The challenge of researching learning technology accessibility practices within Higher Education: An exploration of "shared enterprises" or "political games"?

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Abstract

The 2001 Special Educational Needs and Disability Act (SENDA, 2001) made it an offence for educational institutions in the UK to discriminate against a disabled person by treating him or her less favourably than others for a reason relating to their disability. Learning technologists have therefore been charged with the responsibility of ensuring that electronic teaching materials can be accessed by disabled students, which is requiring them to develop new practices. In an attempt to explore how learning technologists are developing these practices this paper will present a review of the accessibility literature and identify key issues that may influence the "accessibility" practices of learning technologists. These issues are explored and interpreted using Wenger's (1998) Communities of Practice, which focuses on the development of "shared enterprises" and Konur's (2000) Institutional Theory Tool, which focuses on the "games" that educational institutions might play when creating rights for disabled students. This interpretation suggests that educational research will face a challenge of providing a detailed and rich description of the "shared enterprises" that contribute to a developing accessibility practice and an explanation of the political games that may block or hinder this practice.

Introduction

In the United Kingdom, The 2001 Special Educational Needs and Disability Act (SENDA) was brought in as an amendment to the 1995 Disability Discrimination Act (DDA) and is being implemented as Part IV of that Act (HMSO,1995 & 2001). From September 1st 2002, the Act made it an offence for educational institutions to discriminate against a disabled person by treating him or her less favourably than others for a reason relating to their disability. The Act covers all aspects of student services, but the particular aspects that are relevant to the work of learning technologists include e-learning, distance learning, examinations and assessments and learning resources (including libraries and computer facilities).

Discrimination will be considered to have occurred if a disabled person is treated less favourably for a reason relating to their disability than a non-disabled person to whom that reason does not apply or if there is a failure to make "reasonable adjustments without which the disabled person is placed at a substantial disadvantage". From a learning technology perspective, a reasonable adjustment might involve changing or adapting electronic materials.

This paper present a review of literature published between 2000 and 2003 that focuses on accessibility legislation and learning technologists' interpretation and implementation of the legislation. Key issues that may influence the "accessibility" practices of learning technologist and be worthy of further research will be explored.

A review of learning technology "accessibility" literature

The review focused on what key professionals (academics, researchers, educational developers and staff developers) within the learning technology field were saying and doing about making electronic materials and resources accessible to disabled students. This review revealed four key issues that may influence the "accessibility" practices of learning technologists:

- The perceived imposition of the law and the difficulties of responding to it;
- The identification and implementation of existing accessibility tools and guidelines in order to comply with SENDA;
- The adaptation or re-framing of generic accessibility tools and guidelines for more specific practice(s);
- A call to involve disabled people or their advocates in the design of electronic material.

The perceived imposition of the law and the difficulties of responding to it

In the literature, discussion of the legal imperatives of SENDA seems to be coupled with a perception that higher educational institutions will find it difficult to respond or will be resistant to such an imposition. For example, Lawson (2002) reports on a talk by Neil Crowther, a senior policy analyst at the Disability Right Commission. She writes:

> "Neil's talk outlined the new duties which SENDA will impose on providers of post-sixteen education and related services.." (Lawson, 2002, p.22)

Lawson's' emphasis on the imposition of the Act is coupled with a pessimism and doubt regarding whether things will actually change. She notes that while it may be educators duty to provide disabled students with the rights that they are owed, this cannot happen unless there is a major change in culture and ethos, and such a change is unlikely: "Though such an outcome seems extremely remote, it is one worth striving for" (Lawson, 2002, p.22).

In reporting on a research project that used interviews with key stakeholders to explore issues surrounding disabled students and multiple policy innovations in Higher Education, Wilson, Ridell and Tinklin (2002) noted that there was some degree of sympathy with senior managers in Higher Education in terms of the degree of change that SENDA may require. They use an illustrative quote from one academic who said:

> " I mean actually you can't but have sympathy with senior management because what, what has to be communicated is massive, you know. I think if you went through the code of practice that accompanies the DDA part 4. What you are getting is an extremely tall order in terms of institutional change."

