliance to web content accessibility guidelines. With the help and assistance of disabled computer users, the research will complement this technical audit with the experiential knowledge gained by users who will be asked to provide empirical evidence of accessibility on a representative sample of selected sites.

Although the concept of eDiscrimination may be a relatively new phenomenon, a brief review of history reveals that the two concepts, disability and employment are closely linked, a problematic relationship for successive governments over the past century. Such a review also reveals that our methodological approach, providing 'distance' and cleared definitions of the two terms, impairment, and disability, is not new and has previously been employed in the struggle to provide greater employment opportunities for disabled people.

# Defining research participants

## User testers

Section 6.2 discussed the difficulties encountered finding suitable research participants. Again, the issue of the language of disability also became a feature in defining target groups. Our starting position was that we required impaired people who used assistive equipment to access the internet to join our project. However, we found that not only did some people resist the label of 'disabled' as a defining characteristic; some also resisted admitting having an impairment. This was noticeably the case for two participants who classified themselves as not disabled, without an impairment, but with a form of dyslexia. The following example illustrates this point and was taken from an informal discussion where the issue of definitions was under consideration.

Q.Are you a disabled person?
A. No, not disabled but am slightly dyslexic.

Q. Would you say you have an impairment then?
A. No, it's dyslexia, it's the way I read words, and if anything it's just that it takes me longer to type and read than other people. I don't think of myself as disabled or having anything wrong with me, it's the words… I use speech recognition because it's quicker than trying to type and I think it's got much better now once you've trained it and that can be time consuming, then it's ok.

This extract illustrates some of the problematic issues which arise if simplistic dualisms are used in relation to disability research. This issue has been analysed in recent years academically through disability discourses (Shakespeare1998). For some time, people with severe hearing impairments have argued that the language of disability is not necessarily appropriate (Corker 1996; 1998). For some authors including Corker, deafness is not necessarily a disability, rather the inability to have sign language recognised as an alternative to spoken and written English is what causes oppression and disability to many in the deaf community (ibid). Hence this research in attempting to include the widest demographic population of user testers has included some people who do not define themselves as disabled or impaired, but who do have difficulties accessing internet resources. The two other groups of participants originally intended to inform the research were private and public sector organisations where again engagement was sometimes problematic. In total 11 organisations were interviewed although as will be discussed below, one private sector organisation was interviewed twice after conducting some accessibility work. Hence in total 12 interviews were obtained.

## Public sector participation

In total 6 public sector organisations were interviewed for the project. This limited response was clearly differentiated between local authorities and other bodies. Some, including Greater Manchester police quickly responded to our request for interviews and were extremely cooperative with their time. The organisation had made significant steps to improve the accessibility of their website and was keen to discuss our research and gain in addition to giving information. On the other hand, no local authorities contacted in the North West of England joined the project. Most simply did not respond to email or telephone requests and normally after 3 attempts to make contact it was determined not to pursue the matter any further. We did have personal contacts through a third party with one major local authority. Initially it appeared the authority would join the project, but again they declined to participate. However, in this case an explanation was provided. We were informed the organisation recognised their website was not accessible and were updating it to meet accessibility guidelines. Clearly any research during a period of alteration would be problematic and disruptive for the organisation. Although this represents an official line, unofficially we were advised that the organisation did not wish to participate in research which it felt may be critical of its internet resources. Again this is a problem area well known to researchers,, firstly in regard to how much time can be spent (Hill 1993); and how to gain access to research sites which may be concerned over any critical findings (Buchanan et al 1986; Jorgensen1989). However, despite the absence of any local authority from the project, as indicated, several public sector organisations including some employment centres did agree to provide interviews. By comparison, private sector organisations were generally more inclined to join the research for differing reasons.

## Private sector participants

In total 5 private sector organisations provided interviews. The initial contact for both public and private sector organisations was through the accessibility steering group of the trade organisation in Manchester. Initial contact was through personal contacts developed by the project manager Dr David Kreps. Dr Kreps is a published author in the field of accessibility and hence his personal contacts were extremely beneficial to the project as he was regarded as an 'insider' by many organisations which again is recognised as a beneficial factor when seeking access (Buchanan et al 1986; Jorgensen 1989; Miller and Glassner 1997). Initial contact with private sector organisations commenced with a presentation of the research aims at an accessibility event held by the Manchester

digital trade association. This approach provided two direct contacts who expressed a desire to participate in the research. However, the majority of private sector participants emerged through a 'snow balling' method (Mason 1996: 103). We found after interviews researchers were provided with additional names and contact details of other organisations who would probably be interested in the project. This method was the most successful for gaining participatory organisations. One other private sector organisation 'Fluid creativity' joined the research but through a different channel to those discussed above.

One principal reason for producing a project website as discussed in section 1.5was to enable user testers to interact with the site and provide an analysis to the project of external employment related websites. Clearly an organisation with proven competencies and capabilities in the area of accessible design was required to build the site. The contract for the work was offered by tender to three web development organisations who specialised in accessible web design. The company eventually awarded the contract was 'Fluid creativity', which offered itself as an accessibility specialist. These claims were supported by recently awarded industry prizes won in open competition with industry rivals for the accessibility of their web designs. An analysis of the difficulties encountered making the project website are discussed in section xxx. Perhaps unsurprisingly the organisation agreed to participate in an interview before they commenced the work. Here reassurances were provided regarding the relatively straight forward nature of producing an accessible website. However, as the delivered site proved to be unusable in certain areas for screen reader users, and several months passed before a fully accessible website was produced, the organisation was asked for a second interview in November 2007. This second interview became a pivotal aspect of the project and is contained in section xxx. After all, it would be hypocritical in the extreme if a research project intended to reveal barriers to inclusion through inaccessible web content design, did not confront the unexpected difficulties the project itself had in making an accessible website. It should be noted here that no criticism of 'Fluid creativity' is implied or intended. The organisation worked in close collaboration with the project team, with both parties working to resolve some unexpected technical difficulties.

# Accessibility Audit on Employment Related Websites

"The transition strategy from Hypertext Mark-Up Language (HTML), as it is practiced today, to HTML based on Extensible Mark-Up Language (XML) in the future is difficult," (Berners-Lee 1998) wrote Tim Berners-Lee, Director of the World Wide Web Consortium (W3C), in September 1998.

The vision of that transition brings together a number of distinct issues, from the purely computationally efficient, to the ethically and morally virtuous. There has been a good deal of excellent work on the importance of standards (Hanseth 2000, Brunsson 2002, Schmidt 1998, Grindley, P. 1995). What the concept entails, in a nutshell, is no less simple – and no less fundamental – a development as the standardisation in the industrial revolution of the length and width of nails and screws. This put an end to the bespoke smelting of every screw and nail in every machine available to industry, and made an invaluable contribution to the efficiency and productivity of every industrial endeavour (Keep 2005). The establishing of strict global standards for web coding is no less simple – and no less fundamental – an exercise for the information age.

Now, web development is in many respects not an unusual skill, in that it ranges from the hobbyist, through the cottage industry, to the blue chip and the public professional. What is unusual is that the platform upon which this range of skills is presented is the same. To make use of the dramatic analogy often used by sociologists (Goffman 1990; Butler 1993) – and indeed by the sociologists of technology, in particular actor-network theorists (Law 1992; Latour 1993) - it is as if the children's living-room Christmas play for the grandparents, the school gym-hall drama, the amateur village hall pantomime, the touring small-scale theatre production, and the grand opera, were all to appear one after another on the same stage. To impose standards upon all of these diverse levels of skill, in order better to control and improve the quality of service provided by the stage, is a tall order. To ensure, additionally, that an induction loop is provided in the theatre for the hard of hearing, and that auditory commentaries are available for the blind, is both morally imperative, and extremely difficult to ask of those at the hobbyist end of the spectrum. Yet it is perhaps precisely because of this range of skill levels sharing the same platform, that there is also apparent, on the web, a great range of compliance with the latest standards for code languages.

Just as the British Standard Whitworth System, in fixing a set of standards for the threads of screw bolts, wrested control of the workplace from the artisans who used to handcraft each screw and bolt for each new machine, and passed that control to the capitalist entrepreneurs who could now for the first time simply buy a packet of standard screws, so too, the W3C standards for web coding wrested control of the web, in the mid-1990s, from the likes of Microsoft and Netscape, (Phillips 1998) who wanted to define HTML for their own proprietary purposes. It is noteworthy that the centralisation of control from artisans to entrepreneurs created by the Whitworth System is not replicated in this case; the centralisation implied by the transition to XML is from the entrepreneurs to a non-proprietary, non-profit-making global standards body. Yet – as the research undertaken by this project underlines - web developers – the artisans of the web – still persist in refusing to adopt the latest versions of XHTML in their practice.

The World Wide Web Consortium, established by Berners-Lee in 1994, is a non-profit-making, academic body. It is an international consortium where Member organizations, a full-time staff, and the public work together to develop Web standards. Its mission is: "To lead the World Wide Web to its full potential by developing protocols and guidelines that ensure long-term growth for the Web." (W3C 2005) In the political climate of global capitalism, however, the W3C is a cautious organisation. They publish Formal Recommendations, rather than standards. They do not engage in any direct lobbying of the industry concerning compliance. Indeed their victory over Microsoft and Netscape in the Browser Wars of the mid-late 1990s was something achieved not through open conflict between the W3C and the makers of browser software, but rather through the vigorous lobbying of external organisations such as the Web Standards Project, (WaSP) "formed in 1998 with the goal of promoting core web standards and encouraging browser makers to do the same, thereby ensuring simple, affordable access for all," (WaSP 1998; Zeldman 2003) - and enabling web developers to avoid the increasingly necessary expense of creating multiple versions of their websites individually tailored to increasingly different browsers. Nonetheless, it is clear that the standardisation of code languages implicit in a W3C Formal Recommendation carries with it the intent of those who contributed to its making, and the W3C is an inherently non-proprietary, public sector body for whom the interests of private commercial enterprises will at best be secondary. Ultimately, indeed, a W3C Formal Recommendation, seen in this light, can only serve one master, the Director of the W3C, inventor of the web, Tim Berners-Lee.

