



Inclusive learning for all

WHY ACCESSIBLE E-LEARNING MAKES BUSINESS SENSE

The CIPD is committed to the provision of accessible and usable information and services and in making this commitment, recognise the wide range of disabilities that can affect our members' ability to fully use the services we provide. If you need help accessing information or services from the CIPD, please call 020 8612 6210 or email lis@cipd.co.uk

Introduction

According to recent figures, over 8.5 million people in the UK have a disability, but employers frequently overlook their abilities. Advances in technology are opening up huge possibilities for disabled people to gain better access to education and training and to participate in work. In particular, e-learning offers disabled learners new ways to learn, as it can easily be adapted to different learning styles, speeds and communications formats. For example electronic text, unlike printed text, can be 'read' by people who are blind or dyslexic and by those who can't hold a book or turn pages. And typical barriers faced by disabled learners such as physical access to buildings and transportation can also be removed.

The real value of e-learning may therefore not be in serving people already well served by traditional training, but rather in making training available to people who find it difficult to participate in classroom training, or who choose not to. A 2002 survey by CEDEFOP revealed that 55 per cent of respondents surveyed agreed that e-learning will open up new and innovative learning opportunities for learners with disabilities. Eighty per cent of the training professionals surveyed in this study also believed that e-learning should be provided to learners with disabilities to improve equality of access to learning (CEDEFOP 2002).

Given the growth in numbers of people unable to work, demographic changes creating a shrinking talent pool and an ageing workforce, and the ongoing development of disability legislation in the UK, this issue is growing in relevance for employers. All education and training must now be designed with issues such as impaired vision, hearing and mobility in mind. Apart from the clear moral and legal obligation to provide effective training to disabled people, there is also a vast untapped potential for employers, which could go a long way towards meeting some of the skills gaps that many industries are suffering (CIPD 2004).

The aim of this research is to assess how far the potential of e-learning to improve access to learning for disabled people has been realised and to identify the underlying factors that have helped or hindered it. Stakeholders from the fields of learning, disability, HR, Government and online accessibility were interviewed to gain their views on the following research questions:

- What is the potential for e-learning to equalise the experience of those with disabilities?
- What are the current experiences of those with disabilities accessing education or training?
- What can e-learning offer disabled learners that traditional training techniques cannot?
- What are the current barriers to successful use of e-learning by those with disabilities?
- What guidelines and legislation are currently in place? Are they sufficient?
- What are the best practices for designing e-learning to maximise accessibility?

It is hoped that this report will raise awareness about the importance of providing accessible and usable training for all learners, not just those with disabilities. Alongside identifying current barriers, it will also provide practical recommendations about how to gain full value from the training and e-learning you currently offer, by making it more accessible.

Useful definitions

What is 'e-learning'?

The CIPD defines e-learning as 'learning that is delivered, enabled or mediated by electronic technology, for the explicit purpose of training in organisations', and emphasises the importance of connectivity in distinguishing e-learning from stand-alone delivery modes such as the use of CD-ROMs (CIPD 2002).

What is a disability?

According to the Disability Discrimination Act (DDA) 1995:

The Act defines a disabled person as someone with 'a physical or mental impairment which has a substantial and long-term adverse effect on his ability to carry out normal day-to-day activities' (DRC 1999).

According to the DDA 1995, as a service provider, you might discriminate against a disabled person in two ways:

- by treating him or her less favourably than other customers because of their disability; or
- by not making reasonable adjustments to the way you deliver your services, so that disabled people can use them. (DRC 1999)

What is 'accessibility'?

The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect (Tim Berners-Lee).

In this context, the CIPD believes that accessibility refers to the ability of web-based information or e-learning to be viewed, navigated and read by everyone, including people with disabilities who use various assistive technologies. Accessible e-learning takes into account the special needs of learners with auditory, visual, mobility, and cognitive impairments and gives those users an equivalent learning experience to that of non-disabled learners.

Setting the scene

Disability is more common than we tend to think. And since the UK's population is ageing, the issue is certain to gain even more prominence in the coming years. Recent disability figures for the UK from the Office of the E-envoy suggest that there are over 8.54 million people registered with one form of disability or another. Of these:

- Over 2 million have a visual impairment.
- Eight million people suffer from some form of hearing loss.
- One million people have a form of learning difficulty.

It's worthwhile remembering that impairments take a variety of forms and can exist together in combination (E-envoy 2002). For example, research from the RNIB suggests that two-thirds of all people with a visual impairment have an additional disability or serious health problem such as deafness, arthritis, angina or diabetes (RNIB 2002a).

In Autumn 2001, nearly one in five people of working age in private households had a long-term disability (3.7 million men and 3.4 million women). Around 3.5 million disabled people were in employment, an employment rate of 48 per cent compared with a rate of 81 per cent for those without disabilities (National Statistics 2001).

For a variety of reasons, traditional education has often failed disabled people. Providing them with the ability to learn new skills during their working lives is therefore imperative. The UK Government is fully committed to encouraging lifelong learning, and this is perhaps where e-learning has a useful role to play. Unlike classroom-based learning, it generally doesn't involve physical access issues and has the advantage of offering a 'new' solution untainted by previous experience. As a secondary but significant benefit, e-learning by its very nature inevitably improves a learner's IT skills as they learn.

Many employers may not be gaining as much value from the disabled people they employ, because the training they offer is not usable by them. A large proportion of organisations are also likely to be overlooking the fact that disabled people offer a new talent pool from which they can recruit to help them deal with existing skills shortages. Accessible e-learning may be able to improve access to training, thus upping the skills of disabled people and therefore the contribution they can make in the workforce.

The UK legislative landscape

In the UK, e-learning is considered to be a service and is therefore covered by the Disability Discrimination Act 1995. Although the prevailing thinking is that e-learning falls under Part 3 of the DDA (service provision), the University for Industry (Ufi), who developed Learndirect in partnership with the Government, are encouraging their providers to also work to provisions of the Special Educational Needs and Disability Act (SENDA) 2001, more recently being referred to

as Part 4 of the DDA, as well as a code of practice by the Quality Assurance Agency (QAA) which are both targeted at educational content (Ufi 2003).

