Making Online Learning Accessible

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This paper considers approaches to making online learning accessible to disabled students. It is based on reflection on experience at the Open University UK, which has more than 8000 disabled students. However the considerations will be applicable to all concerned with online learning and indeed anyone seeking to trade, disseminate information and mediate services online. This paper concentrates on the pedagogic, organisational and cultural issues rather than the technical ones and argues for the importance of addressing these to effect the organisational change needed to ensure that accessibility challenges are effectively met. Firstly the legislative context in the UK is briefly outlined. Then the paper considers who should be responsible for accessibility and how they are to be supported in this role. What it is believed that educators need to know about accessibility is outlined.

Keywords: Disabled Students; Accessibility; Learning Objectives; e-Learning

1. INTRODUCTION

Accessibility to online learning for disabled students has become a significant issue for all higher education establishments in the UK, particularly given the increased use of computers in the delivery of education and antidiscrimination legislation introduced in 2001. This paper reflects on some of the issues raised in responding to this agenda from the experience at the Open University (OU) in the UK. It builds its discussion around the case of online learning, that is the use of internet/intranet technologies in delivering education but the issues are largely the same for the use of educational DVDs/CD-ROMs or other computer software as part of a course. What is more, the issues can generally be extended by analogy beyond the educational sector to anyone seeking to deliver services or trade on the World Wide Web.

To set the paper in context, the Open University is Europe's largest educational establishment with the vast majority of its courses being delivered predominantly at a distance. The OU has invested £30 million in e-learning over recent years. It has an ongoing commitment to:

- widening access to higher education by helping students to overcome barriers to their study
- providing high-quality, interactive educational materials that meet students' needs
- operating within the over-arching mission of openness to all.

The OU's extensive experience in production and delivery of large-scale e-learning are demonstrated by the following statistics:

- About 160,000 OU students and their tutors are online and can use the university's email conferencing system to contact each other and have online discussions via their PCs
- 80,000 OU assignments - one in 10 of all assignments - are submitted electronically
- About 30 of the university's 375 courses are 'online'. Another 150 require the student to have online access (for delivery of course materials, study support, etc); and a further 97 allow the student to use online services if they wish.

The Open University currently has over 8,000 disabled students approximately half of whom receive some particular support from the university to enable them to participate in their studies. The university is committed to making its online educational content and student services accessible to disabled students but the scale of this presents a challenge. This paper concentrates on the pedagogic, organisational and cultural issues rather than the technical ones; it argues for the importance of addressing these to effect the organisational change needed to ensure that the accessibility challenges are effectively met.

2. UK LEGISLATIVE CONTEXT

Many countries are introducing legislation making it illegal to discriminate against disabled people in education. In the UK the key legislation is the Special Educational Needs and Disability Act 2001 (SENDA) [1]. This amends the Disability Discrimination Act (DDA) 1995 [2] and now constitutes DDA Part 4. This Act legislates that education providers must not treat a disabled person less favourably for any reason that relates to the person's disability. Further, the education provider is required make reasonable adjustments to enable a disabled person to participate in its courses. Access to the online elements of its courses is an important area where, by considering the needs of disabled students, discrimination can be prevented. Further it is where, if necessary, reasonable adjustments can readily be made to meet the diverse needs of students with disabilities. An important feature of the Act is that the needs of disabled students need to be anticipated and that it is therefore not sufficient for an educational establishment just to attempt to deal with the needs of a disabled student as they arise. This is important because where this has been past practice often the needs of disabled students have been poorly met because of lack of forward thinking.

2.1 Reasonable Adjustments

The term "reasonable adjustment" is used widely in the DDA Part 4 and it begs the question what is reasonable? This is a moot point and one that almost has to be considered on a case by case basis. However the act is supported by a Code of Practice [3] which gives examples of the types of activity that should be considered and may require adjustment. Reasonable adjustments should be made to make all learning activities accessible to disabled students. This includes all learning materials: paper-based, web or computer-based, videos, audio etc. If this is not possible for some reason alternative learning activities should be provided.