The vision of the transition, moreover, derives from the same source. XML is at the heart of Berners-Lee's vision for the Semantic Web (Berners-Lee 1998): 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. The Semantic Web of the future promises to bring us intelligent search engines able to supply paragraphs of detail in answer to our queries, plucked from websites relevant to the topic, rather than merely a list of possible web addresses where the answers might be obtained. XML, as a development from HTML, is crucial to this project, and is a great deal stricter, requiring far greater rigour from both the web developer and the browser. The imposition of code standards upon the world wide web, in pursuit of this vision, only incidentally wrests control of the future of the web from those corporations who would wish it to conform to their own proprietary needs (Phillips 1998). In short, the evolution of standards for the web, unlike the simpler example of the British Standard Whitworth screw thread, is a very heterogeneous network of very complex relations between an inventor seeking the next level of his invention, corporations seeking market dominance, and advanced web developers seeking a level playing field in the browser market to facilitate cross-browser coding.

The rigour of XML, moreover, is, as we shall see, equally crucial for those with disabilities, if their impairments are not to be a barrier to their accessing the web. "The power of the Web is in its universality," as Tim Berners-Lee has famously stated, "Access by everyone regardless of disability is an essential aspect."(W3C 1999)

## W3C Document Type Declarations (DTDs)

The story of HTML is somewhat chequered. In its earliest days it was a new tool created by Tim Berners-Lee at the European Organization for Nuclear Research (CERN) laboratories in Switzerland to assist in data sharing between the computers at the centre. Based upon Standard Generalized Mark-Up Language (SGML), it was a miniature, simplified version of that highly complex language. But Berners-Lee soon had other plans for it. Taken up by the World Wide 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.

Web pages, originally merely text with the odd image added to spice things up, increasingly became, during the mid-1990s, a 'virtual' extension of the already mature desk-top-publishing revolution, which had seen the printing industry massively computerised over a very short period of time. HTML 3, a formal recommendation of the W3C in the mid90s, contained a wide range of new visual formatting properties, in response to the increasing interest in what could be achieved presentationally on the web.

There were essentially three main players in this online development: Netscape, Microsoft, and the W3C. While Netscape and Microsoft vied for control of the web with their own, proprietary, unwieldy new versions of HTML, and other minor players busied themselves with ever more complex and cumbersome plug-ins visitors to websites 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), and a new presentational language: Cascading Style Sheets (CSS).

The W3C's new versions of HTML, following HTML3, 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 the 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 Transitional DTD thus included "presentation attributes and elements that W3C expects to phase out as support for style sheets matures," and the admonishment that, "Authors should use the Strict DTD when possible, but may use the Transitional DTD when support for presentation attributes and elements is required." (W3C 1999) The differences between HTML 4 and XHTML1.0 were minor, constituting mainly in some more rigorous rule-based practices in the latter 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.

Steven Pemberton, Chair of HTML and Forms Working Groups at the W3C, when asked about the Transitional versions of HTML, in the course of an email correspondence with the Principal Investigator on this project during February 2005, said, "As far as I am concerned the phase-out is more or less complete." Asked for a direct quote regarding what kind of HTML to use, he replied: "people should be using strict DTDs and validating against them."

## Browsers

But of course this is far from the whole story. User Agents - the browsers through which web pages are viewed – had of course to change and develop with this transition. "HTML browsers accept any input, correct or incorrect, and try to make something sensible of it," as the W3C's FAQ page on XHTML explains. "This error-correction makes browsers very hard to write, especially if all browsers are expected to do the same thing. It has also meant that huge numbers of HTML documents are incorrect, because since they display OK in the browser, the author isn't aware of the errors. This makes it incredibly difficult to write new web user agents since documents claiming to be HTML are often so poor." (W3C 2004) As things stand, however, at the time of writing, the browsers used by the vast majority of people worldwide are by and large XHTML compatible, and fully capable of supporting style sheets, making the continued use of a Transitional DTD quite unnecessary.

| 2008 | IE7 | IE6 | IE5 | Fx | Moz | S | O |
|---|---|---|---|---|---|---|---|
| January | 21.2% | 32.0% | 1.5% | 37.2% | 1.3% | 1.9% | 1.4% |

Table 1:
Browser Usage Statistics January 08 (W3Schools.com 2008)

Of the above Browsers, support for XHTML and CSS is excellent in Internet Explorer 7 (IE7), Firefox (Fx), Mozilla (Moz), Safari (S) and in Opera (O). Internet Explorer 6 (IE6) and Internet Explorer 5 (IE5) have problems with some style sheet positioning. Thus the overwhelming majority of people accessing W3Schools do so with an XHTML compatible browser fully supporting style sheets. Browsers are, of course, free, and the tiny percentage of users still using an older browser can easily be guided to where they can update their software. IE5 is, in any case, not so bad in its support for CSS as browsers such as Netscape 4.x, now hardly is use at all.

## Web Accessibility

Parallel with the development and publication of XHTML, 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. Thus HTML 4 and XHTML 1.0, published the same year, contained these elements in both Strict and Transitional flavours, as does XHTML1.1. The WAI also published, in the following years, the Authoring Tool Accessibility Guidelines (ATAC), and User Agent Accessibility Guidelines (UAAG). It is these standards for those making websites, the software tools many use to make them, and the browsers through which they are accessed, that have since 1999 been increasingly 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, and 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: Level A, Level AA and Level AAA. Of particular note are three Guidelines included as of Level AA priority: 3.2, 11.1 and 11.2. Guideline 3.2 of the WCAG states: "Create documents that validate to published formal grammars". Guideline 11.1 states "Use W3C technologies when they are available and appropriate for a task and use the latest versions when supported." In a climate where nearly all browsers support the latest versions of HTML and CSS, it would seem that the WCAG are expressly recommending that this is the way webpages should be made. The fact that Guideline 11.2 states "Avoid deprecated features of W3C technologies" would suggest that it is the Strict DTD of HTML 4.01 or XHTML 1.0 that should be used, in any case, if the latest version, XHTML 1.1, is not used.

Amongst those responsible for the creation of the WCAG 2.0, there is ongoing discussion about the relationship between accessibility and validity. "People agree that validity is a good first step towards accessibility and that validity does not guarantee accessibility," opens the summary at the W3C website. Essentially, there are those who feel that XHTML code that validates against the Document Type Definition laid down by the W3C is essential, and should be a Level A priority, and those who feel that accessibility is the highest priority, and that the recommendations may at times be behind advances in making pages accessible – in short that invalid code may at times be more accessible than valid code.

In summary validity, it can be said – at the very least - is an important part of what makes a webpage accessible. Legislation and Directives in Europe, Australia and the United States aimed at preventing discrimination against, and promoting equality of opportunity for, disabled people, have made the construction of websites in compliance with the WCAG 1.0 a legal requirement. Most governmental directives specify Level AA as the minimum requirement, and valid code is a very important part of what makes a website accessible.

In the final analysis, to return to the theatrical analogy with which we began this section, it is clear that the children's living-room Christmas play for the grandparents will likely never reach the standards required of the Grand Opera. But the standards of professionalism set by those at the top of the profession will inevitably impact upon those below, with the inevitable implication that the onus is upon those web developers responsible for the public sector and blue chip private sector websites to improve their own standards, if the laudable vision of the semantic web is ever to be realised.

## Audit of Employment Websites

Many studies of the accessibility of various categories of website have been undertaken, (e.g. Zaphiris at el 2001; Ritchie et al 2003; Guo et al 2005). Research undertaken by City University for the Disability Rights Commission and published in April 2004, (DRC 2004), which examined over 1000 UK websites across all sectors, and the study of some 300 or more European Government websites published at the Ministerial eGovernment Conference in November 2005, (eGovernment Unit 2005; Thompson 2003) all used a broadly similar combination of strict pass/fail audit against the W3C's Web Content Accessibility Guidelines (W3C 1999) and the results of a disabled user testing exercise, to assess the accessibility of websites. The combination of IT audit and user testing is needed because a simple automated software check against the guidelines, as commented elsewhere (Kreps et al 2006a and 2006b) is insufficient to address all the issues.