Middling and Bostock (2002) suggest that the response to SENDA will not be speedy if Higher Educational institutions see SENDA as an imposition. They offer one way to counter the culture of institutional resistance:

> " by working with colleagues in a department to allow them to develop their approach to inclusion with support, advice and guidance, the speed of development increases. As anyone working for change in an HEI will recognise an imposed or blanket

solution will not be well received by academic departments." (Middling & Bostock, 2002, p. 9).

The identification and implementation of existing accessibility tools and guidelines in order to comply with SENDA

A number of accessibility and guidelines were in existence prior to SENDA and the literature review revealed a large number of articles that attempted to suggest how they could be used to help comply to SENDA. The most commonly cited guidelines focus on web accessibility and are produced by the World Wide Web Consortium (WC3). The Web Content Accessibility Guidelines (WCAG) outline three priority levels and the general consensus seems to be to design for priority 1 and 2 (McCarthy, 2002).

Whilst McCarthy gives a reference for these guidelines, he provides no description or explanation as to how these guidelines can be applied in practice. Witt and McDermott (2002) begin to address this by describing their experience of attempting to design a Web Site to priority three of the WCAG. They outline how they chose Dreamweaver as the design tool, Bobby as a validator to check completed pages and the LIFT plug-in to check ongoing progress. Their experience led them to report how they needed to produce their own simplified version of the WCAG because "extracting the desired information can be confusing".

The adaptation or re-framing of generic accessibility tools and guidelines for more specific practice(s)

Witt and McDermott are not alone in attempting to produce their own interpretations of accessibility guidelines. Some have produced very general guidelines. For example, Sloan, Rowan, Booth and Gregor (2000) offer their own "accessibility golden rules" which includes the rather vague rule "Use valid HTML and follow the Web Content Accessibility Guidelines". Others have produced technology specific guidelines. For example, in collaboration between UK and Australia, Pearson and Koppi (2001) **e**valuated the accessibility of WebCT and distilled their findings into a set of guidelines for academic designers of WebCT courses. Others have focused on producing disability specific guidelines, most notably for visual impairment and dyslexia. For example Lockley (2002) and Blankfield (2002) give some advice on making web based course materials accessible to dyslexic students. Whilst Lockley offers five simple design guidelines, there is no indication of whether these guidelines are grounded in practice and experience. Blankfield on the other hand based what she calls "good practice" guidelines on interviews that she had conducted with dyslexic students who were using WebCT.

A call to involve disabled people or their advocates in the design of electronic material

The attempt by some practitioners to adapt existing guidelines suggests that the theory and reality of accessibility and accessibility guidelines may not always match. Maureen Piggott, a MENCAP regional director, further emphasises the potential mismatch between theory and reality and in doing so challenges learning technologists to be user or student centred in their design approaches:

> " The W3C guides to web design…are an example but the reality is that information providers, designers and developers are too remote from people with cognitive disabilities to produce person-centred solutions." (Piggott, 2002, p.22)

Some learning technologists have taken up Piggott's call to involve disabled students in the design of accessible web sites. Pearson and Koppi (2001) for example argue that the key to accessible courseware is to take a learner-centred design approach. While Smith (2002) emphasises the involvement of dyslexic students in his design of a Virtual Learning Environment Interface and makes a plea for a wider deployment of user testing.

In addition to the call to involve disabled students there is a call to engage in a dialogue with people who are knowledgeable about the needs and concerns of students with disabilities (disability officers or co-ordinators). For example, Phipps (2002) urges staff and educational developers to give serious consideration to using "non-traditional facilitators" such as disability officers for workshops in this field. While Middling and Bostock (2002) describe how in response to SENDA legislation their institution has begun to develop staff development programmes jointly between Disability Services, Staff Development teams and departments. In describing how a computation department attempted to deliver an inclusive curriculum using specialist software, Conroy (2002) describes how the internal drivers for this initiative were the departmental disability co-ordinator and the university's disability and learning support advisor.

Frameworks for exploring the enterprise of accessibility

The Disability Discrimination Legislation in the UK has charged learning technologists with the responsibility of developing accessible electronic teaching material and resources. The results from the literature review give some indication as to how they are attempting to meet that responsibility and the issues and challenges they are facing in developing new accessibility practices. Two possible frameworks could be used to interpret and explore these issues and challenges further. The first framework is offered by Wenger's (1998) theory of Communities of Practices, which introduces the concept of shared enterprises. The second framework is offered by Konur (2000) and his Institutional Theory Tool, which introduces the concept of "political games".