As yet the UK has not taken any specific legislative action on online accessibility unlike in the US with the Section 508 legislation (2002), and instead defers to the guidelines offered by the de facto standards body for accessibility, the World Wide Web Consortium (W3C). This body has set up the Web Accessibility Initiative (WAI) providing Web Content Accessibility Guidelines (WCAG) that define three levels of conformance with the accessibility guidelines:

- 'A' meets priority level one of the guidelines.
- 'AA' meets priority levels one and two of the guidelines.
- 'AAA' meets priorities one, two and three of the guidelines.

In essence the A, AA and AAA standards provide a system of ratings used to assess the accessibility of web-based information. Although, most other parties defer to these guidelines some organisations are taking their own approach by picking out those of most importance to their specific audiences. For example, the Royal National Institute of the Blind (RNIB) is offering an accessibility 'badge' for UK websites called the 'See It Right' logo:

In order to qualify for the 'See It Right' accessible website logo, sites must achieve a standard of accessibility better than the WAI 'A' standard. This requires compliance with all priority one checkpoints, as well as a number of 'priority two and three checkpoints that have particular relevance to users with sight problems ...' (RNIB 2002b).

There are several issues with adopting a system of unenforced guidelines. Firstly, how do you objectively measure compliance with the guidelines? Software tools exist that can validate aspects of accessibility but unfortunately none alone can prove compliance. And without a firm legal base, how do you force organisations to spend time and money thoroughly testing their e-learning? Research tells us that testing e-learning content can often be ignored by organisations due to pressures to meet delivery deadlines. For example, a recent study by City University showed that on average only a quarter of all e-learning content provided to end users was properly tested (Dunn 2003).

It is equally dangerous to assume that simply meeting appropriate accessibility standards guarantees that e-learning is effective (ie usable as well as accessible). One of the Office of the E-envoy's 'top ten guidelines' for UK Government web information states that content needs to 'achieve universal accessibility and usability. This may be taken to mean that services must not only be accessible but usable by people with special needs' (E-envoy 2001).

It seems as though meeting the standards is achievable, while providing usable and effective e-learning is perhaps the real challenge. For example, a recent survey by the Disability Rights Commission (DRC) found that as many as 45 per cent of the problems experienced by the research user group were not a violation of any particular checkpoints in the WAI guidelines, and would not have been detected without user testing (ie testing with 'real' people). And somewhat depressingly, the same report found that only 19 per cent of websites comply even with the lowest priority checkpoints for accessibility (DRC 2004). While this research specifically addressed website accessibility, it seems reasonable to infer that there is no reason for the percentage of accessible e-learning to be any higher.

How can e-learning support learners with disabilities?

There is widespread agreement that adapting e-learning content for disabled learners is likely to benefit everyone. We all have different ways we prefer to learn, which are well documented elsewhere (eg *How Do People Learn?* CIPD 2002). So an inclusive strategy where learning resources are provided in different formats to suit different needs or preferences will provide more effective learning overall.

The principles and methods of training and education (pedagogy) have shifted dramatically due to the advent of e-learning which, by its very nature, offers a range of advantages over traditional, offline methods. These include:

- The learner is at the centre of the process and has full control over the pace of the learning.
- Interactivity, at its best, is engaging and increases the effectiveness of learning, especially retention.
- It is flexible regarding time and place of learning.
- Consistency of presentation – the computer never has a 'bad day'.
- It's scalable for large numbers of learners.
- It allows collaborative working through discussion boards, real-time chat and remote lectures.
- Materials stored electronically can be repurposed as often as necessary (eg bulletin board discussions can be edited to form FAQs or case studies).
- It provides concurrent, different routes through learning materials, based on user preferences and/or diagnostic pre-tests.
- There's a variety of media, so users can choose those that suit them best, including multi-modal approaches which can help people with learning difficulties by offering sound and vision alternatives of the same content.
- It can provide support for users with learning difficulties, such as spell-checking and self-paced input.

An example of some of the adjustments to make e-learning accessible to disabled people are discussed in the US Section 508 legislation as follows:

Many of the provisions ensure access for people with vision impairments who rely on various assistive products to access computer-based information, such as screen-readers, which translate what's on a computer screen into automated audible output, and refreshable Braille displays. Certain conventions, such as verbal tags or identification of graphics and format devices, like frames, are necessary so that these devices can 'read' them for the user in a sensible way. The standards do not prohibit the use of website graphics or animation. Instead, the standards aim to ensure that such information is also available in an accessible format. Generally, this means use of text labels or descriptors for graphics and certain format elements.

Most of the specifications for software pertain to usability for people with vision impairments. For example, one provision requires alternative keyboard navigation, which is essential for people with vision impairments who cannot rely on pointing devices, such as a mouse. Other provisions address animated displays, color and contrast settings, flash rate, and electronic forms, among others (Section 508 2002).

Similar adaptations can be offered to improve the accessibility and usability of e-learning for learners with cognitive, hearing and motor disabilities.

Disability in an e-learning context

While the term 'disability' covers a vast range of specific conditions, in the context of e-learning the main issues relate to:

- **learning** – including most commonly dyslexia, difficulty in concentrating (ADD/ADHD), memory issues, and epilepsy (NB this report specifically does not cover lack of basic skills)
- **visual problems** – from the need to wear glasses through to blindness, meaning that a user may have a degree of difficulty seeing what is on the screen
- **hearing** – from minor hearing problems through to deafness, meaning a user may have trouble hearing sound clips as well as error 'beeps'
- **physical/motor difficulties** – including a range of problems that make it hard to use a mouse. Alternative inputting methods include using keystrokes, trackerballs, joysticks, touchscreens, customised devices and speech recognition.

But is e-learning up to the challenge?

Although e-learning has seen rapid growth in usage, CIPD research *E-learning: The Learning Curve* (CIPD, 2003) has shown that, so far, it has demonstrated more potential than reality. Progress has been disappointing and too often e-learning is simply seen as a way of cutting training costs. Furthermore, the low levels of compliance with accessibility standards means that many e-learning packages are currently likely to be difficult for disabled users to access. Typical barriers that a disabled user is likely to encounter include (those most likely to be affected in brackets):

- images without text labels, or complex images including text, that are not described adequately by the available text label (visually impaired)
- colours used uniquely for emphasis (visually impaired and colour blind)
- video or audio without accompanying transcripts and descriptions (visually and hearing impaired)
- lack of compliance with HTML coding standards (any user of a screen-reader; visually impaired and those with cognitive disabilities such as dyslexia)
- lack of provision of mouse-input alternatives (visually and motor impaired)
- time-limited responses, including real-time chat (motor impaired and those with cognitive disabilities such as dyslexia)
- distracting moving and/or flashing images and/or text (those with cognitive disabilities such as ADHD, and conditions such as epilepsy)
- inappropriate use of language (everyone, but especially those with learning difficulties).