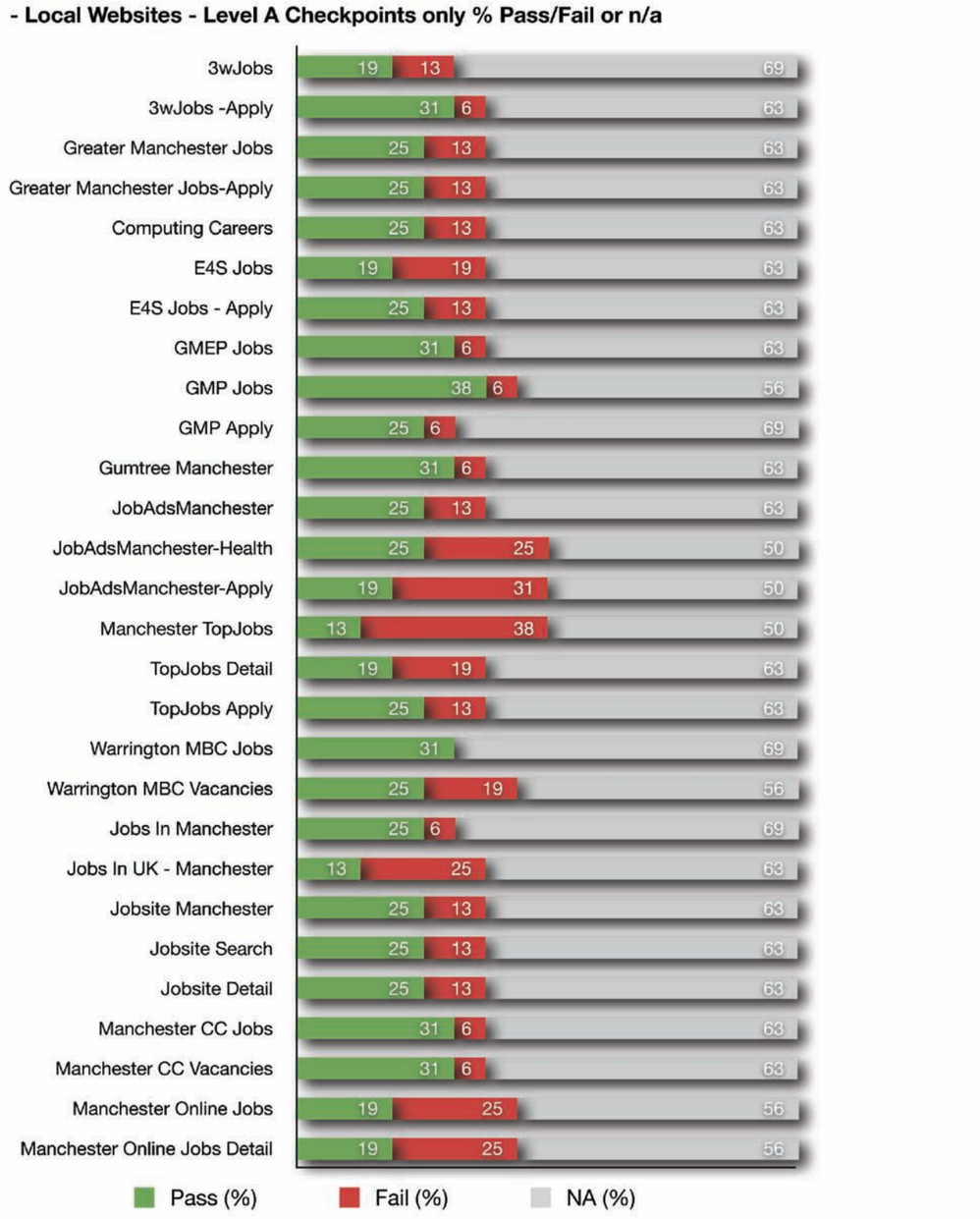
The aim of the majority of the research thus far undertaken in this field, therefore, has been to ascertain either a completely generalised assessment of the accessibility of websites on the World Wide Web in a particular country (DRC 2004; Guo et al 2005) or in a particular sector (eGovernment Unit 2005; Thompson 2003). These studies, whilst worthy and of technical interest, are perhaps somewhat lacking in focus, however. The issue of the accessibility of websites to people with impairments is fundamentally about those people being able to partake fully in the information society, and not be confronted by disabling barriers. There is no more disabling barrier than the economic, and access to the labour market is of fundamental importance. This is, albeit at a higher economic level, not totally dissimilar to the obvious need for clean water and efficient food production in poverty-stricken third world countries, prior to the provision – however worthy and important – of cheap clockwork laptops. Yes, it would be good if the whole of the World Wide Web presented no disabling barriers to impaired surfers, but when between 81% (DRC) and 97% (eGovernment Unit 2005) of the web is inaccessible, websites advertising employment vacancies are of particular importance as regards research focus. Yet in an information society where even the local Job Centre has touch-screen computers listing all the current vacancies (as is the case in the UK), what does this say about electronic access to employment opportunities? Government may embrace a rhetoric of equality of opportunity under the banner of an homogenised concept, but the reality is that any person unable to access a touch screen cannot gain equal access. In this example, the effect of impairment means a severely visually impaired person cannot read a screen; the affect of the choice of technology means the impaired person is also disabled, by non inclusive design. Alternative tactile overlays for touch screens connected to speech synthesis are already on the market, but it would seem such equipment is not available to UK job seekers.

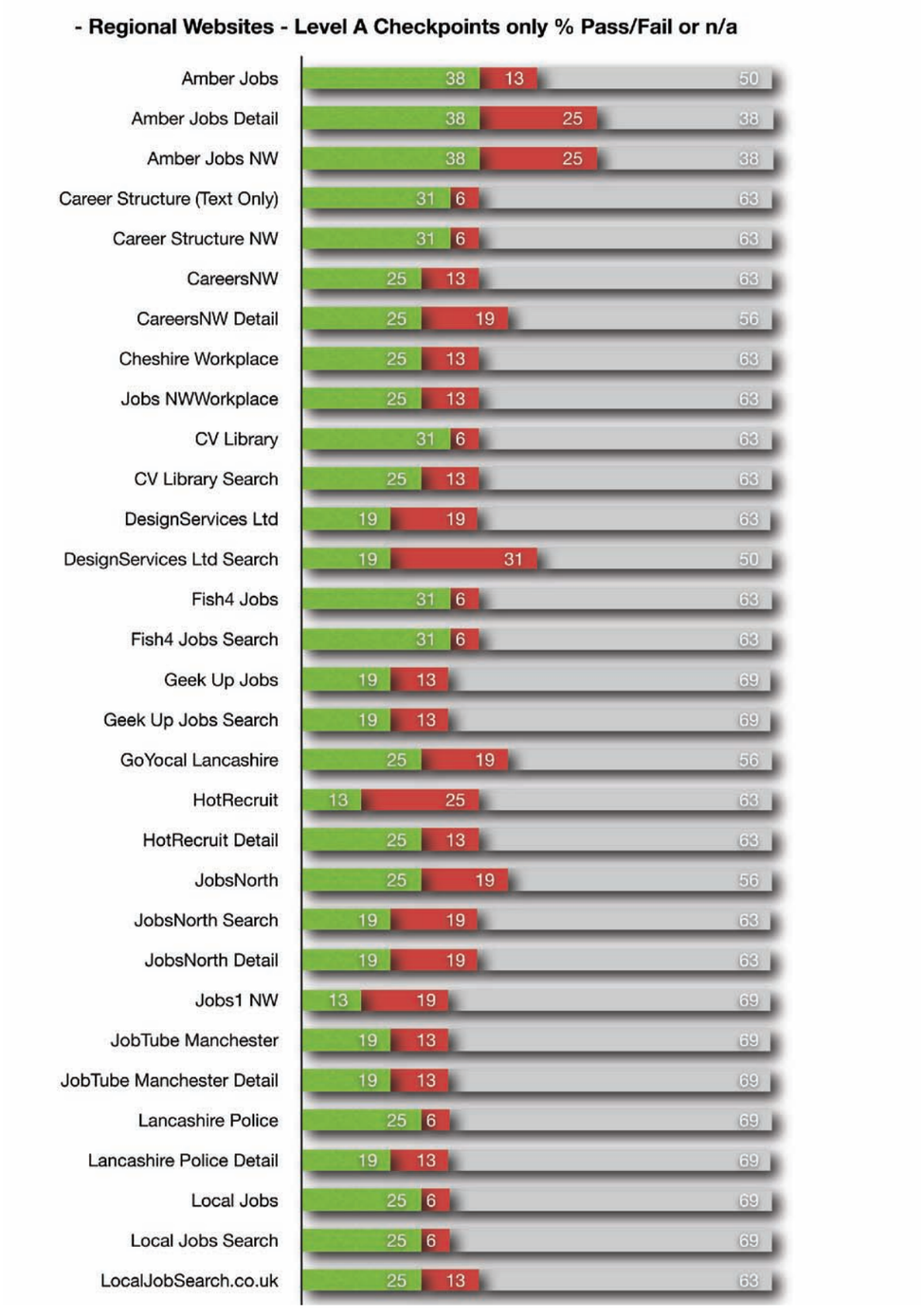
eDiscrimination is a complex area, but the following examples may assist with understanding the problem: Those using screen readers or voice browsers to listen to websites require alternative text with images, labels on form fields, and headings on data tables. Without these imagery is completely inaccessible, forms prohibitively confusing, and data tables meaningless. Those unable to use a mouse to navigate around a webpage require careful coding of the page to ensure 'device independence' is a feature of any interaction. Mouse-only interaction discriminates against such users.

For this research project, a list of employment related websites was drawn up covering both regional and national job adverts, and both public and private sector job opportunities. Of the 112 websites in this list 27 were local to Greater Manchester, 22 from the wider NorthWest region, 53 were national employment services covering all regions, and 10 employment agencies.

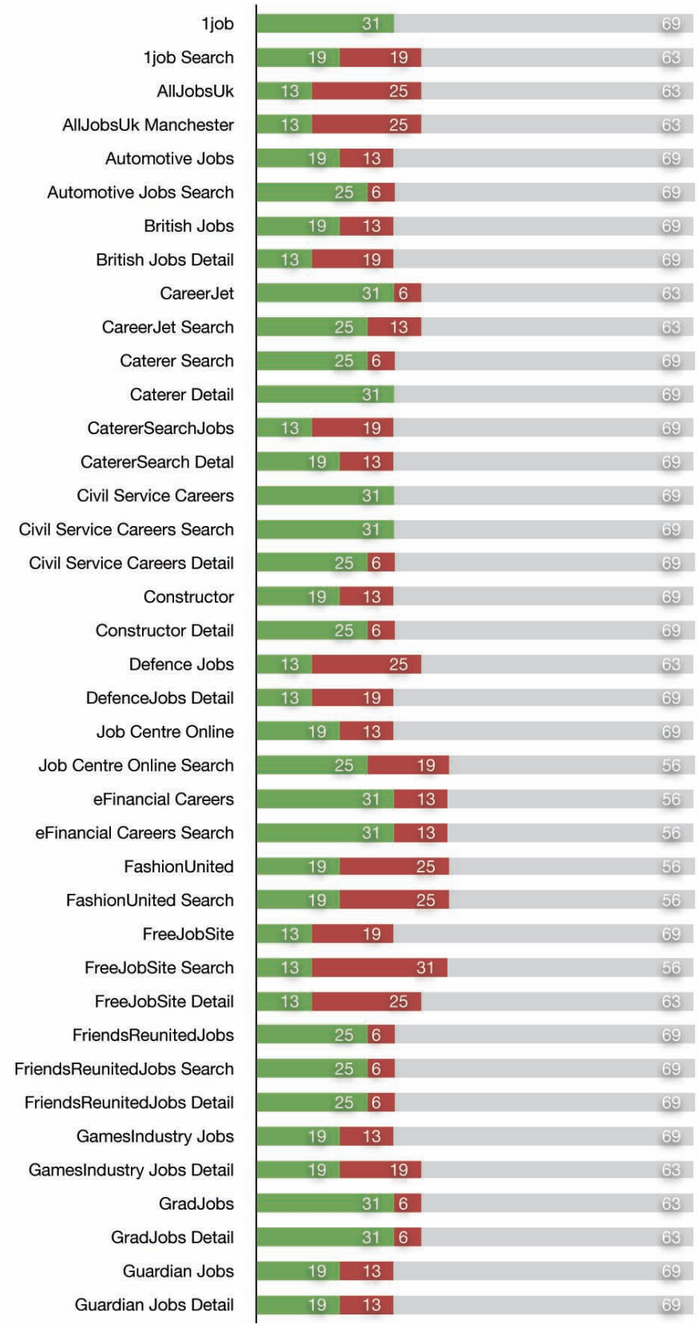
21 of the websites were public sector, the rest private sector. A number specialised in niche markets: 2 were purely in education, 6 advertising general administrative jobs, 1 solely the automotive industry, 1 solely banking and finance, 1 construction, 1 consulting, 1 cultural sector, 1 defence, 1 civilian defence, 4 specifically aimed at disabled job seekers, 1 in engineering, 1 in the entertainment industry, 3 in finance and accounting, 4 in the health sector, 2 in hospitality, 3 in IT, 2 in the police, 2 in retail, 2 in sales, 1 secretarial, 1 for student jobs, 2 for technical posts, 1 for temping and seasonal jobs. The rest were general job search websites, with a wide range of employment opportunities. The full list is included in Appendix 1.