Shared enterprises

Before SENDA 2001 and the emergence of an "accessibility" literature, the learning technology community had applied Wenger's theory of Communities to the general design of learning technologies (Fowler & Mayes, 1999), the design of electronic learning environments (Hung & Chen, 2001) and the building of on-line communities of practice (Guglielmo, 2001). The application of Wenger's theory of Communities of Practice to accessibility practices would therefore appear to have some merit and relevance. According to Wenger practice is understood as:

- giving structure and meaning to what communities do;
- being a source of coherence for a community;
- having boundaries and peripheries that may link with other communities.

A practice that gives structure and meaning to what learning technologists do

For Wenger, practice is about "meaning as an experience of everyday life". He argues that what is important about the pursuit of enterprises is the meanings that are produced from these pursuits. Meaning is located in a process he termed "negotiation of meaning", which involves the interaction of two processes: participation and reification. If participation in communities shapes experience through membership and active engagement, reification gives form to experience by producing objects that "congeal this experience into thingness".

Reification creates points of focus around which the negotiation of meaning becomes organised. So for example reification produce a range of laws, procedures or tools. The negotiation of meaning therefore, may become focused around using a law to argue a point, using a procedure to know what to do or using a tool to perform an action. The findings from the literature review might suggest that in the pursuit of an accessibility enterprise, the negotiation of meaning for the learning technology community may currently be more focused on reification than participation. The literature is dominated by the description and discussion of laws (e.g. SENDA, 2001), procedures (e.g. WCAG,) and tools (e.g. LIFT plug-in.).

Wenger recognised that a very large portion of reification involved in work practices can come from outside communities. In this case he argues reification must be re-appropriated into a local process in order to become meaningful. The findings from the literature review present some evidence for re-appropriation. For example the re-framing and adaptation of general accessibility guidelines (WCAG) that have been associated with national laws (SENDA) to suit local or more specific needs (Sloan et al 2000; Pearson & Koppi, 2001; Lockley, 2002; Blankfield, 2002).

Wenger talks of the " the double edge of reification" and states that a good tool can reify an activity so as to amplify it effects while making the activity effortless. A bad tool therefore, can" ossify activities around its inertness". From the literature review there is some evidence that learning technologists would recognise this phenomena. For example, those who point to the inappropriate use of the Bobby logo on web sites (Witt & McDermott, 2002; Phipps, Witt and McDermott, n.d).

Practice that is a source of coherence for the learning technology community

Wenger describes three dimensions by which practice is a source of coherence for a community: mutual engagement, joint enterprise and shared repertoire. In defining mutual engagement Wenger states that practice exists because people are engaged in actions whose meanings they negotiate with one another. What makes a community of practice out of a medley of people is their mutual engagement as they make things happen. In the learning technology community we certainly have a medley of people (disability officers, academics, researchers, staff developers etc) and the literature review produced a few examples of how these different people are attempting to work together to develop "accessible" online learning material (Middling & Bostock, 2002; Conroy, 2002)

Wenger went on to argue that mutual engagement involves not only our competence, but the competence of others. It draws on what we do and know as well as the contributions and knowledge of others. In some sense the findings from the literature review suggest that the learning technology community is acknowledging that there are some things it doesn't know by calling for the involvement of disabled students (Piggott, 2002; Pearson & Koppi, 2001; and Smith, 2002) and their advocates (Phipps, 2002; Middling & Bostock, 2002; Conroy, 2002).

In defining and discussing the concept of joint enterprise, Wenger introduces the notion of "indigenous enterprise" and argues that conditions, resources and demands will only shape practice if the community has negotiated that. To exemplify this Wenger gives an example of a community of practice that has arisen in response to some outside mandate and argues that practice evolves into the communities' own response to that mandate. This example has some resonance for the learning technology community who might perhaps see SENDA as an outside mandate that has been imposed on the community (Lawson, 2002). If we accept the findings of the literature review as evidence that members of the community are attempting to produce a practice to deal with what they understand to be their enterprise, their practice as it unfolds will belong to the community, even though it might have been prompted by external drivers such as SENDA.