NB. This list is adapted from W3C WAI 2001.

Most of these barriers are relatively easy to avoid and often occur through a simple lack of understanding of accessibility issues on the part of the e-learning designer and developer. Some might require a little extra effort, but the benefit they are going to provide to a large number of users, not just those with disabilities, provides immediate justification.

When confronted with difficulties, there might be a temptation to apply the rule of the lowest common denominator by avoiding features known to have accessibility issues. The problem is that we'll end up offering no more than plain text. While meeting the most exacting accessibility standards, this is hardly likely to provide an engaging learning experience for anyone!

It therefore seems that before e-learning is viewed as 'the solution', there are some widespread challenges connected to the effective design and development of e-learning that need to be addressed. These include providing attractive and high-quality content, maximising learner motivation, understanding the additional support learners need to learn effectively, and challenging negative attitudes to this type of learning.

Uncovering the issues

We canvassed the views of important stakeholders in the areas of online accessibility, learning, HR, disability and public policy by asking them to complete a questionnaire, followed up with discussions. Respondents represented employers from private and public sectors, charitable organisations, public strategy bodies and disabled learners. The results of the research are analysed thematically below.

How can e-learning help disabled users access training and learning?

A key benefit of e-learning was stated to be availability – it can be accessed anywhere and at any time. This can help those with mobility problems, as well as those who find it hard to keep up with the rigid timetable of classroom-based learning. Many disabled users might feel let down by their school experience so that the disassociation with the classroom in itself is likely to be beneficial. Furthermore, some disabled learners feel uncomfortable in classroom situations, or find it difficult to take active part.

'Classrooms are not always very dyslexia-friendly.'

Fiona Hover, Educational Development, Dyslexia Institute

E-learning's self paced nature means people can repeat sections until they are confident in their understanding, which is likely to be particularly helpful for people with learning difficulties. E-learning can also include multi-sensory approaches, which have been used effectively in other forms of training, especially for dyslexic learners.

'E-learning provides the ability to illustrate content more effectively and bring it to life.'

Alex MacNeil, Training and Design Project Manager, Mencap

Learning difficulties are not always identified as people pass through the education system, or indeed employment. Some forms of e-learning such as pre-tests or multiple-choice questions are already used to identify a learner's preferences and existing understanding. E-learning may offer the possibility of building in an overall learner needs analysis, to help direct learners towards appropriate support if it is needed.

Several mentioned that making e-learning accessible didn't just benefit those with disabilities, but made the experience better for all users. User centred design and 'design for all' are seen as

going a long way to improve the experience for everyone.

'There is nothing that dyslexic people need that wouldn't make it easier for everyone else. Good clear symbols, good navigation, simple layout, audio – these are all things that a good e-learning package should have.'

Fiona Hover, Educational Development, Dyslexia Institute

E-learning is often quoted as a means to increase the confidence of disabled learners. It can provide opportunities that they might not have been offered before, and can help them explore and build on their skills. If lifelong learning is to become a reality, then e-learning has the potential to provide a major new opportunity for disabled learners. Many respondents commented on the potential support that e-learning could provide to the Government's aim of getting more disabled people into employment.

'E-learning does have the potential to offer a level playing field in learning, but only if designed appropriately and the assistive technology is thought through – not just a bolt-on.'

Shirley Evans, Manager, Adult Learner Programme, Royal National College for the Blind

From an employer's perspective, accessible e-learning was seen to bridge the frequent skills gap they experienced.

'Training up existing staff is proving to be more cost-effective than recruiting new starters. Accessible e-learning gives the employer the ability to increase its skills portfolio and its ability to be the employer of choice at the same time.'

Tabatha McCree-Cox, HR Web Development Manager, Royal Bank of Scotland

'It would contribute to initial training and development, creating competence and sustaining performance, delivering value to the business and of course making learners with a disability more attractive to potential employers.'

Valerie Almira, Group E-Learning Manager, Centrica

Case Study 1: BECTA – e-learning materials for the National Learning Network initiative

The National Learning Network (NLN) commissions and manages the development of e-learning materials for learners in post-16 further education. The latest materials to be released (Round 3 materials) were designed to appeal to the widest possible range of people, including sight-impaired users. During the design phase of the project, the designers visited the Royal National College of the Blind (RNC) to talk to students about their learning styles and how they use assistive technology such as screen-readers. Based on this research, two versions of each screen were developed: a highly accessible full media version and a text-only version.

The text-only version was specifically tailored for use with screen-readers and contained interactions that involved the screen-reader rather than buttons on the screen. This meant that question screens were still challenging, giving the user an opportunity to think about the answer before hearing the feedback. The multimedia version of the programme was also made as accessible as possible. For example, audio transcripts were provided and suitable colours and screen layouts were chosen for dyslexic users.

From our testing at the RNC we discovered that most of the screens worked well with screen-readers and that learners rarely had to switch over to the text-only version. This meant that the NLN was able to produce a highly interactive and engaging programme while also making the materials available to a wide range of users. However, for the current round of development of NLN materials, we are moving away from having two versions, instead going for one multimedia rich, yet highly accessible, version.

The designers attended an accessibility conference at the RNC where different user requirements were discussed. User trials were then conducted at three stages of the project. At each stage, sight impaired students and RNC advisers gave their feedback on the materials and amendments were implemented. The knowledge accumulated from this project has since been used to improve the designer's internal accessibility testing procedures and to improve the accessibility of our other programmes.

Information provided by John Harris, Director of Education, Epic Group plc.

But e-learning cannot be the whole solution

While e-learning offers many obvious benefits to all learners, such as flexibility of time and place, several commented that it is not a panacea. And the issue of catering for different learners and their needs is as applicable in e-learning as it is for other forms of training. It was recognised that the term 'disabled learners' embraces a vast range of people, often with very different learning needs.