Returning to the question "what is reasonable?", the Code of Practice has a section offering guidance here. Some of the factors that might be taken into account when considering what is reasonable include:

- the need to maintain academic and other prescribed standards

- the financial resources available to the responsible body
- grants or loans likely to be available to disabled students (and only disabled students) for the purpose of enabling them to receive student services, such as Disabled Students' Allowances
- the cost of taking a particular step
- the extent to which it is practicable to take a particular step
- the extent to which aids or services will otherwise be provided to disabled people or students
- health and safety requirements
- the relevant interests of other people including other students.

Now it is up to each Higher Educational Establishment to determine how it responds to this legislation across its institution. Key issues in this response are whose responsibility is accessibility and how are decisions about reasonable adjustments made and recorded.

3. WHOSE RESPONSIBILITY?

The issue of responsibility for accessibility is often helpfully thought of in the same way that responsibility in health and safety legislation is considered. The ultimate responsibility lies with the governing body of the institution. This responsibility is devolved by them to specific named individuals or posts across the organisation, however all employees have a responsibility for health and safety. So in the case of accessibility to online learning, all involved in its conception, implementation and delivery have a responsibility for its accessibility however specific responsibilities should be given to key people. Within The Open University the teams that develop each course (and ultimately the Deans of Faculties) are responsible for the accessibility of their courses. How this responsibility is handled within each course team is left to them to organise however it is recommended that they appoint one of their member to take specific responsibility for ensuring that accessibility issues are properly addressed. This person may or may not be the course team chair. All course team decisions on accessibility and reasonable adjustments should be documented and a protocol has been established for doing this within the formal course development process. It is important to record the rationale for these decisions, both as part of the internal management of course development and because it is these decisions that could be subject to legal challenge under DDA Part 4. Further it is important to inform disabled students ahead of their enrolment on a course of any particular accessibility issues that elements of the course may present them and where they may be offered an alternative activity.

It is also important to clearly establish the division of responsibilities between the educators devising the course and the developers implementing its software and web based components. Because of the fact that accessibility is intrinsically linked to the learning objectives, as argued in the next section, the approach taken at the OU is that it is the educators' responsibility to specify the accessibility criteria but the developers' responsibility to determine how these are met in the technology they employ.

There are several specialist units within the Open University that support different aspects of the university's work in meeting the needs of disabled students. These include the Office for Students with Disabilities (OSD), the Centre for Assistive Technology and Enabling Research (CATER), and the Accessible Educational Media (AEM) group. It is important to note that the primary responsibility for accessibility in courses is not devolved to these but remains with the teams developing the courses. However these units support in different ways the roles of the course teams. CATER and AEM have collaborated in delivering an extensive staff development programme designed to ensure that all faculties and their staff realise their responsibilities in response to DDA Part 4. They further have a consultancy role with individual course teams on the accessibility issues raised by different elements in their courses including their web presence and other uses of computers. This role includes validating that accessibility approaches adopted have in fact successfully met the needs of disabled students. Thus course

teams and their developers can call upon specialist support at all stages of the development of online components: conceptualisation and specification; evaluation of early prototypes and validation of final developments before they are released.

4. WHAT ARE WE SEEKING TO MAKE ACCESSIBLE?

So often in accessibility considerations of educational web sites or software, the focus is on how best to make a particular element technically accessible to disabled students. However the authors maintain that educators need to stand back from these considerations and remember that fundamentally what we are seeking to make accessible is the learning. This may seem an obvious statement but it is often missed and is key to deciding what is the most appropriate response to meet the needs of disabled students. Thus fundamental to accessibility considerations in online education is having clearly established learning objectives. This is important through different degrees of granularity from the overall learning objectives for the course though to the learning objectives for the individual activities being mediated online. [By analogy it is the case when considering the accessibility of any online service that it is the objectives of that service that must be referred to in determining the best way to make it accessible and not in the first place the technology envisaged as being used to implement that service.]