According to Wenger the shared repertoire of a community of practice includes routines, words, tools, ways of doing things, stories, gestures, symbols, genres, actions or concepts that the community has produced or adopted in the course of its existence, and which have become part of its practice. The findings of the literature review suggest that the learning technology community has started to develop a shared "accessibility" repertoire, but that it is by no means complete. If it were complete, there would be no need for pleas such as this one by Witt and McDermott:

> " A practical set of instructions and demonstrators of best practice is needed, since compliance depends on interpretation of guidelines." (Witt & McDermott, 2002, p. 48)

Practice that has boundaries and peripheries that may link with other communities

According to Wenger, communities of practice cannot be considered independently of other practices. Their various enterprises are closely interconnected, their members and their artefacts are not theirs alone. Communities of Practice are therefore sources of boundary and contexts for creating connections. Wenger presents two kinds of connections: boundary objects and brokering. Boundary objects are defined as artefacts, documents, terms, concepts, and other forms of reification around which communities of practice can organize their interconnections. Brokering is described as the connections provided by people who can introduce elements of one practice into another.

Artefacts such as SENDA and WCAG could be viewed as boundary objects in the sense that multiple constituencies refer to them in the literature when trying to negotiate or define theirs and others practice: Those constituencies include: academics (Lawson, 2002; Blankfield, 2002; Conroy, 2002,); staff developers (Middling & Bostock, 2002); researchers (Wilson et al., 2002; Witt & McDermott, 2002) and designers (Smith, 2002).

Wenger notes that the design of artefacts (documents, systems, tools) is often the design of boundary objects. He illustrated this by giving an example of designers of computer systems,

who focus on issues of use and often employ the term "the user" as a generic term with "mythical proportions". From this perspective, "use" is a relation between a user and an artefact. But, that user engages in certain practices and is therefore a member of certain communities of practice. Artefacts can therefore be boundary objects, and designing them might involve designing for participation rather than just use. If we extend Wenger's example of computer systems to electronic teaching materials, these could be viewed as boundary objects in the sense that they create continuities across the boundary of the practice of designers and the practice of users. The existence of such a boundary of practice is perhaps recognised in the literature through the calls for the involvement of disabled students in the design of electronic teaching material (Piggott, 2002; Pearson & Koppi, 2001; Smith, 2002).

Wenger argued that when people transfer from one community of practice to another- or have multi-membership, they can transfer some element of one practice into another through brokering. Brokers are able to make new connections across communities of practice, enable coordination, and open new possibilities for meaning. This notion of "brokers" who can create connections between communities is reflected in the literature that discusses the role of staff developers. For example, Middling and Bostock (2002) describe how in response to SENDA legislation their institution has begun to develop staff development programmes jointly between Disability Services, Staff Development teams and departments. While Phipps (2002) argues that developers must act in a brokerage role with all the staff providing perspectives that can inform strategic policy and decisions. The call to involve the advocates of disabled students in the design of electronic material (Conroy, 2002) might also place disability officers in the role of broker.

Political games

The 'communities of practice' framework offers a useful framework for conceptualising emergent e-learning accessibility practice. However, one major flaw of this framework is that the influence of power relations on the development of practice is underdeveloped. For example, Joyce and Lisewski (2003) argue that practice does not develop in a power vacuum. The notion of power and authority:-the politics of practice- are reflected in the ideas of Konur (2000). Prior to the publication of SENDA, Konur used an institutional theory tool to offer an interdisciplinary analytical framework for interpreting the process of creating enforceable rights for disabled students in higher education. His framework emphasised the social and political aspects of higher education and equated the process of creating rights for disabled students to a game that had rules. According to Konur, the institution is the context within which the game is played where Institutions set the rules of the game and the educational services that an institution provides can be divided into one of four teams.

Institutions set the rules of the game

Using the team sport analogy Konur argues that educational institutions set the rules of the game and organisations within the institutions play (as teams) to those rules, with individuals within the organisations as team players. In one sense this analogy is not helpful in understanding institutions responses to SENDA because this legislation has brought about rules (laws) that were not within the power of educational institutions to influence. However, there is some evidence to suggest that educational institutions might play games in terms of how they choose to interpret the legal implications of SENDA (Wilder, 2002). These games may involve waiting for a legal precedence to be set or Case Law to be created which defines what " reasonable adjustments" institutions should be making. This waiting game may be played out within the context of cultural or institutional resistance (Wilson et al., 2002;

Middling & Bostock, 2002) and influenced by the pessimism or sympathy of an institutions team players (Lawson, 2002; Wilson et al., 2002)

Educational services can be divided into teams

According to Konur, within educational institutions there are social and political teams, which provide the services required to maintain orderly social and economic competition. He divides these services into four classes or teams;

- Rule making teams: politicians, activists, Disability Rights Commission (DRC), courts, tribunals, government, disability rights advocates;
- Rule advocating teams: Funding Councils, DRC, Government, disability rights advocates;
- Rule implementation teams: service providers and users;
- Rule enforcement teams: Funding Councils, Quality Assurance, DRC.