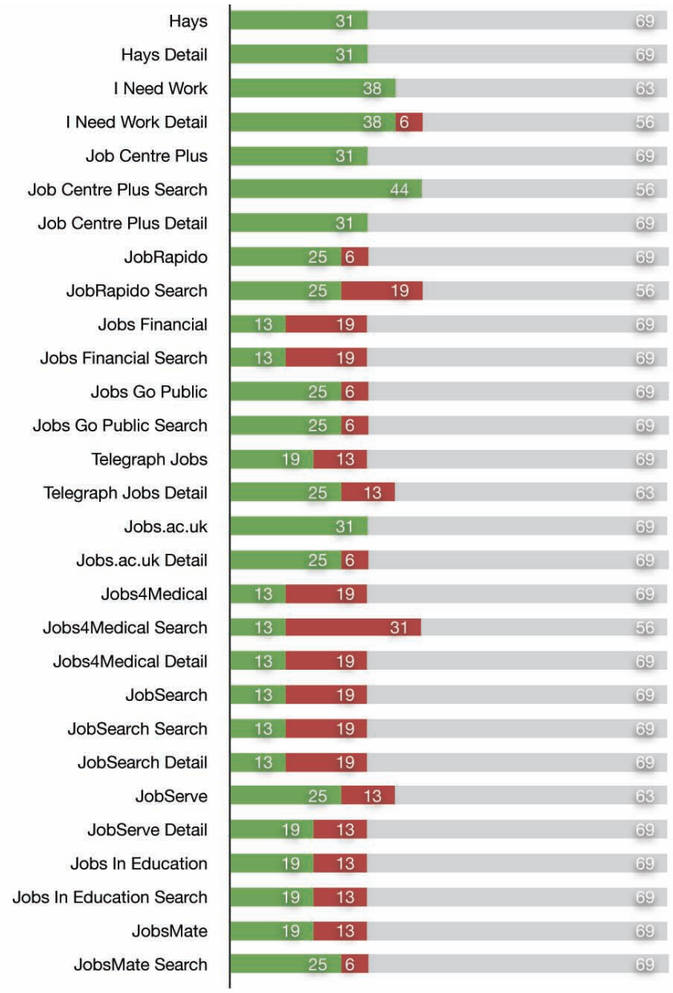
These 112 websites were subjected to a rigorous audit against each of the 65 checkpoints of the Web Content Accessibility Guidelines 1.0. 15 of the websites passed all Level A checkpoints. None passed all Level AA checkpoints. The following diagrams show how websites performed regionally and nationally, at Level A.

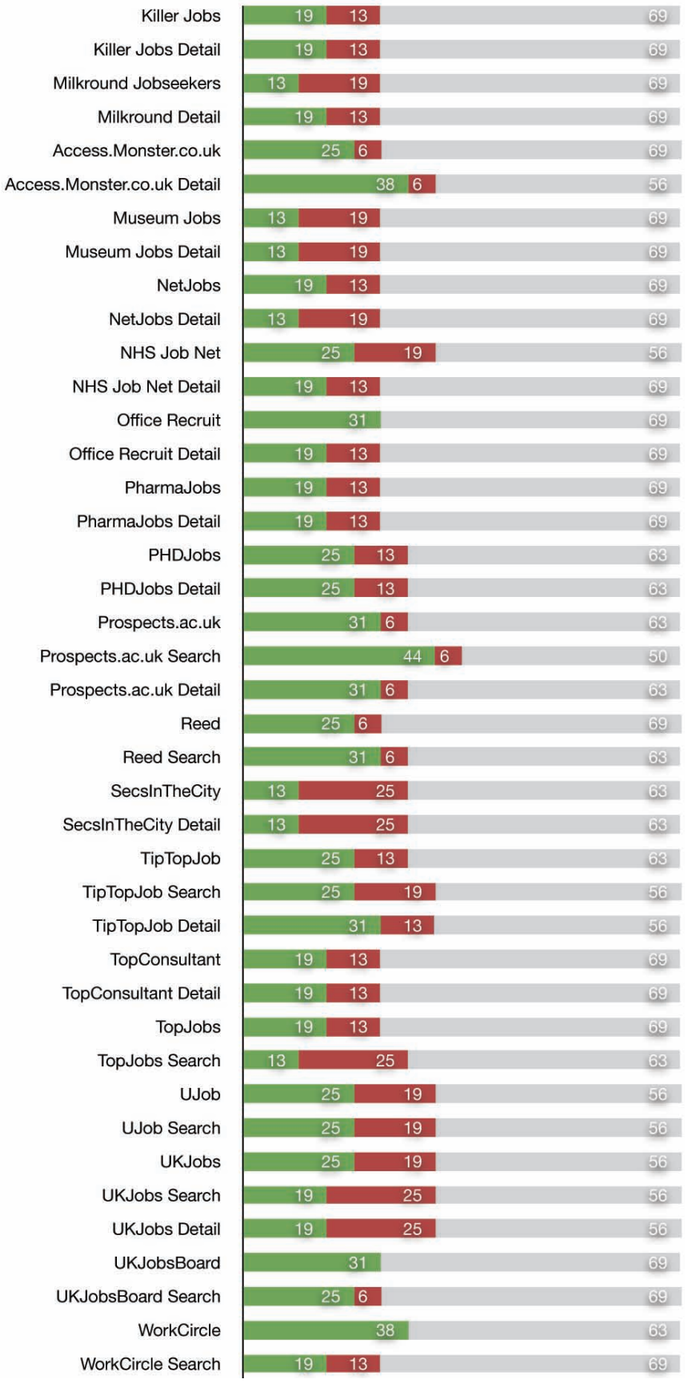



- Regional Websites - Level A Checkpoints only % Pass/Fail or n/a
Amber Jobs 38 13 50
Amber Jobs Detail 38 25 38
Amber Jobs NW 38 25 38
Career Structure (Text Only) 31 6 63
Career Structure NW 31 6 63
CareersNW 25 13 63
CareersNW Detail 25 19 56
Cheshire Workplace 25 13 63
Jobs NWWorkplace 25 13 63
CV Library 31 6 63
CV Library Search 25 13 63
DesignServices Ltd 19 19 63
DesignServices Ltd Search 19 31 50
Fish4 Jobs 31 6 63
Fish4 Jobs Search 31 6 63
Geek Up Jobs 19 13 69
Geek Up Jobs Search 19 13 69
GoYocal Lancashire 25 19 56
HotRecruit 13 25 63
HotRecruit Detail 25 13 63
JobsNorth 25 19 56
JobsNorth Search 19 19 63
JobsNorth Detail 19 19 63
Jobs1 NW 13 19 69
JobTube Manchester 19 13 69
JobTube Manchester Detail 19 13 69
Lancashire Police 25 6 69
Lancashire Police Detail 19 13 69
Local Jobs 25 6 69
Local Jobs Search 25 6 69
LocalJobSearch.co.uk 25 13 63
LocalJobSearch.co.uk Search 31 6 63
LocalJobSearch.co.uk Detail 31 6 63
MasterStaff 19 19 63
MasterStaff Search 25 13 63
Mersey Workplace 25 13 63
Mersey Workplace Search 31 6 63
NWJobs 25 13 63
NWJobs Search 19 19 63
PlanetRecruit 19 13 69
PlanetRecruit Search 19 13 69
SFGroup 19 13 69
SFGroup Search 19 25 56
SFGroup Detail 19 25 56
thisislancashire 19 19 63
Pass (%)
Fail (%)
NA (%)

**- National Websites - Level A Checkpoints only % Pass/Fail or n/a**






Clearly, the compliance with WCAG 1.0 of the vast majority of employment related websites in 2007 is as poor as that found among EU public sector websites in 2005 (eGovenment Unit 2005) and in 1000 general UK websites in 2004 (DRC 2004).

# Interviews from the public and private sector on web usage and developments

## Introduction

In the course of the project members from eleven different public and private sector organisations were interviewed. This included members from five web development companies and six members of public sector organisations in the Greater Manchester area. The method used was semi-structured interviews. Questions covered five different but related themes: web accessibility standards, industry awareness and training, marketing and cost, accessibility testing of websites, disabled people and employment. Each interview lasted between 45 and 75 minutes. The main purpose of these interviews was to assess the awareness of the issue of web accessibility in the private and public sectors and to find out more about the reasons why the majority of websites in the UK remain inaccessible. Furthermore, with respect to the public sector we looked at the developments in the employment sector and at the level of help that disabled people can access in finding and getting a job.

## Web Accessibility guidelines

All interviewees were asked for their experiences of the practicality and usefulness of the W3C accessibility guidelines. All were aware of the existence of the guidelines with several, particularly those concerned with web development, claiming to use and consult them. Interviews with web developers also confirmed that public sector organisations are more interested in meeting accessibility guidelines. Opinions varied in terms of the usefulness of the standards. For example, a web developer remarked:

"Standards are relatively useless; I use a common sense approach to accessibility. The guidelines would be too long and too complicated: If you get something under 200 pages you are doing quite well really. Even if it is under 200 pages, they're just so bloody boring." (Company A: 9)

On the other hand, public sector organisations that did not have to actually use the guidelines to create websites generally held a more positive outlook on accessibility guidelines:

"I think for somebody like me who is not disabled, they provide really good guidelines on what measures should be taken to make sure our website is accessible." (Company PS:F).