An important concept in accessibility is that of alternative presentation or equivalent activity. Often a decision has to be made as to whether accessibility is best achieved for a particular group of disabled students by presenting the same element in a different way, e.g. by using a detailed text description of a set of data instead of a graph, or whether a totally different although educationally equivalent activity is more appropriate. It is the learning objectives that need to be referred to as the basis of such decisions.

An example from experience at the OU that illustrates this is on a programming course that uses a specific programming environment which is inaccessible. If the learning objectives are to learn a particular programming language, students could use an alternative (equivalent) programming environment that is accessible. However, this would not be appropriate if the objectives are to learn to use that specific programming environment. If the latter was the case then a clear rationale must be agreed as to why this particular programming environment is so important to the objectives of the course. A further example from an assessment issue on an OU course is where a video is used showing a conversation between a social worker and a child. If the learning objective is to appreciate that non-verbal communication takes place, and the assessment requires the student to describe the body language, then an alternative activity and assessment should be devised for blind students.

Situations where visual or auditory discernment forms part of the learning objective present particular challenges when deciding how best to make them accessible to those with a significant impairment in the relevant sense. The standard approach of including an equivalent text description or transcription is often not appropriate here. This is because it is difficult to construct these textual equivalents in such a way that they still meet the sensory discernment aspects of the learning objectives. Basically the issue is how to construct a description that does not simply “give the answer away”. This can make it difficult to create a description that is effective in promoting the learning of the skill one is seeking to develop in the student. In such cases how the learning objectives of this particular activity relate to the overall learning objectives of the course should be considered. Often the appropriate response is to develop an alternative activity that has an equivalent weight of contribution to these overall objectives in the same basic area as problematic activity but does not include the sensory discernment objectives. However it must be accepted that there are fundamental limits to accessibility.

5. WHAT EDUCATORS SHOULD KNOW ABOUT ACCESSIBILITY

All educators need not become accessibility experts, although some might and support colleagues in this area, however all educators need to have an appreciation of the issues and

an overview of how disabled students may select to make effective use of the computer. This general level of knowledge about the area is important in avoiding the assumption of limitation. This can be illustrated by sometimes heard comments by educators of the type “I don’t think a blind person could possibly do this” when in fact the truth of the situation is that they do not know how a blind person might readily do the task in question with the aid of their assistive technology, if the appropriate response is made in its devising.

This general awareness of accessibility is also important in ensuring accessibility issues get addressed at the right time, at the conceptualisation and specification stage of a component in online learning, not just discovered once it has been developed. It is a too frequent frustration to those working in accessibility that they are repeatedly presented with situations where they are asked to comment on the accessibility of an online component once it is developed. Often widespread accessibility could have been readily achieved if it had been considered at the outset but now only limited accessibility can be achieved because of time, technical or cost constraints. Meeting the accessibility agenda does incur costs but these costs are significantly lower if accessibility is considered from the outset rather than looking for a fix after the majority of the development work has been done. By giving all educators who might originate or specify online course components a general awareness of accessibility, they can be trained to at least ask the right questions about accessibility at the early stages even if they do not know the answers.

The next two sections give a brief overview of the accessibility information that it has been judged as important to know for educators at the OU and has formed the basis of staff development seminars there. This is considered from both ends of the problem, firstly how disabled people use a computer and what assistive technology they may elect to use, then secondly what response is required by those developing online learning components to ensure it is compatible with the way that disabled students may be seeking to access these.