'It is hard to define what a "typical disabled person" is. There are so many different types and combinations of disabilities and each will result in very different preferences for training and learning.'

Jim Cowan, E-learning Strategy Development Manager, Welsh Assembly Government

Another frequent comment was that e-learning should not be seen as a replacement for other forms of learning, but as a valuable addition.

E-learning is still in its infancy, and some respondents considered that its true potential has yet to be realised, regardless of its accessibility to disabled users. This is perhaps inevitable for such a recent phenomenon and a few commented that it could follow the same path as the Internet in moving from a sprawling repository of disparate information into an invaluable information resource.

'Given the evidence of how the Internet has empowered disabled people then it is possible that e-learning can also contribute.'

Bernard Fleming, Head of Online Services, Foundation for People with Learning Difficulties and The Mental Health Foundation

Very little hard evidence is currently available about the accessibility of e-learning, and many interviewees therefore referred to website surveys, such as the recent one released by the DRC, and extrapolated a similar conclusion – there are likely to be accessibility problems with over 80 per cent of existing e-learning. Currently, this seems a reasonable-to-optimistic estimate, since e-learning typically includes more rich media and interactivity, which are both likely to challenge accessibility guidelines.

Case Study 2: Centrica – building an inclusive and accessible e-learning strategy

Centrica is the ultimate holding company of many well-known brands including British Gas, Scottish Gas and One Tel. The Group has approximately 30,000 employees. To date, the vast majority of training has been face to face, although British Gas was one of the early pioneers in the UK of computer-based training. Although e-learning is a very small percentage of overall training offered at present, it has been of increasing importance to the group as a means of achieving business and learning goals.

Centrica is well aware of the importance of accessibility and inclusion in the Group's e-learning course development. The development of accessible e-learning is believed to reflect the true nature and background of customers and staff and increases awareness of the challenges and opportunities presented by a global diversity and inclusion strategy. The central e-learning working group recently developed a set of guidelines for accessibility when designing and developing e-learning. It notes that Centrica expects 'all training materials be designed to make things convenient for all learners as well as making things possible for those with disabilities', further drawing the connection between accessibility and overall usability. The standards also require compliance with the Group Web Accessibility Policy and Guidelines.

Centrica holds its suppliers to a high standard regarding accessibility, but also expects its suppliers to be proactive about stating their intentions to develop accessible e-learning. 'Suppliers are not up to speed on how to develop e-learning that is both engaging and accessible. There should not be any compromise between creativity and compliance with accessibility standards. Both should be available and achievable at the same time.'

Centrica has recently commissioned a piece of e-learning on diversity and inclusion – needless to say, this piece of training will serve as a 'beacon' course for accessibility. Longer-range plans include auditing existing e-learning to determine how it could be made more accessible.

Information provided by Valerie Almira, Group E-Learning Manager, Centrica.

Can e-learning live up to the challenge?

It would be fair to say that current attitudes towards e-learning are very mixed. Practically everyone seemed to be aware of the potential it offers, especially to disabled users, but few seem to have witnessed this potential being fulfilled. However, this is not down to problems with inaccessibility alone, with the majority of respondents quoting usability issues as just as likely to demotivate learners and cause them to give up. Overwhelmingly, the respondents felt that the crucial issue at this time is a lack of awareness of accessibility issues, especially at leadership level. This is coupled with minimal, and often disappointing, experiences of using e-learning.

Several charities commented that while e-learning, just like the Internet, has the potential to empower disabled users, this only applies to those who can access it. For those who can't, it tends to exclude them further. And most charities commented that many disabled people were not in work, so the costs of a home computer and Internet connection might be prohibitive.

'We are dealing with technology and people in their own homes. Some people are struggling with old versions of computers and are on low incomes – they don't always have the right kit. The individual wouldn't understand why they couldn't access the e-learning and they may just give up.'

Margaret Bordogna-Crane, Researcher, British Council of Disabled People

'A large number of us gain our IT skills at work. Because of the benefits trap, lots of learning disabled people are denied access to work – so they may not have the appropriate hardware to access e-learning or the IT skills to use it.'

Alex MacNeil, Training and Design Project Manager, Mencap

However, the impact it can make on the lives of disabled users can't be underestimated:

'The Internet is the most useful resource for everyone but for people who are severely disabled it can be the gateway to the world. I know myself I have gained so much from access to the Internet even with the limitations that presently exist.'

Diane Fazackarley, visually impaired Internet user

It is also a common feeling, especially among older people with disabilities, that the traditional education system has failed them.

'Lots of disabled people have been excluded from education – if you have problems lots of people think, "It's my fault. I'm stupid, I don't want to draw attention to myself" – so you perpetuate the problems by excluding yourself.'

Margaret Bordogna-Crane, Researcher, British Council of Disabled People

Unlike classroom-based learning, e-learning offers a 'new' option untainted by previous experience that might be more appealing to disabled learners than traditional educational methods.

Case study 3: Mencap – designing an accessible induction package

A recently launched CD-ROM from Mencap presents an induction to working with people who have a learning disability. The programme is highly visual and modern-looking. One trial user commented: 'I found the graphics well laid out, interesting to look at and not too fussy – fussy graphics sometimes complicate things.' Audio and video have been used throughout the programme to increase engagement and aid usability. One trial user commented that the CD was 'talking sense'. They added: 'I was impressed that the majority of the time you could understand what you were doing even if you were unable to read.' Use of rich media such as audio and video need to be used appropriately, but for some audiences they can have a much greater impact than text- or graphic-based presentations, which some people can find a little boring.

While the primary communications channel is audio and video, provision is made for those with hearing and sight impairments. For those with a hearing impairment, there is the option to replace all audio with text or subtitles. There is also an option to increase or decrease the volume. While volume can be altered within the Microsoft Windows, it is easier for users if they can change it without having to leave the actual programme they are using.

For those with a sight impairment, there is a button to increase the on-screen text size. The instructions on how to navigate round the programme are very clear, while allowing more confident users to bypass them and get on with the actual content. During the user trials, it was observed that everyone, regardless of IT experience or literacy, was able to navigate successfully around the programme.

Information provided by Alex MacNeil, Training and Design Project Manager, Mencap.