Perhaps an approach which could be applied to understand these diverse opinions would be to consider the statements above in terms of competing discourses of rhetoric and realities. For government agencies including the office of information commissioner, positive rhetoric over the advantages of applying accessibility guidelines may be expected. After all, any negative statements could lead to the almost inevitable question of what are the agency doing about it? By contrast, the private sector web developers face the reality of having to apply the guidelines in practice.

The issue of tension between rhetoric and reality can also inform understandings which several private sector organisations raised. Concerns were related to the political arena in which decisions are made over the nature and content of accessibility guidelines.

"People can't agree because people probably come with an idealistic view of how a website should be approached in terms of accessibility. Often they are in conflict with the guys who are doing the programming and that is where a lot of the troubles begin." (Company B: 4)

"People who work in the steering group do not necessarily come from an accessibility standpoint... It seems there is a fair mix of motivations for being involved in the project. That's the reason why it has taken so long." (Company B: 5)

A further issue which animated several private sector developers was the apparent impression held by many outsiders that compliance to accessibility guidelines was an objective task. Several suggested in reality subjective opinions were frequently APPLIED in the guidelines which require a considerable element of personal judgement. Hence automated checking tools do not provide adequate checks in relation to determining website accessibility.

"I think you could have automated tools to a general degree. But it is people that use it and automated tools are simply not going to do the job well enough." (Company C: 12)

"Guidelines do not always make sense, or need to be carefully interpreted. There is a trade-off between accessibility and usability. A website maybe fully accessible, but can at the same time be a complete nightmare to use. Some of the websites which are 'Bobby approved' or are 'AA' are in fact very unusable." (Company A: 16).



Hence there is an apparent difference between a website attaining accessibility accreditation and how useable any site is for people using assistive technologies to access web materials. If accessibility guidelines do not necessarily produce usable websites, then the question becomes are the guidelines of any value? Here opinions ranged from limited support for the guidelines to unqualified statements towards their value. "So we have got a framework that is there that is reasonably solid. I wouldn't want to say that it perfected accessibility... But at least there is a framework there." (Company D: 5)

"It's a guideline, isn't it? It might help a few people, might be worse for others as well." (Company B: 5)

"It is not a focus on the things that really matter." (Company A: 9)

"They are quite restrictive. Things like the WCAG are just best practices." (Company E: 4)

Unsurprisingly, the level of support for accessibility guidelines depended on whether or not the person making the statement was directly involved in the practical application of their use. Practitioners all identified the limitations and contradictions in the guidelines, whereas those who simply worked with websites constructed for them were generally under the impression that compliance to guidelines was necessary to produce accessible websites. This divergence between rhetoric and reality lead into a consideration of the use of education and training for those involved in producing and using accessible web content.

## Industry Training

All private sector organisations were asked their views on training and where training was available within the industry. It was suggested by several interviewees the IT industry in Manchester in the form of Manchester Digital would push for higher professionalism with respect to producing accessible websites

"I am secretary of Manchester Digital, which is the trade association of web companies in central Manchester… We have been trying to educate a lot more members on things like accessibility." (Company D: 13

"Manchester Digital has a partnership… based in London. And they get people rather than trainers down. Trainers are people who are actually doing it in industry and achieving results." (Company C: 5)

We raised the issue of whether the expertise of making websites accessible would originate from the university sector or from within the industry. It appears that university education was not widely regarded by interviewees. Most of the web developers we spoke to had either not finished their university degree in computer science or spoke very critically of university IT courses. One company stressed that when hiring new staff they let people work on a trial basis, as university qualifications would not be any proof that people can actually build websites:

"That is the only way we can find new people and see how they work. An interview doesn't tell you anything, a CV tells you even less it seems." (Company A: 2)

Another recruitment strategy was to ask university lecturers who their most talented students were, and offer them positions during their course.

"Jim was halfway through a degree and then decided he could not be bothered doing it any more, because he knew more than his lecturers at the time. We saw his work and that was the critical thing. Great we could look behind it and look at the code" (Web Company C: 5).

"We used to take on graduates and postgraduates directly from university. We stopped doing that because it is not that the skills are out of date, but because a lot of the theory that we expect people to have picked up on a degree they haven't. So we are always starting from square one with people when they come in." (Company D: 13)

This raises the question of where did the web developers get their web accessibility training. In nearly all cases it fell to the web developers to teach themselves about web accessibility. However, particularly the public sector organisations would send their staff on short training courses conducted by IT professionals to catch up with the latest accessibility issues.

"One of our officers… went down; there is a public sector forum for accessibility. Like a conference seminar." (Company PS A: 8)

Another organisation arranged for staff to gain access to a virtual book shelf where access to the latest technical books online are available. Employees who would be interested in a particular topic like accessibility could simply access the latest relevant publication from their desk.

"Every time a new publication comes out, it adds an electronic book to the book shelf. And we pay about £400 a year for all our staff to have every book they do. " (Company D: 14).

So far we have considered internal factors of accessibility and training in individual organisations. An issue of significant relevance is contained in the private sector of web developers. These are the people who are commissioned by outside organisations to produce websites. Hence these organisations are in a position to comment how accessibility is regarded by purchasers of websites.

## Marketing and the cost of accessibility

Some web developers claimed to use web accessibility in the marketing of their web services, while others were reluctant to do so because it may raise concerns with clients over potential additional costs.

"We have been running for about five years since 2002. I remember being asked only once for an accessible site." (Company A: 2)

Two web design companies said they would make websites automatically accessible, as long as no additional costs are involved, a third argued cost is more a feature of complexity and levels of accessibility:

"We try to make them as accessible as possible. At least nothing that would increase the cost for the clients." (Company A: 3)

"The real value comes out of testing with users. Obviously that takes time and money. If you are going to a great length to make sure the website is accessible, it takes a lot of time." (Company B: 4)

"We used to say to everybody if your site needs to be accessible we charge you 10% premium. The cost of a site to make it accessible. We stopped doing that because it is not a flat rate in every case. In some cases it is completely something we can do in the build without costing any more money or taking any more time." (Company D: 9)

One company (Web Company B) assured us that all their websites would be at least level a compliant. However, sometimes clients complain about accessibility features:

"We do get clients come back to us… we end up in an argument with the client about accessibility. And actually they don't care about it - about accessibility." (Company A: 3)

The issue of how many organisations which commission websites regard accessibility was succinctly presented by a web developer who had several years experience of dealing particularly with small firms who required a web presence:

"Small business owners are just not aware that they ought to be accessible. What they ask you, will they prosecute me and the answer being no. No they won't. So because there are no examples of anybody being prosecuted, publicly prosecuted, business owners simply don't give a toss." Company C: 2).

Opinions did diverge over the issue of whether web accessibility costs more money. Three web development companies claimed that web accessibility would generally not result in additional costs, with two others estimating the costs for accessibility in the range between ten and thirty percent of the project costs. However, it should be noted that such statements are bounded by the individual's definition of what constitutes an acceptable level of accessibility:

"If you give us a certain turnout as a standard of single a accessible. If you go to double A we put probably about 30% on." (Company C:. 2)

The reason for what may appear a confused situation on the apparently simple issue of whether making an accessible website is more expensive can again be understood by contrasting rhetoric's and realities. Some web developers regarded basic level 'A' guideline conformance as producing an accessible site. Others took a realistic stance which suggested although level 'A' can be achieved at minimal cost; this would not necessarily guarantee an unproblematic usable site:

"It's just the actual process of doing and checking. You can build a website, but to make sure everything works correctly is kind of a validation process. Is everything right? Is the menu working OK?" (Company C: 3)

"If the site is more complex you try to second-guess pathways through for people who are blind or partially sighted or things like that. A lot of thought needs to go into this and the bigger the site the more thought and the more complicated it gets." (Company B: 9)

Generally, web developers regarded basic compliance to accessibility guideline sat level 'A' as meeting accessibility requirements. At this level it was common to find the view that level 'A' would not require user testing to validate websites. The issue of validation only appeared as higher levels of accessibility were desired, and it was the issue of validating sites through testing which generated greater time and hence cost on to websites. The following section considers how web developers rationalised the use of validation through testing after commissioning a website.

## Accessibility Testing of Websites

All interviewees generally agreed that the testing of websites would be important, but few of them actually did significant accessibility testing before delivering websites to clients. The main reason for this was the additional time and effort required for carrying out the testing:

"The testing takes for ages. You certainly want to use some of the technologies that visually impaired use and make sure it is compatible with that." (Company C: 3)

In the public sector, the more common practice was to purchase products including user testing from outside specialists:

"The read speaker service that we are purchasing is round about £2,500. This is quite a substantial take of our budget" (Company PS A: 2)

This level of commitment to web accessibility seems to be rare, even in the public sector. Several private sector organisations commented that ideally websites should be tested by disabled user testers, as this would be the only way to make sure that disabled people can use the website. One company (Web Company D) said that they had done this in the past, but eventually stopped the practice because clients would not pay for it. Another web developer had similar experiences:

"We realistically should use visually impaired or impaired in another way to actually go and test it. But there is no way to do that. You simply cannot deliver that bit." (Company C: 2)

Some web developers (Company B) suggested that there could be a future market for user testing websites, providing legislation was enforced. At the moment, many web developers argued private sector organisations would not have to fear any legal consequences for not making their websites accessible:

"If the risk to me is not even one in a thousand chance. It is a one in a million chance that they have actually legal action taken against them." (Company C: 8)

However, although the above applies a 'hard' business rationality to producing accessible websites, other web developers argued the essence of accessibility should be based not only on legal enforcement policies, but also as a matter of social justice:

"I think the industry generally felt it was pushed upon them... our users are not blind anyway, why should I have to bother? But these days most of us realise that it is a moral obligation as well as a legal obligation to at least do the basics." (Company B: 10)

The majority of web developers agreed that the only practical way of ensuring websites were accessible would be through applying a business case rationality. However, as identified above, this view was often accompanied by the social justice argument implying organisations had a moral imperative not to discriminate against any minority in society. Whilst such arguments appear firmly rooted in the private sector, by comparison the reality of attempting to engage more disabled people in work lies firmly in the hands of employment specialists the largest of which are located in the public sector.