Rule enforcement teams detect and punish teams and players who violate established rules. While rule advocating teams teach players the rules of the game through socialisation of the individual where they are taught and persuaded to play the rules of the game. The teams dominating the accessibility literature at the moment appear to be rule advocators and rule implementers. The advocators are linked to funding bodies such as JISC (e.g. Wilder, 2002) or government sponsored agencies such as TechDis (Phipps, Sutherland & Seale, 2002; Phipps, 2002; Phipps et al., n.d.). While the rule implementers are linked to staff development (Middling & Bostock, 2002), teaching (Blankfield, 2002; Conroy, 2002;) and research (Witt & McDermott, 2002). These teams have identified the need to involve more team players, notably disability advocates and disabled students.

Whilst in the literature at least there is no disagreement about the value of involving disability advocates such as disability officers or co-ordinators, their perceptions of the game might be very different to those of the existing players. For example, rule advocators such as Phipps (2002) suggest that disability advocates can play a brokerage role and link different communities or teams together. However, an inspection of the National Association of Disability Officers (NADO) website [1] reveals that a fair number of the discussion papers and conference abstracts seem to focus on the difficulties that disability officers have in trying to span different communities:

> "People working in this profession have a problem in that they don't know what they are called: disability officers, disability advisers, disability co-ordinators….It is not easy if you belong to the faculty of a university, to the British Dyslexia Association, to the Royal College of Speech Therapists, and to the National Federation of Access Centres, as they all have different views of what you should be." (NADO, n.d)

Disability Officers may also lack the legitimacy or power to influence strategic and policy issues. For example, Barbara Waters, Chief Executive of The National Bureau for Students with Disabilities, told Vice Chancellors at their 2002 conference that an audit carried out for the Scottish Higher Education Funding Council revealed that the disability officer seemed to carry all of the responsibility for disability issues across the institution with little strategic management support.

The call for the involvement of disabled students in the design of e-learning material is an interesting one because it makes two key assumptions. Firstly that designers and developers of e-learning material would be able to identify and recruit disabled students into the design team and secondly that disabled students would know enough about the disability discrimination legislation to understand the implications of their involvement in design teams.

The absence in the literature of reported incidences of teams or players being caught violating SENDA and being "punished" might suggest that disabled students in the UK are not using the legislation to make complaints and take institutions to court (and/ or that rule enforcement teams are not enforcing the rules). Konur argued that disabled people have a crucial role to play in creating enforceable civil rights for disabled students in higher education. However, they need first to have an adequate and timely access to a wide range of information on the service provision for disabled students to "understand the outcome of the game**"**. Only in this way, would they be able to contribute in a positive way to "the game being played.". It appears however, that disability advocates such as the Disability Rights Commission (DRC) and the National Bureau for Students with Disabilities (SKILL) are targeting their information and awareness raising campaigns mainly at education service providers rather than education service users. This might suggest that disabled students are not currently in a position to understand that there is even a "game" being played. Until they do, the game might appear to be very one-sided, with a referee that is reluctant to blow the whistle for a foul.

The challenge for educational research

The Disability Discrimination Legislation in the UK has charged learning technologists with the responsibility of developing accessible electronic teaching material and resources. The results of the literature review would suggest that although some learning technologists are attempting to meet this challenge, there is not as yet a clearly defined, well rounded or easily recognized accessibility enterprise that can shape the professional practice of learning technologists. The challenge for educational research would therefore appear to provide a detailed and rich description of current accessibility practices and the context in which they are emerging in order to explore the development of accessibility practices and potential barriers to that development. Such an exploration may be illuminated by a focus on the extent to which learning technologists feel they are in a community working towards shared goals or in a team competing against other teams to determine the rules and outcomes of the accessibility "game".