Case study 4: Dyslexia Institute – designing learning for dyslexic users – Units of Sound

Units of Sound (version 4) is a PC multimedia programme which encourages and supports independent learning for anyone, child or adult, who is experiencing a literacy level lower than their peers. Starting with three-letter words, it builds the confidence that comes with competency through three structured stages to fluent, independent reading and writing. The built-in screening process places each learner at their correct point in the four programmes within the suite: Reading, Spelling, Memory, and Dictation.

Units of Sound teaches reading, as well as giving the opportunity to practise it. The computer screens have been designed to be as clear and uncluttered as possible so that there are no visual distractions to interfere with the process of reading or spelling. Students can record their own voice and compare it to the programme model when reading the blocks of words. There is no synthesised speech in Units of Sound. All speech is a recorded human voice so there is no need for software screen-readers.

The recording feature has provided a positive active component to learning which encourages even the most reluctant learner to become involved in the learning process. As I watched the intense concentration of a dyslexic ten-year-old boy listening to his own voice and deciding that he could improve his pronunciation, I knew that the late nights, the early mornings, the panics and the crises of the production period had been worthwhile.

Information provided by Fiona Hover, Educational Development, Dyslexia Institute.

What are the current barriers to the accessibility of e-learning?

Some of the deeper issues that disabled people may currently be facing in employment may remain hidden, as it appears to be quite common for people not to make their circumstances known to an employer.

'Lots of people don't declare a disability – they think it will be used against them.'

Margaret Bordogna-Crane, Researcher, British Council of Disabled People

This was especially seen to be the case for older people with cognitive and learning disabilities, who are likely to have found their own private means of living with their disability. If any records had been kept of the access needs of employees, they were likely to be held at a local level and were therefore not part of an organisation's training strategy. This can make the design of accessible training and learning more difficult as the specific needs of the target audience may be largely unknown by the HR/training department.

'If employees require adjustment to their workspace because of a disability, their local or line managers are expected to make the necessary changes as part of their responsibilities.'

Valerie Almira, Group E-learning Manager, Centrica

And before considering the accessibility of e-learning content itself, many remarked that there are some preliminary barriers that need to be overcome.

First of all, can a learner get physical access to a learning location?

While the ability to learn from home is clearly a strong benefit of e-learning, it is also recognised that some disabled people might not be able to afford suitable equipment. There are many public learning centres catering for such people, but not all of these are currently accessible, for instance, by wheelchair users. However, this situation is likely to improve as the new DDA legislation comes into force.

Second, many disabled users benefit from using some form of assistive technology, for example, a screen-reader such as JAWS

Again, cost might be an issue here, as well as the need for a certain amount of technical expertise that is required to set up and use such technology correctly. It was felt that more public awareness, both among disabled learners and those offering services to them, is needed in this area.

The final preliminary barrier is the fact that much published e-learning is accessed via some form of learning environment or management system

It is still quite common that these systems themselves are not fully accessible and in some cases they can block access to the e-learning content completely. The same is true if e-learning is launched from a simple web page:

'Intranet – if that isn't accessible then many people won't be able to access the e-learning.'

John Hunt, Website Manager, Disability Rights Commission

Unanimously respondents stated that the fundamental barrier to creating accessible e-learning is a lack of awareness among developers and buyers. And when a superficial awareness of the issue exists, practical implementation is even less well understood. They felt there was too little information available to help organisations ensure that the content they develop or buy meets adequate accessibility standards. Many observed that the drive needed to come from the procurers of e-learning, who are in a position to demand that certain accessibility standards are met.

Those responsible for procuring e-learning also raised a related issue, whereby they felt that accessibility was being avoided because it was thought to hamper creativity:

'Suppliers are not up to speed on how to develop e-learning that is both engaging and accessible. There should not be any compromise between creativity and compliance with accessibility standards.'

Valerie Almira, Group E-Learning Manager, Centrica

This attitude could be put down to a lack of awareness of what accessibility actually means in practice. There are obvious areas where a compromise or alternative will be required (eg when using video or audio), but most accessibility issues can be addressed quite simply, without any negative impact on creativity.

Many commented that e-learning on its own tended to offer too isolated an approach to learning and could lead to demotivation and high drop-out rates. An ongoing project with the Open University suggests that these can be as high as 50 per cent as opposed to 10 per cent typically for non-online courses. It is therefore seen as imperative that e-learning is blended with other appropriate support, such as online mentoring, learner communities etc.

'It is not just the quality of the e-learning software/content, but the quality of the support for learners as well. Support systems such as helplines and email help mailboxes also need to be designed for use by disabled learners.'

Gareth Parry, Learning Resources Manager, Remploy

Since there is a wealth of experience of delivering this support in an offline environment, many felt that knowledge of effective learning design alongside an understanding of the needs of disabled learners should be the starting point for recruiting people to provide this support, rather

than their IT skills. Some respondents went further to suggest that the perceived technological focus of e-learning could itself contribute to a lack of user-centred design.

Much e-learning already exists, and, since accessibility has only recently gained heightened prominence, much of it is likely to be either fairly or totally inaccessible for a variety of disabled users. Most respondents agreed that it would be unrealistic to attempt to make it all accessible at once. The priority is seen as first adopting an accessibility policy for new content and then building in the same accessibility when existing e-learning is updated.

Some commented that e-learning tends to be inaccessible because it needs lots of interactivity to make it interesting, often quoting the Flash development tool as an accessibility barrier. Even the very latest version of this tool is seen as having major accessibility issues, and many users may not be using, or even able to use, the latest version. Clearly, if content will only work using a specific version of software, this is a serious accessibility barrier in its own right. Form-filling was also raised as an accessibility blackspot. People using screen-readers, such as those with partial sight or dyslexia, can have difficulty using e-learning. For instance, if a table is not set out appropriately, its content becomes meaningless. Instances such as this were not seen to be malicious, but due to a simple lack of understanding.

Finally, not all organisations see learning as a high priority, so this issue might not be considered as important as say physical access for disabled learners, in spite of the fact that they are both covered by the same legislation.

Case study 5: Employers' Forum on Disability – Disability Confident

Disability Confident is a commercial, e-learning resource aimed at providing guidance on the issues raised by the DDA 1995. As such, it is clear that the accessibility of the programme is of paramount importance. While a largely text and graphic presentation might have been relatively easy to make accessible, there was a desire for this product to maximise engagement by including rich media. A balance therefore needed to be struck between a highly engaging learning experience with frequent use of video, and the access needs of disabled learners.