## Disabled People and Employment

Three interviews focused specifically on the problems and opportunities disabled people have finding employment in an information society. In particular we were interested in the question whether IT affects the way disabled people get into employment. We spoke to a local Job Centre in the Manchester area concerning their experience with disabled people. The people at the Job Centre were reluctant to answer our questions and the PR section of the Greater Manchester Central District branch of the DWP refused to give an official response. It seems that the people in the Job Centre and in the DWP are aware of their shortcomings in terms of providing equal service to disabled people. However, notes of the meeting were transcribed and the opinions expressed provided an 'insiders' view towards the employment potential for unemployed disabled people whether computer literate or not:

" Generally we only deal with a few disabled job seekers, and it would be indeed a big problem to find jobs for them because of negative preconceptions of the employers." (Company PS D: 1)

Again, an analysis comparing rhetoric to reality may assist. Policy makers increasingly appear to proclaim that equality of opportunity's key to producing greater social inclusion for disabled people through paid work (Danieli and Wheeler 2006). The evidence provided here from a government job centre plus office would suggest the reality is that opportunity provision is insufficient in itself when the problem is rooted in the attitudes of employers. Similar experiences were related by other employment agents:

"We have cases here in the careers service where we have refused to work with certain companies because they haven't amended their vacancies or their recruitment practices." (Company PS E: 8)

"I think that it's wrong that employers don't want to take people on. We find our customers who get into employment are not career-led. They are just happy to have a job that they understand and enjoy. From being isolated at home, from the way benefit is looked at to the next stage of actually getting employment and being respected." (Company PS C: 8)

Although the research is specifically aimed at revealing barriers to employment due to inaccessible web recruitment materials, it would be doing a serious disservice to disabled people if the additional discrimination based on the attitudes of some employers was not noted. As the research is primarily concerned with disabling barriers related to technological artefacts, the following discusses internal barriers faced by disabled people who try to access employment services at job centre plus offices.

We found that the Job Points, where job seekers can search for jobs online and access job advertisements, are generally inaccessible for a variety of disabled users. This is the case for several different impairment specific groups. For example, the heights of the machines (which cannot be adjusted) make them difficult to use for people in wheel chairs. Also, the touch screen access menus have no speech alternative for blind people. The Job Centre Plus website, which we audited, is also largely inaccessible. The only alternative disabled people have in accessing the services of the Job Centres is to speak to an advisor. The problem is that disabled jobseekers are only entitled to speak to a job advisor for half an hour every two weeks.

Although there are clearly difficulties in accessing national government run employment agencies, more localised provision is also provided for disabled people. Manchester City Council launched a project in 2004 called 'Stepping Stones into Work', which provides additional support to disabled job seekers. Disabled people are referred to Stepping Stones by the Manchester Job Centres and Stepping Stones helps them to get back into work.

"City Council realized that there were 40,000 people collecting disability benefit and they wanted to help those people. So they put £3 million into a pot and Stepping Stones was born." (Company PSC: 1)

The organisation had a high level of knowledge of accessibility issues in relation to web design:

"Nobody wants to use frames because they are bad anyway... It's making sure that stuff within the code of the page doesn't stop things from reading the text. That is what is important. That is where your screen reader is. Likewise for many things. Use flash videos then nothing can read the text. So you don't know what is on the page. Plus where is it making the tile contrast, the colour scheme?" (Company PS C: 8)

This company prides itself on knowledge of accessibility and it's web design:

"The other thing that we have with our website is the fact that the leaflets are all available as a CD-ROM or as a PDF. There are all sorts of different options that are part and parcel of the site. On the site documents are PDF. At which point you do whatever you do with the PDF." (Company PS C: 8)

However, when the website was accessed through a screen reader, several problematic issues were found. Firstly, headers were not used hence navigation through the site is extremely time consuming. Also, when the jobs page is accessed, again no headers are provided, and no active links to external employment vacancies are given. This site displays an exemplar of issues raised earlier in this section. The website managers are aware of accessibility guidelines and do understand many of the problems disabled computer users face. However, it appears unlikely that the site has been tested by disabled computer users, as many simple accessibility features are absent. In short, the rhetoric of accessibility is known and spoken, in reality the usability of an employment related website is compromised through lack of testing and hence validation.

# Interview with eDiscrimination website development organisation.

The combating eDiscrimination project website was not originally intended to become a central element in the research process. Rather, it was originally planned as a research output, IE an exemplar of good accessible web design. However, due to the difficulties encountered making the site accessible for the HAL screen reader, the development of the project website became more regarded as a matter of process. The choice of the HAL screen reader was a practical decision, as one researcher was dependent on this access equipment to use computers.

As discussed above, the project website was designed to serve several purposes: to act as a repository of articles produced from the project, a holder of multiple links to other potentially useful sites for disability related issues, an information holding site of user tester demographics, a test site for gauging basic user tester internet competence, and a user tester feedback interface. Hence in addition to static text, the site was required to host a standard search facility, and a user tester section where registration was required, which then allowed user testers to join the project. The user tester section has a series of questions to be answered through the selection of yes/no radio buttons, and fields to allow the input of individual data such as email address etc. So, although there were several different elements to the website, there is nothing on the site that has not been produced on countless others. At the time the website was required, the University did not have sufficient capability to build the site 'in-house', hence the decision was made to put the development of the website out to competitive tender in May 2007.

Three companies were asked to provide quotations against the same specification for the project website. All three bid for the work, and the successful company' Fluid creativity' was commissioned in June 07. It was a difficult decision to select a company, all three provided competitive prices, and all three had sites they had produced for other companies checked using a HAL screen reader for accessibility, which all had passed. Ultimately the final decision to place the order rested on practical decisions. The company was relatively local and had won awards from the Manchester Digital trade association for the accessibility of its internet sites.

After the order was placed, technical and financial members of the company were invited to a meeting in the University where detailed discussions took place regarding specific requirements for the website which included all elements of the site including content management suite to be capable of use through the HAL screen reader. The company stated their commitment to accessibility of websites and suggested our request was not problematic, as in their opinion, all websites the company produced were by default to a high standard of accessibility. This point was reiterated by the senior web developer from the organisation Jaik, who in a later interview commented:

> "The way we put things together anyway it is all included rather than an additional cost for making something accessible... It does not take any longer to do it the right way. It is just, obviously, the knowledge to actually do it right in the first place." (Jaik, Fluid creativity)

There are two issues Jaik expresses here: firstly, there is no additional cost in making websites accessible if done professionally initially; secondly, accessibility will follow from applying professional standards.The company was fully aware that screen readers were to be used to check the site but never expressed a need to test any elements of the site with screen reader users before launch. This does not reflect any criticism on Fluid Creativity or Jaik himself as a senior web developer. Rather it reflects a view found in the majority of web developers interviewed for this research who believed accessibility could and does arise from a professional approach to development and adherence to accessibility guidelines:

> "it does not take us so much more work, if any more work to make it accessible... so why not just do it?... We try to make them as accessible as possible." (Company A: 7)

> "We need to do a little bit of research on guidelines… It's making sure that stuff within the code of the page doesn't stop things from reading the text. That is what is important. That is where your screen reader is." (PS C: 7)

> "They provide really good guidelines on what measures should be taken to make sure our website is accessible." (PS F: 6)

> "They just need accessibility to be taken hand in hand in the design, that way it will work well." (PS B: 8)

Hence it would be incorrect to argue the position Fluid Creativity adopted regarding the ease of producing accessible websites was unique. It was only when the organisation believed the website was ready for launch that the first element of user testing appeared and problems arose surrounding the inaccessibility of the site for HAL screen readers. Much of the following is drawn from email correspondence between the University and Fluid Creativity over testing the website. Initially, it was thought the area of most concern would be the accessible contents management suite.

> "I've been having a look for other WYSIWYG editors (which are the only ones that will automatically generate the HTML for you) that are accessible, but I've found nothing. If we just use a plain text box with no HTML code then obviously it will limit the formatting that can be done to just paragraphing." (Jaik, Sept 07)

No WYSIWYG editor was found that could be regarded as accessible. However, writing html code is not an accessibility issue, so although standard WYSIWYG could not be used and is therefore inaccessible, this does not mean an accessible alternative was not possible. The issue here is the time that was initially spent looking unsuccessfully for what eventually proved to be a fruitless task. Although the organisation had produced accessible websites previously for a number of clients, clearly the definition of accessibility did not extend to issues of site management. Although the CMS was made accessible as noted above, the more problematic issues occurred when the site was required to interact with disabled user testers.

As a static site containing information and general articles, accessibility proved easily accomplished. The first problematic area arose when the search facility was accessed by the screen reader. Dropping on to the search facility simply froze the screen with the only option being to reboot the computer. This event happened on every occasion the search facility was attempted with eventually the search option being removed from the site until much later when it was resolved with the assistance of the screen reader manufacturer 'Dolphin computer access'. After the issue had been resolved Jaik explained the problems from his perspective:

> "I don't know exactly the cause of it, but it appears to be some incompatibility between the screen reader software and one of the plug-ins that is installed in Internet Explorer. When it hits on a certain combination of html, it just seems to trip it over. Its one of these one in a million bugs that have a certain combination or condition that cause something to freeze up." (Jaik, Nov2008)

Jaik continued to advise that he had been in contact with the technical experts at 'Dolphin', who claimed never to have come across this particular problem before and again the consensus appeared the event was a fluke of incompatibility between the html used in the search engine and the screen reader programme:

"We tried the obvious things and it wasn't any of them. But it turns out it was just some very rare incompatibility between the screen reader and another plug-in that is installed. Actually the bit that was tripping it up was only a piece of html code. We found it and tried changing it and it still tripped it up. If we had enough time to spend on it we could just trial and error through every combination and narrow it down a bit." (Jaik Nov2007)

The issue which is identified here and will be returned to later, is that making websites accessible is not guaranteed simply by following guidelines or adopting best practice coding methods. In this example, an established web developer practiced in using accessibility guidelines and html coding techniques together with the manufacturer of a commercially successful screen reader both had difficulty in tracking down and correcting a serious accessibility conflict on a website. It was only at the point where a screen reader user tested the site and found the problem that it surfaced as an extremely problematic accessibility issue which required addressing.