5.1 Assistive Technology

Virtually all disabled people can be enabled to make effective use of a computer. Some disabled students use accessibility features provided by the operating systems of the computer and/or specialist software or hardware, to facilitate their use of the computer. These software or hardware tools are often referred to collectively as ‘assistive technology’. If it is to be accessible to disabled students, any software or educational content mediated by the computer has to be developed so that it is compatible with these tools. It is important that all educators have an overview of how disabled students may use a computer and the implications of this for any software or web content they commission or develop. It is beyond the scope of this paper to provide such an overview of the range of assistive technology available and the types of student that it may benefit, however some references to further sources of information are included at the end of the paper [4, 5]. The sort of level of detail most educators would need to know can be contained within a one to two hour staff development session. Experience at the Open University has shown that such sessions have far more impact if different examples of assistive technology can be effectively demonstrated. There is a further issue that an educational institution needs to consider and that is how students are supported in selecting and being trained in the use of the most appropriate assistive technology to support their studies. This, however, is usually the domain of student support services or IT support staff and is beyond the scope of this paper.

It is generally unhelpful to consider medical classifications of disability when seeking to identify the means of enabling people with disabilities to make efficient use of the computer. It is preferable to consider the abilities, and disabilities, of the individual with respect to what they need to do to make most effective use of the computer; in other words, to take a functional approach. The functions to be considered fall into two broad categories:

1. How the person may best input commands and information into the computer (here most computer users use the keyboard and mouse);

2. How the person receives the output from the computer (for most computer users this will generally be the monitor, but also includes loudspeakers and printers).

5.2 Accessible Online Content

There are extensive guidelines and software tools to support developers in producing accessible web content and other software that might be presented online. It is probably sufficient for educators to know that these resources exist but an understanding of the underlying accessibility principles will help them in their role and in managing the balance of responsibilities for accessibility between commissioning educator and developer.

The World Wide Web Consortium (W3C) creates Web standards. Under its Web Accessibility Initiative (WAI) it has drawn up extensive guidelines for creating web pages that are accessible to many people with a disability. URLs to these and associated validation tools are given at the end of this paper [6,7,8,9,10]. It should be noted that these are guidelines to presenting information in an accessible way on the Web and further resources may be needed when seeking to address some of the accessibility issues in interactive educational software. There are, for example, specific accessibility guidelines for particular programming languages that may be used to implement educational software, e.g. JAVA [11].

The WAI guidelines can certainly at first sight appear complex and there are issues about how to best support developers in using them but these are beyond the scope of this paper. There are 14 guidelines, each of which is associated with one or more checkpoints describing how to apply that guideline to particular features in Web pages. Each checkpoint is assigned one of three 'priority' levels reflecting the impact not following it will have on accessibility. Levels of conformance are then specified against these priorities. It is recommended that an educational website seeking to meet the needs of disabled students, and its obligations under DDA Part 4, should aim for 'Double-A' conformance, which means meeting all priority one and priority two checkpoints.

Most web sites and pages are produced using authoring tools rather than 'hand crafting' HTML. There is a high degree of variability in how readily these tools support authoring in a way that conforms to the accessibility guidelines. However in response to US legislation, most of the major suppliers of such tools are seeking to address this in recent and planned releases.

5.2.1. Underlying Principles of Software Accessibility

Briefly stated here are the main accessibility principles that underline all software accessibility guidelines. It is recommended that all educators are cognisant of these to enable them to effectively take on their responsibilities for accessibility in the design of Web and software course components.

1. Allow for user customisation

   Many different disabled people, including those with a visual impairment and dyslexia, find online content can be made more readable if they are able to choose particular font styles and sizes and use different background and foreground colours. Because of the wide diversity in what different people would select as their optimally readable configuration this is best addressed by allowing them to configure these. This is usually most readily done by enabling the web pages or software to inherit user set parameters from the browser or computer operating system.

2. Provide equivalent visual and auditory content and interface elements

   Text is the most readily accessible form of online content. It can be rendered into synthetic speech by screen readers and configured for different presentation as commented on above.

Text descriptions should be provided for all images, graphics and video content, transcriptions provided of auditory content, and text labelling of interface elements included.