The team elected to develop the content using Macromedia Flash MX, a tool that can create different formats of the content to suit the learner's needs. Accessibility features include:

- subtitles for audio and video
- adjustable colour schemes
- keyboard or mouse navigation

- AuDeTel version (contains audio descriptions of video clips)
- screen-reader compatibility.

Since the full accessibility features of Flash MX might not be available to some users, especially those using assistive technology, other versions are provided. These include an HTML version without rich media, and another specifically aimed at people using screen-readers.

A number of public and private organisations – Barclays, BT, Department for Work and Pensions, Inland Revenue, Post Office Ltd and Remploy – provided a steering committee, as well as access to the programme's end users. This ensured that the design and development was informed by a wide variety of users, including those with disabilities.

Information provided by the Employers' Forum on Disability.

Views on the legislative landscape and accessibility guidelines

All interviewees were familiar with the DDA, and most had direct or indirect knowledge of the W3C's web content accessibility guidelines (WCAG). Most felt the legislation and associated guidelines were just about sufficient, but only as a baseline. Bobby, a software tool used to check accessibility, was frequently referred to, though most respondents agreed it was only a small part of a solution.

Most felt that there was no substitute for testing with real end users. A frequent comment was that making content accessible strictly according to the guidelines in itself didn't necessarily make it any more usable.

'No, that isn't enough. Complying with existing guidelines doesn't mean that disabled people can access it.'

Susan Scott Parker, Chief Executive, Employers' Forum on Disability

'One of the best accessibility tools is a human being. Asking a disabled user is always going to be the most effective approach to ensuring accessibility.'

Bernard Fleming, Head of Online Services, Foundation for People with Learning Difficulties and The Mental Health Foundation

Many issues were seen to arise in the practical implementation of the legislation and guidelines. While most people understood the principles of the DDA, the implications of the Act and especially how to verify that e-learning was 'accessible' in practice were far from clear.

'People know about the DDA but don't know what to do about it and what constitutes compliance. It is not just clear guidance, but clear examples and support with implementation.'

Georgina Kamsika, New Media Technology Manager, Learndirect/Ufi

While most feel that it is important for standards to be met, all concur that the best proof of accessibility is by testing with actual users. The DRC's recent survey, *The Web: Access and inclusion for disabled people*, found during user testing that 45 per cent of accessibility problems were caused without violating a single WCAG checkpoint.

Some respondents suggested that the Government should introduce a rating for accessibility. In this way, content could be properly accredited and buyers and users would have more confidence. However, due to the reasons indicated above, it seems unlikely that the accreditation process could be achieved solely by automatic software. In other words, it would require human intervention and a large element of subjective judgement, which is likely to take considerable time before it could be implemented.

How should the Government respond?

The Government has a commitment to lifelong learning, social inclusion and increasing the participation of disabled people in employment. E-learning was seen as potentially having a valuable input in the successful implementation of these initiatives:

'We haven't even scraped at the possibilities yet. E-learning really makes lifelong learning a possible reality.'

John McCann, Senior Transforming Government Adviser, e-Government Unit, Cabinet Office

'A top priority for Government is moving disabled people from incapacity benefit into employment. For those people there will be a lot of preparatory training that will need to be done to get them ready for work – e-learning may have a useful role to play in this.'

David Benwall, Diversity Strategy Manager, Employer Services Directorate, Jobcentre Plus

However, many felt that the Government could drive better accessibility in e-learning by:

- raising awareness of this issue – this was seen by the vast majority of respondents as the single largest barrier to accessible e-learning at the moment
- providing more support for employers in the form of practical advice and financial incentives, both for providing accessible e-learning content and also to encourage provision of assistive technologies
- leading the way – as a major commissioner of e-learning, the Government is in a position to set the standards for best practice.

The charitable organisations and public policy bodies we asked were often critical of the Government's role in this issue to date. Generally, it was felt that raising awareness of this issue is happening too slowly and practical recommendations and support were lacking. Some suggested that some form of awareness campaign would be useful.

'I would love Government to play a role in campaigning on this. The digital divide is very real – it is not just about disabled people.'

Susan Scott Parker, Chief Executive, Employers' Forum on Disability

'I think there are two things they could do – raising awareness of the needs of disabled users and raising the profile of this issue. The regulations may be fit for purpose but we need to raise awareness of them and employers' responsibilities – we need a much more high-profile campaign of what they should be doing.'

David Benwall, Diversity Strategy Manager, Employer Services Directorate, Jobcentre Plus

Several people felt that government grants would be helpful, especially to help organisations purchase assistive technology. But funding might also help ensure e-learning content is made accessible, for example, by subsidising training for designers and developers. Where schemes did exist, such as 'Computers at home', which financially encourages employers to buy home PCs for their employees, they were felt to have too low a profile:

'Very few employers know about that and the Government has to make this scheme more visible.'

Gareth Parry, Learning Resources Manager, Remploy

Case study 6: Disability Rights Commission – Citizenship and Disability for schools

The DRC has produced a classroom e-learning tool on citizenship for Key Stages 3 and 4, focusing on disability, diversity and equality. It is a resource for teachers, enabling them to provoke thought and reflection among students about disability issues.

The content is built around an award-winning 12-minute film – 'Talk' – that challenges misconceptions about disability in an entertaining way. It features a non-disabled person who in the first scene, after paying lip-service to what his company should do to comply with the DDA and a heavy drinking session, wakes up to discover society turned on its head. Now the majority of the population are disabled and he is the 'able' outsider. He is offered help he doesn't want and treated like a child. He is presented with writing in Braille that it is assumed he can read, and there is general shocked whispering whenever he enters a public place. He goes for a job interview and on a date, both of which don't succeed because he is different, after all he is 'able'.

This thought-provoking video is certainly likely to provoke interesting discussions. The video is supported by a range of other teaching resources, such as comprehensive lesson plans and worksheets. To aid accessibility, the video clips are available in three versions:

- original
- subtitled and British Sign Language (BSL)-signed (for those with a hearing impairment)
- audio-described (for those with sight impairment).