As noted above, while the search facility was being resolved, the function was removed from the site to allow further development and testing to take place. Once more, serious accessibility issues arose which illustrated the conflict between accessibility guidelines and the practical usability of the website.

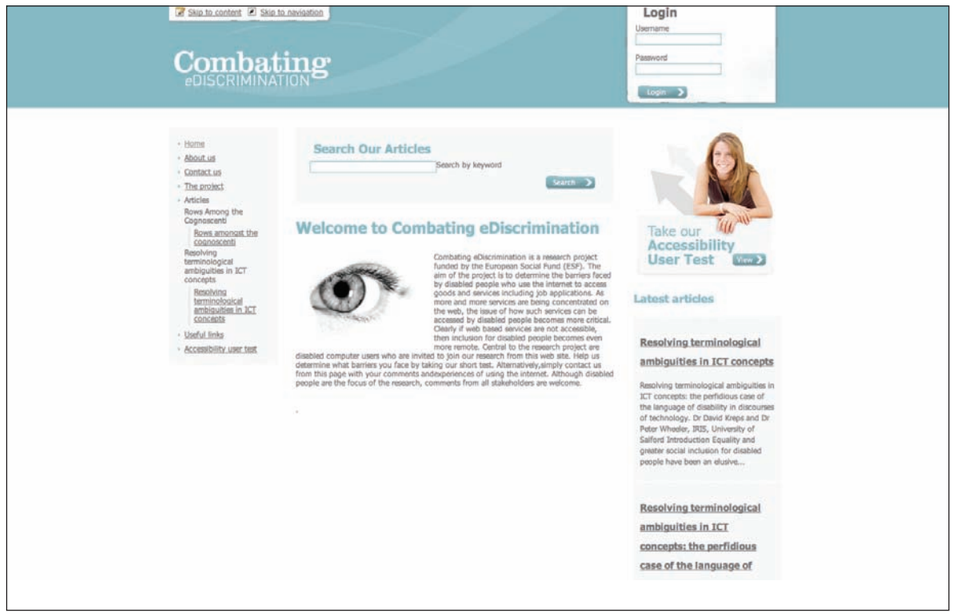
One section of the website was intended to be used by disabled computer users to firstly provide proof of their internet capabilities, and secondly to generate data on the accessibility of employment related websites that were commercially operating on the web. To achieve these objectives, the website was required to collect information from user testers. From a technical perspective, the data collection required two methods of user tester interaction. Firstly, edit boxes were needed to allow user testers to fill in personal details such as name and email address; secondly radio buttons were required for answering simple binary opposites. For example the question, "Do you define yourself as disabled?" Had two check boxes for answers, 'Yes' and 'No'. For people who do not use a mouse to position the cursor, activation of the appropriate check box is achieved by pressing the keyboard space bar when the desired answer is arrived at using the keyboard up or down arrow keys to navigate. Although entering data in text boxes never caused any accessibility problems, finding a method to allow access to the questions and radio button answer selection again proved extremely problematic. In brief, the screen reader could not initially read the related questions which required check boxes to be selected. Hence as the screen reader was moved down the webpage, it simply announced 'Yes', 'No', repeatedly without reading the related question to be answered.

There are guidelines and published techniques for ensuring that the coding behind checkboxes and radio buttons work with screenreaders, involving labelling and specific code ordering. However, the problem of reading a question and then providing radio selection buttons as responses was not in itself a simple issue of appropriate coding. After multiple unsuccessful attempts to solve the problem within the site, Jaik returned to a simple basic one page of html coding with one question: 'Do you like rabbits?' with two 'Yes/No' radio buttons for responses. This single webpage worked perfectly with the screenreader, but when this code was incorporated into the full website the problem returned.

Coding up forms according to the guidelines, in short, worked fine in isolation, and the screen reader had no problems interpreting it properly. Within the design that had been produced, however, properly positioned using Cascading Style Sheets with structural html, the form ceased to work. An unusual, technically valid but counter-intuitive coding structure needed to be adopted, before the screen reader would work with it. In this case the code that actually worked could not be described as structural html, thereby rendering most keyboard shortcuts unusable, and was on the contrary – to the eye of a web accessibility specialist - rather clumsy-looking code, yet more accessible than the original more guideline-compliant code had been.

This points to what must clearly be one of the most important findings of this part of the project:

In the context of CSS positioned designs, unplanned-for anomalies, about which there is no mention in any specification or guideline on the W3C, may arise, rendering otherwise compliant code in practice inaccessible. Making the code accessible may require counter-intuitive recoding that whilst validating against specifications may run counter to the letter of the guidelines. This is most common in the case of more complex code structures such as HTML forms.



# Focus group report and findings

The combating eDiscrimination project website was not originally intended to become a central element in the research process. Rather, it was originally planned as a research output, IE an exemplar of good accessible web design. However, due to the difficulties encountered making the site accessible for the HAL screen reader, the development of the project website became more regarded as a matter of process. The choice of the HAL screen reader was a practical decision, as one researcher was dependent on this access equipment to use computers.

A focus group with eleven disabled user testers was held at the RNIB centre Liverpool. The purpose was to provide initial information over the barriers faced by individuals when accessing the internet and in particular difficulties in access to job related websites. All of the people attending the focus group had some access issues although all had a visual impairment and used assistive equipment to access internet resources.

The focus group was structured around four main themes: the access to assistive computer equipment, their experiences in Internet use, the training they have received, and the problems they have encountered when they tried accessing employment services over the Internet. With respect to the final theme, we had asked the user testers in advance to access two employment websites and to try to fill in an online application. The websites were www.monster.com and www.northwestjobs.co.uk. These were the same sites as individual user testers were required to access and provide feedback to the project. These sites are also used by the project website for any online user testers who wished to join the project.

## Background

Most of the participants were either out of work, in some form of education and training, or employed on a part-time basis. All had applied for jobs previously with all having used computers and the Internet before. However, only one has applied for jobs online. The participants were generally over 30 and less than 60 years old. Almost all of the people attending used a combined text magnification and screen reader software, 'Supernova'.

## Access to Assistive Equipment and Training

Several participants noted the costs of buying assistive technology were prohibitive.

"It costs about £800 to purchase Supernova." (Participant 2)

"That's true. It's really expensive the equipment. So even before you start to find yourself a job, whatever it is, you've got to first find a way of getting assistive technology." (Participant 3)

"You also need a decent computer to start with, or otherwise it is crashing all the time. So you are talking about another 500 to 600 quid for a decent computer to run Supernova." (Participant 7)

All expressed the opinion that the initial barrier to computer access was the initial start up costs. For most, costs were met either through family finances, charitable donations, or government's access to work scheme. However, each option has its own related problems as participants observed:

"I can't afford the equipment so I use the library one. They only allow you an hour at a time if you book it and it takes them about 15 minutes to get the programme running which comes out of your hour." (Participant 1)

"I applied to Henshaw's; they gave me part of the cost but only if I could find the rest myself. It took me nearly 2 years to get it." (Participant 10)

"Access to work will only come in after you start work and have an assessment. I waited 3 months for the assessment and then they were haggling with work over who should pay what. I waited nearly 18 months before I got my equipment." (Participant 11)

Hence there appears no obvious mechanisms which can be readily access to enable many disabled people to even have the equipment necessary to access the web. A secondary related barrier appeared as participants generally agreed that the levels of access to training varied considerably often dependant on the area in which people live.

"… I have got a feeling that it might be a postcode lottery. If I lived half a mile down the road, I would have free IT training, I would have a computer". (Participant 8)

"If you are in Liverpool it's great. Liverpool council have really, really good support at the moment. I live in Prescott and they are absolutely rubbish. It is where you live". (Participant 10)

"It is a postcode lottery. It does depend on where you live actually". (Participant 3)

The issue of training with assistive equipment was regarded as almost essential, because not only did it prepare disabled people for work, it also provided confidence for individuals to apply for posts in the first instance.

"I would feel so much more confident if I knew I could start a job and be able to use the equipment when I started. The thought of going in on the first day without knowing anything about how to use the computer fills me with dread." (Participant 6)

"How many employers will take you on then wait for access to work to buy the equipment, and then wait till you can use it properly?" (Participant 8)

"I want to sit in the interview and say 'yes I can use IT, yes I can access the Internet'. Not sit there and say 'yes there is training available, yes there is Access to Work, yes it will be available to use some time in the future', which I can't determine and they can't determine either." (Participant2 )

The issue raised above is particularly relevant to small employers. Whilst large organisations including government agencies may be in a position to wait for both equipment and training to be provided for disabled employees, it would be difficult to imagine the same situation would be possible for smaller employers with much tighter budgetary and cash flow conditions. Employers are in the first instance required to purchase any equipment for disabled staff under the access to work initiative, and then reclaim the money spent from the programme. So, as discussed above, with equipment often taking several months to arrive, and employers then having to wait several months for reimbursement of costs, then it could be the case that small employers would be reluctant to engage disabled workers who required expensive computer equipment. Clearly if the problems of training are then added to the situation, it would be understandable from an

economic or business argument to disregard disabled job seekers purely from the financial implications. Under such an analysis it would be difficult to argue a 'business case' for the employment of such disabled people, with any rationality for their engagement resting more towards arguments of social justice. Perhaps this is why the inclusion of disabled people is often regarded as best met outside arguments of business rationality, rather falling on public sector and voluntary organisations.

## Access to assistive equipment in public facilities

As discussed earlier, some public facilities including libraries do have a range of assistive equipment available free for use by disabled people. However, worthy as such initiatives are, participants told of limitations and problems when such facilities were used. This issue revolves principally around independence of use. When screen readers or text magnification systems are used on privately owned computers, the assistive software is designed to load by default with the operating systems. From this position the disabled user can use the assistive equipment set to personal requirements by default to select programmes and any other feature of the computer. However, it appears this start up process is regularly disabled by library specialists thereby removing independence of access. The consequence of this is that although disabled people can book up to one hour on a library computer, in reality this time is significantly reduced as library staff are required to enter user name and passwords, select and load assistive programmes every time the disabled users attempt to use library computers.