References

Blankfield, S. (2002). *Supporting dyslexic students in effective use of online learning*. Paper presented at Association for Learning Technology Conference, Sunderland, 2002.

Conroy, G. (2002). *Delivering an inclusive curriculum using specialist software*. Retrieved October 24, 2003 from http://www.hefce.ac.uk/pubs/hefce/2002/02%5F48/02%5F48c3.pdf

HMSO. (1995). *The Disability Discrimination Act*. Retrieved October 24, 2003 from www.hmso.gov.uk/acts1995/1995050.htm.

HMSO. (2001). The Special Educational Needs and Disability Act. Retrieved October 24,2003 from www.hmso.gov.uk/acts/acts2001/010010.htm

Fowler, C.J.H., & Mayes, J.T. (1999). Learning relationships from Theory to Design. *Association for Learning Technology Journal,* 7,3,6-16.

Guglielmo, T. (2001). From Formal Training to Communities of Practice via Network-based Learning, *Educational Technology*, 41,2,5-14.

Hung, D.W.L., & Chen D.T. (2001). Situated Cognition: Vygotskian Thought and Learning from the Communities of Practice Perspective: Implications for the Design of Web-Based E-Learning. *Educational Media International,* 38,1, 3-12.

Joyce, P., & Lisewski, B. (2003). On Reification: A Reinterpretation of Designed and Emergent Practice- A Reply. *.ALT*-J, 11,2,64-66.

Konur, O. (2000). Creating enforceable civil rights for disabled students in Higher Education: an institutional theory perspective, *Disability and Society*, 15,7,1041-1063.

Lawson, A. (2002). Enablement on campus. AUT Look. *Bulletin of the Association of UniversityTeachers,* 222, 22.

Lockley, S. (2002). *Dyslexia and higher education: accessibility issues*. Retrieved October 24, 2003 from www.ilt.ac.uk.

McCarthy, D. (2002). *Disability legislation and accessibility of online materials.* Retrieved October 24, 2003 from www.ilt.ac.uk.

Middling, T., & Bostock, S. (2002). Accessibility: implications for teaching staff and staff developers. *Educational Developments* 3,3, 8-9.

National Association of Disability Officers http://www.nado.ac.uk/

Pearson, E.J. & Koppi, T. (2001). Inclusion and online learning opportunities: designing for accessibility. *Association for Learning Technology Journal,* 10,2,17-28.

Phipps, L., Sutherland, A.,& Seale, J. (eds) (2002). *Access All Areas: disability, technology and learning*. Oxford and York: ALT/TechDis.

Phipps, L, Witt, N., & McDermott (n.d). *To Logo or Not to Logo?* Retrieved October 24, 2003 from http://www.techdis.ac.uk/resources/logo001.html

Phipps, L. (2002). Are you reasonably adjusted? *Educational Developments* 3,4, 6.

Piggott, M. (2002). eAccessibility for All, *Ability*, 43, 22-23.

Sloan, D., Rowan, M., Booth, P., & Gregor, P. (2000). Ensuring the provision of accessible digital resources. *Journal of Educational Media*, 25,3,203-216.

Smith, S. (2002). Dyslexia and Virtual Learning Environment Interfaces. In Phipps, L., Sutherland, A and Seale, J (eds). *Access All Areas: disability, technology and learning*. (pp. 50-53) Oxford and York: ALT/TechDis.

Wenger, E. (1998). *Communities of Practice: Learning, Meaning and Identity.* Cambridge: Cambridge University Press.

Wilder, B. (2002). Disability legislation: implications for learning technologists in the UK. In: Phipps, L., Sutherland, A and Seale, J (eds). *Access All Areas: disability, technology and learning*. (pp. 6-9) Oxford and York: ALT/TechDis.

Wilson, A., Ridell, S., & Tinklin, T. (2002). *Disabled Students in Higher Education*. Retrieved October 24, 2003 from: http://www.ed.ac.uk/ces/Disability/index.htm

Witt, N.A.J & McDermott., A.P. (2002). Achieving SENDA-compliance for Web Sites in further and higher education: an art or a science? In: Phipps, L., Sutherland, A and Seale, J (eds). *Access All Areas: disability, technology and learning*. (pp. 42-49) Oxford and York: ALT/TechDis.