Information provided by Disability Rights Commission.

To sum up ...

Our findings indicate widespread agreement that e-learning has the potential to greatly improve access to learning for disabled users, but a general acceptance that this potential has so far rarely been realised. Increasingly, there are excellent examples of well-designed, accessible e-learning, as the case studies demonstrate, but as it stands, these are exceptions. This is perhaps not surprising considering that e-learning has only become mainstream in the last few years, and accessibility as an issue is also relatively new.

A common danger cited was in blindly adhering to guidelines that in themselves don't always help, nor do they necessarily improve the usability of e-learning. Involving a sample of end users, including those with disabilities, throughout design and development is clearly believed to be the best way of ensuring content is accessible in the widest sense, and is key to usability goals.

There are major differences in opinion about what constitutes reasonable adjustment. For some, an accessible text version of e-learning content was thought to be acceptable, while others feel this doesn't provide the same quality of learning experience. The WCAG opened what some see as a 'get-out' loophole: 'If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information (or functionality), and is updated as often as the inaccessible (original) page' (W3C WAI 1999). It seems that the best approach is to proactively provide for the majority of known disability issues, while responding to individual issues on a case-by-case basis.

Inevitably, over time, legislation will enforce the accessibility of e-learning, but this is likely to be piecemeal and fairly long term. Since it is an issue that affects us all, a more sustainable approach would be for organisations to exploit an accessible e-learning strategy now, to ensure their practices comply with legislation, to gain competitive advantage by retaining and having access to a larger talent pool as well as behaving in a socially responsible and equitable manner.

Interestingly, products designed for people with disabilities often become best of class. Two recent examples are mobile phones with large buttons, which have become a best-seller for BT, and the Tesco website built for accessibility that has frequently proved more popular with non-disabled users. This is because these products are often easier and simpler to use because they include fewer unnecessary features. So, although perhaps driven by the threat of legislation, it's clear that making e-learning accessible to disabled learners is not a minority issue and will ultimately give everyone a more user-friendly learning experience.

Practical recommendations for making your e-learning accessible

While it's not the purpose of this report to provide a comprehensive checklist, the following are some basic hints and tips to consider when reviewing the accessibility of the e-learning you offer.

Adopt an accessibility policy

First and foremost, adopt an overall accessibility policy to cover all of your organisation's web-based information. Then, with all e-learning content, provide a prominent accessibility statement explaining what accessibility features are available. This will save a disabled user hunting for things that might not exist, and shows you are facing up to the issue.

Example of comprehensive policy for a website:

'[This organisation] is committed to ensuring accessibility of its website for people with disabilities. New and updated web content produced by our organisation will conform to W3C/WAI's Web Content Accessibility Guidelines 1.0, Conformance Level A, by [date]. Existing web content produced by our organisation, and new, updated, and existing web content provided for our site by third-party developers, will conform to Conformance Level Double A by [date]. We will initiate an internal monitoring program by [date]. Vendors supplying software used to develop our site will be required to provide information by [date] on conformance to W3C/WAI's Authoring Tool Accessibility Guidelines 1.0, Conformance Level A. Our home page and our "about this site" page will include links to this policy. We will review this policy in the future to consider updating it to an advanced version of W3C's Web Content Accessibility Guidelines once available.'

Example provided by W3C WAI (2002).

Tackle accessibility head on

The issue of accessibility needs to be confronted from the outset, as it's difficult and expensive to try and tack it onto a finished programme. Whenever possible, involve disabled learners in the process, identify where they have most problems and provide solutions.

But remember that modest actions can make a massive difference. Such as:

- Allow for keyboard input throughout – this is easy to test, simply unplug the mouse and see if you can still get through all of the content.
- Provide the ability to customise screen settings, such as font type, size and colour, background colours, and positioning on the screen; allow users to override screen settings with their own customised settings.
- Check content is accessible by actually using it with a screen-reader and zoom software.
- Follow widely available best-practice guidelines for writing content – in essence make sure it's simple, clear and consistent.
- Make sure all visual media is correctly marked up so a screen-reader can provide audio descriptions, and above all make these descriptions meaningful (close your eyes, listen and see if they still make sense).
- Make sure all audio media are available in transcript, and if there are deaf people in your audience whose first language is BSL, consider using an in-vision signer, or even a computer-animated signer.
- Provide as many different learning options to similar content as is feasible within the budget, and let users pick those best suited to their own learning needs.
- Avoid putting users under time pressure to complete e-learning activities or tasks as this often causes stress in disabled learners.

Top ten things to AVOID!

- Missing ALT-tags, or ALT-tags on graphics that are meaningless eg 'man and woman'. Explain the purpose of the graphic (if it has no purpose consider removing it!).
- Fixed (absolute) font size and positioning that prevents users from adjusting the presentation to suit their needs.
- Colour or context used to define links such as 'Click on the red box', 'Click here'. This might be useless to someone using a screen-reader, or who is colour-blind.
- Missing punctuation on bulleted lists. The absence of a full stop or other appropriate punctuation can mean that a screen-reader might read the bullets as one long, confusing sentence.
- Blinking, scrolling or animated text can be hard to read, distracting and can disturb some individuals.
- If time-limited responses are felt to be essential, make provision for those for whom this will present an unfair disadvantage, such as those with cognitive disabilities (eg dyslexia, learning disabilities).
- Text content inserted inside a graphic, which is inaccessible to screen readers.
- Mouse-only navigation – ensure that all interactions can equally be achieved using the keyboard.

- While it might be tempting to include features offered by the latest technology, remember that this might make the content inaccessible to those with older systems.
- Inconsistent navigation and/or layout. Try to make navigation and layout as simple, clear and consistent as possible so that users quickly become familiar with moving around the e-learning programme.

Help people use the accessibility settings that are already in place

Not all users will know how to change settings (eg font size) on their browsers, so consider providing these controls within your e-learning programme or provide a list of the available accessibility provisions in a prominent place on your intranet to guide people.

Case study: Disability Rights Commission website

A good example is provided by the DRC website (www.drc.org.uk). On the website homepage, there is a prominent button, 'Access options', which describes all the accessibility functionality offered on the website. The DRC website can be adapted to meet a variety of needs. For example, you can change the text size and colour scheme, use software to enable you to listen to the text, and choose options to navigate around the site using drop-down menus and access keys. The settings an individual selects are saved for future visits.