3. Provide compatibility with assistive technologies

This simple statement hides a multitude of technical issues but by following set web or software standards the opportunities for this being adequately addressed are maximised as the assistive technologies are to a large part developed with these same standards in mind.

4. Allow access to all functionality from keyboard alone

Many disabled people are unable or prefer not to use a mouse. This includes blind people and those with some physical disabilities. By ensuring that software can be fully used without a mouse the needs of these users are met but also generally more efficient interaction with the software is offered to all users.

5. Provide context and orientation information

It is important to consider the accessibility issues of navigating around the content as well as the content itself. This is an often neglected area. Support should be provided for efficient navigation by informing the user of where they are that takes into account that some users may be using screen-readers or other assistive technologies. This is another case where thinking about the needs of disabled users often yields benefits for all users by promoting usability generally.

6. CONCLUSION

Legislation now directs that online learning should be made accessible to disabled students and most educational establishments would aspire to this from their own ethos. However to achieve this requires cultural change across the organisation. This paper has reflected on the process of promoting this cultural change within the Open University. The importance of being clear about roles and responsibilities in promoting accessibility has been stated and the centrality of the educators' role in this has been argued. They of course need to be provided with the necessary expert support to enable them to take on this responsibility.

The fundamental importance of the leaning objectives in establishing accessibility criteria and in identifying and making adjustments to online course components to meet the needs of disabled students has been highlighted. This is the central point of the paper. It is from this that the centrality of the educators' role follows. The knowledge that educators need to know about accessibility issues to enable them to perform this role has been outlined. This has been the basis of the staff and professional development programme in response to DDA Part 4, enacted at the Open University across all its faculties, and such an approach would be commended to other institutions.

REFERENCES

[1] Special Educational Needs and Disability Act 2001 (SENDA): http://www.hmso.gov.uk/acts/acts2001/20010010.htm

[2] Disability Discrimination Act 1995: http://www.legislation.hmso.gov.uk/acts/acts1995/1995050.htm

[3] Disability Rights Commission's Code of Practice for providers of Post 16 education and related services - DDA 1995: Part 4 (Word document): http://www.drc.org.uk/uploaded_files/documents/2008_187_DDA%20Pt4%20Code%20of%20Practice%20for%20Post%2016%20education.doc

[4] BECTA factsheets on ‘Using ICT in special needs and inclusive education’:
http://www.becta.org.uk/leas/display.cfm?section=13_1#sn

[5] AbilityNet factsheets including “Technologies and approaches, services and organisations, which can help anyone who has a special IT requirement”:
http://www.abilitynet.org.uk/content/factsheets/Factsheets-list.htm

WAI Content Guidelines for creating accessible Web pages:
[6] Guidelines: http://www.w3.org/TR/WAI-WEBCONTENT/
[7] Techniques: http://www.w3.org/TR/WAI-WEBCONTENT-TECHS/
[8] Checklists: http://www.w3.org/TR/WAI-WEBCONTENT/full-checklist.html

Accessibility Validators:
[9] Bobby: http://www.cast.org/bobby/
[10] A-Prompt: http://www.aprompt.ca/

[11] Accessibility guidelines, tutorials and tools for developers working in JAVA made available by SUN Microsystems at:
http://www.sun.com/access/developers/index.html

OTHER RESOURCES

TechDis
TechDis is a Joint Information Systems Committee (JISC) funded service supporting the further and higher education community in all aspects of technology and disabilities and/or learning difficulties. Its home page can be found at:
http://www.techdis.ac.uk/

Good practice guides for staff in Higher Education published by Skill (National Bureau for Students with Disabilities), available at:
http://www.skill.org.uk/info/drc_guides/index.asp

Learning and Teaching Good Practice Guide, information on complying with the Disability Discrimination Act Part 4, published by the Disability Rights Commission available at:
http://www.drc-gb.org/whatwedo/publicationdetails.asp?id=202&section=1