"In London, I know they have Supernova. You can have it for an hour. So I can use it. But it is limited in the amount of time. Also the passwords for the PCs, the login part you have to go through a series of inaccessible edit boxes... They have to spend 15 to 20 minutes before Supernova is loaded. That is part of the hour." (Participant 5)

Hence, although theoretically accessible computers are available free to use in libraries, in practice when the time constraints are taken into account, and additional time is added for disabled users to try and search for jobs, putting to one side the often inaccessible design of employment websites, then library provision could not offer access to many disabled users. Again the only practical method of accessing websites would be via home computers which again is restricted to cost and training issues mentioned earlier. With the problems of accessing equipment discussed, the group moved on to issues of the accessibility of websites generally,.

### Using Internet resources

Many websites have accessibility options on their homepage, which allows the users to change some settings or to activate a simple online screen reader. The problem described by one user tester was that often the accessibility options are often virtually hidden on the homepage in small print in some remote corner.

"I did a lot of testing of the accessibility options. Often they are right at the bottom of the page in small print. So you can't actually see where they are very easily, unless you know where they are." (Participant 8)

"I have been going to Remploy helping me with jobs. This happened with Merseyside Police. You have actually got to look because if there are any jobs advertised on the site there, you know its mute it's a big thing to download off the Internet... It's people who are dyslexic saying it is too small. I said I am sorry, I am not even bothering with that." (Participant 4)

Even when and if accessibility options can be located, this does not in itself solve many of the issues disabled computer users face. Most participants had very similar problems when it came to colour options provided by websites, and the problems of website default colours disabling accessible options available to the disabled users from their assistive equipment.

"Black and white (as default colours) is best you know. So that you can base your colour background on quite a bit of colour data. If you have all these screen colours you can't see anything." (Participant 3)

"You might have very pale orange and I work on black sometimes. That is orange on black background. Or yellow on black would be fine. If they decide to put purples and writing in the pale colour, sometimes it doesn't come through... and they have got yellow text in.. and you have some of your colours as green. We need to be able to customise it to whatever is our preferred colour scheme." (Participant 2)

"It depends on web page colours, when you reverse the colour with Supernova they contrast on each other it doesn't matter how you change it; the poor contrast is still there." (Participant 4).

"We are all individuals, we all have our own preferences, we want to keep the contrast, it is your colours and you can customise them. We can do it for ourselves." (Participant 7)

"And it looks so pretty with these gorgeous colours, with that beautiful jade or a dark jade. Or it was very dark jade with black. And I just switched it off because I thought it is just not worth going any further." | (Participant 9)

How documents were made available from websites also raised considerable concern. Where standard 'Word' documents appeared to present few barriers, because they could be accessed using an individuals own default colour options, by contrast, PDF documents were generally regarded as problematic.

"The only problem I am having is that it is in PDF and the screen doesn't work with one of those." (Participant 1)

The issue of accessing PDF documents did exercise the group, below relates the tone of the discussion.

"PDF comes in a different format, it's very strange." (Participant 6)

"I no. It's far worse." (Participant 3)

"PDF is horrible. A lot of files are in PDF. It is just horrible to use." (Participant 10)

"Especially the colour contrast of it, of PDF. These people, these web designers, 'oh it's a wonderful page, isn't it pretty?' There is no colour contrast or no colours to use. It just makes it worse." (Participant 2)

The issue of font size and colour accessibility together with more general issues of accessing particularly web 2.0 sites where often security codes are captured inside discreet and highly inaccessible boxes also overlapped in to discussions of how accessible the two employment related job sites were.

"There is a new feature on web pages, also on job web pages these days. On the Login, when you sign up, you have strange colours and letters with different shapes. It is a new thing…with really strange colours in the background and letters in it. You have to identify and copy them to sign in. You can't see a thing. It is actually horrible. It doesn't matter what you use, you can't change the colours." (Participant 3)

"If you sign in there is a grey box with six letters in, but there is a mixture of strange colours behind these letters." (Participant 1)

"Sometimes there are strange fonts and I don't know why they make it so hard to read. But you are meant to copy them into a box beneath to verify that you are whatever. It is really hard to read because it is very strange colours." (Participant 6)

"At least you can see and know the letters are there, using only a screen reader is different, for some reason they make those boxes so that screen readers can't even go inside to read the numbers." (Participant 11).

These extracts highlight the added problem facing many disabled people as web 2.0 technology moves increasingly into websites. Exclusion for the web can only increase if many disabled users are prevented from signing in to sites because the capture graphics demanded as a security check cannot be accessed. However, neither employment related sites we asked focus group members to access before coming to the group had such sign in barriers, hence this particular barrier did not prevent access. Although, other access issues did disable most group members.

"A difficult point about the Internet is that with the zoom-text technology I use is that the busier a page; the more difficult it is to read. If you can't fit everything on the screen then you are hopping here and hopping there…it becomes so difficult that you give up in the end. Like one of those websites you gave us. There was so many bits here and bits there I can't read it all at once so I have to keep reading it. So the busier…these web pages might be, they may be very pretty and professional, but they sometimes put too much stuff on it." (Participant 2)

"Monster.com was in columns. So I was going down one column. I sometimes I was out of a column I can see to get an idea of the layout by putting a whole page on. Otherwise when I put it back on to read it, that Monster one, I read one column and then I went down another column. It was good the way it was laid out, while the Northwest one was absolutely awful. The size and colour was absolutely everywhere I found." (Participant 9)

"Yes I did try to find a job. I clicked upon any other job basically trying to follow through. I did find it difficult and then I kept thinking I don't know what I was doing. In the end I kind of gave up." (Participant 1)

"It had all these things down the side something like baskets; I found it really frustrating actually. Did anybody find when you put something in the basket, and then you couldn't find what it is in your basket. It was very small on the top and it says 'when you find the job you want, put it in the basket'." (Participant 7)

"Monster, I could access the information, the job specs etc., but then I could not work out how to apply to any of them. I could access the other one because of the colours." I gave up on the other one." (Participant 5)

Focus group members whilst able to access the specified websites to varying degrees found the process extremely time consuming and often induced eye strain. No individual found either website easy or quick to use. However, an issue additionally brought up was the frequently observed problem of filling in forms whether online or from downloaded applications. Those who expressed an opinion were mostly concerned with the impression a badly laid out form would produce for any prospective employer. This appeared to be the position even when the design of the form was poorly structured and mostly inaccessible.

" They don't let you type it in; you have got to write it by hand. You print the form out and then write it by hand and sometimes they have little boxes where you have to put it in. Each letter in an individual box and it is just a night-mare." (Participant 2)

"With an online application form, for example the university one, I make sure that everything is aligned and when you have columns and tables with data, it might not fit in with the descriptions of your qualifications presentation-wise. When you are submitting your application form, you have to ask people to make sure that the presentation of the content is all aligned properly." (Participant 5)

"If you go over the box, the little box, they will just void it in your application." (Participant 4)

"It would be far easier to go on the website to actually fill it in. You put it in the box and fill it in on the website. Would be far easier if the boxes expanded to suit your application." (Participant 8) .

"In the application there is another place where you go normally to write details in sort of pay etc and often the background is in strange colours. It can sometimes have the palest orange words on it and white space where you have to write, they are horrible." (Participant 3)

## Conclusions

The focus group provided some very useful questions for the research to address. Although participants had a variety and range of different impairments they all used a combination of screen reader and text magnification, or were single users of text magnification. Here the generic term 'text magnification' is used although readers should be aware such software also provides users the ability to choose and alter colours and there contrast settings. However, for the majority the ability of assistive equipment to gain access to internet resources was restricted due to the conflicts which occur as default colours selected by web developer's contrast or conflict with user preference settings.

One issue which many found disabling was the methods of producing inaccessible PDF formats without accessible 'Word' alternatives. Similarly, application form design requires considerable thought if it is not to discriminate against many disabled users. Online application forms would be significantly more accessible if text boxes were expandable to allow information to be simply copied and pasted in from word processed documents. Multiple constructed tables with numerous columns and rows many of which contain no descriptive element for screen reader users are particularly inaccessible. Perhaps one practical observation here would be to allow disabled computer users to evaluate application forms for accessibility before organisations upload them on to employment and job vacancy pages.

Focus group members provided many simple alternatives to overcome the multiplicity of barriers found on the Internet. Perhaps the simplest was for web developers to produce sites which can detect visitors are using assistive equipment and ensure this is not overridden by site default colours. All focus group members were frequent users of Internet sites and the most frequent reason for abandoning any specific site was because of poor or inappropriate design. After all, what is the point of providing accessibility features on a website in a location that cannot be found by a disabled computer user? Many of the issued raised in this chapter could be regarded as issues of common sense and good design if internet applications are to be designed for the majority of disabled people. However, as web 2.0 technologies gain greater presence on the web, it will be the duty of developers to ensure security codes which require first reading and then copying in to signing up routines are at an absolute minimum made available in a format which can be accessed by users of text magnification and screen readers.





# Summary

The main findings of the project are that:

- Most websites in the job opportunities sector are not following professional standards of web development
- Professional standards of web development need to be augmented with user testing to ensure proper accessibility

Of particular note is that there is a common belief amongst web developers that:

- There should not be any additional cost in making websites accessible, as the expertise to create a site professionally should be in place from the start
- Accessibility will follow from applying professional standards

This was the view found in the majority of web developers interviewed for this research. However, this research has shown these beliefs in the web development community to be quite possibly erroneous. On the contrary, it seems that:

- Additional costs may be incurred due to the need for disabled user testers to be involved in ironing out 'bugs' not foreseeable through the use of professional standards
- Accessibility does not always follow from applying professional standards, but requires user testing.

A closely related outcome to the above findings, therefore, is that:

- Professional standards – i.e. the use of valid W3C code and adherence to Web Content Accessibility Guidelines – is not enough to ensure accessibility
- Different versions of XHTML and CSS, the range of different browsers with differing implementations of same, and the range of different assistive technologies with differing support and responses to same, altogether, present too many variables and potential for unusual outcomes, for a simple professional approach to coding to be sufficient. User testing will likely find problems needing attention.

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