Most importantly, the information about the accessibility features is placed where it can clearly be seen and where users will easily be able to find it.

Be an educated buyer of e-learning

There is no substitute for experience, so talk to those who have previously commissioned e-learning. Try to avoid using ambiguous blanket terms like 'accessible' when briefing suppliers, and, instead, define what you require from the point of view of proving compliance. How will you measure whether what is delivered complies with your requirements? For example, you might request WCAG AA compliance, which can be measured by checking off each checkpoint individually. Of course, there is room for some subjective interpretation but at least this has a solid basis.

Think about your other software systems

Finally e-learning is often accessed through another software system (eg a learner management system or an internal intranet) and supported by collaborative tools. Don't forget that all these peripheral systems will need to follow the same requirements as the e-learning, otherwise it will still fail as an accessible learning experience.

Case study 7: Inland Revenue – designing for accessibility

The Inland Revenue has looked carefully at the accessibility of their e-learning programmes and worked closely with an external e-learning consultancy to draw up a set of guidelines on how to make future e-learning programmes fully accessible. The guidelines cover three main areas: design principles, layout and navigation and programming.

Every potentially inaccessible screen interaction was reviewed and an alternative accessible option was proposed. For example, the 'drag and drop' action is practically impossible to use with a screen-reader, or without a mouse. 'Drag and drop' questions can increase learner engagement and add some variety. But, there will always need to be an alternative, accessible version. This question type can often be replaced quite simply by a 'multiple check box question type, where the 'dragable' items are listed and the user is asked to check the relevant box related to each. Alternatively, it can be possible to replace 'drag and drop' questions with a series of multiple-choice questions, even if this is somewhat less elegant. If providing both versions is not feasible within the timescale or budget, then 'drag and drop' screens should be avoided completely.

One other key issue that arose, specifically for IT systems training, was how accessible an e-learning programme needs to be if the underlying IT system itself is not accessible. The dilemma is clear. If by making the training programme accessible, it no longer accurately reflects the operation of the working IT system, then its use might do more harm than good. The priority therefore is first to make the IT system accessible, and in the meantime provide training on the existing system that is as accessible as possible without compromising its actual functionality. Of course, this could well require the training to be updated once an accessible system is in place, but at least it provides timely training for those about to use the existing system.

Information provided by Judy Maxwell, E-media team, Inland Revenue.

Involve learners

Learner-centred design, as the name suggests, means providing a suitable and effective learning experience, so it's crucial to include end users in the process. This doesn't have to entail regular, formal user trials, though this would clearly be ideal. But it is surprising how many informal opportunities exist to check elements of a design, which can often lead to enormous accessibility and usability benefits.

Make the case for usable and accessible e-learning

HR practitioners need to make the case to senior decision-makers in their organisation about the need to prioritise the issue of the accessibility of learning and training (with a particular emphasis on e-learning). This will be necessary for HR to receive time and resources to dedicate to this area. The information in this report about the case for designing accessible e-learning (complying with disability legislation, accessing a wider pool of talent, improving the design of e-learning for all learners, alignment with a corporate social responsibility agenda etc), will hopefully help you to persuade senior decision-makers of the importance of this issue.

Improving the accessibility of your e-learning need not involve a large amount of money and resources. Many current barriers are easy to avoid and often just require a good understanding about accessibility by e-learning designers. By making a little extra effort, benefits will be realised for a large number of your employees, not just those with disabilities. Surely, it makes sense to spend a little extra time and money making sure that the training you offer is a usable, accessible and provides an effective learning experience for your whole workforce.

Conclusions

Catering for the needs and preferences of all learners in one e-learning product is likely to be practically impossible. Especially when these needs might be in conflict. But, a major benefit of e-learning compared to traditional training methods is that it provides opportunities to create parallel paths to the same learning outcomes, which can be tailored for specific audiences, such as disabled learners.

Pragmatism has a major part to play. For example a blind person is unlikely to insist that content is stripped of all images and video because of his or her own impairment. And most people would not think it 'a reasonable adjustment' for organisations to make their entire e-learning back catalogue accessible immediately due to the significant costs and resources involved. There are perhaps interesting comparisons with other more mature media such as film. People do not expect the majority of films to be made differently as a result of the DDA, but that some thought is given to helping people with disabilities enjoy a similar experience. Many cinemas now offer not just better physical access, but also induction loops and subtitles for the hard of hearing, and accompanying audio through headphones to explain what is happening.

In recent years, there has been rapid growth in the use of e-learning as its potential has become clear, albeit often as a way of saving costs. But e-learning has a much greater potential, especially in meeting the needs of disabled learners which, to date, have often been neglected. By gaining access to improved education, training and work opportunities (via technological advances), there are significant opportunities for people with disabilities to play a greater role in the workforce and to have a better quality of life.

For employers, offering accessible e-learning opens up the possibility of providing more effective training to disabled (and non-disabled) staff to heighten their contribution to the organisation and make better use of talent within the current workforce. Many employers now realise that disabled people are an under-utilised resource of skills, which with a little extra support can offer a much broader talent pool from which to recruit. Being proactive in regard to accessibility issues also protects organisations from accusations of discrimination and demonstrates a commitment to acting in an inclusive and socially responsible manner.

The chief barrier at present appears to be a lack of awareness, especially around the detailed implementation of existing legislation and guidelines. It is clear that the Government could play a stronger role in raising awareness and providing a more coherent approach to defining what it actually means to call e-learning accessible.

Legislation is already in place and progress appears to be being driven by website accessibility cases. There is a clear business driver for the owner of a commercial website in not wanting to exclude a large number of potential customers, so web accessibility is certain to improve. It has

taken a little longer for the same imperative to filter through to e-learning, but the shrinking talent pool and the extended disability legislation in itself ought to be stimuli enough, without the need for cases going to court. But the legislation is there, and if organisations do nothing, this is inevitably the path that will be followed.

Overall, e-learning has been shown to have enormous potential, not least to those learners with disabilities. HR have a key role to play in raising the profile of this issue. By exerting pressure over minimum expected accessibility standards during procurement, they can help to 'raise the bar' across the industry and ensure that disabled people have a greater chance to participate in education, training and the workforce in general.

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