

# **CONSTRUCTING ACCESSIBLE CBA: MINOR WORKS OR MAJOR RENOVATIONS?**

**Kathy Wiles and Simon Ball**

# **Constructing Accessible CBA: Minor Works or Major Renovations?**

Kathy Wiles, LTSN Generic Centre  
Simon Ball, TechDis

## **Abstract**

Accessibility is rapidly becoming a buzzword within learning and teaching. A useful definition of accessibility might be "something that can be easily and conveniently approached, entered, understood and used by disabled people". From a broader perspective it may be preferable to consider Usability and the concept of 'Design-for-All' (the European equivalent of the American term 'Universal Design'). A comparable definition of Design-for-All might be "something that can be easily and conveniently approached, entered, understood and used by everyone". The apparently subtle difference between these definitions is in fact vital in terms of Computer-Based Assessment. If we are to go to the trouble of designing assessments that are rigorous, fair and useful to both teacher and learner, then we would be saving ourselves a great deal of time and effort if we adopted a Design-for-All approach from the outset, rather than having to create a separate 'accessible' version later. This paper also examines the role of 'equivalence' in assessment and questions how we view assessment and those we assess, recommending a relinquishing of our control of assessment in favour of a student-centred approach, that also involves disabled students in assessment design.

## **Legislation**

The Special Educational Needs and Disability Act (2001) [SENDA] in the UK amended the Disability Discrimination Act (1995) in that it repealed the exemption from the Act of education. Hence education institutions are now obliged by law not to treat a disabled person 'less favourably' in terms of admissions, assessment, in fact any service which it provides 'wholly or mainly for students'. Institutions, therefore, have to make 'reasonable adjustments' if a disabled person would otherwise be placed at a 'substantial disadvantage' when compared with their non-disabled peers.

This means institutions must enact wholesale changes to their policies and practices in terms of learning and teaching, and therefore also assessment. Individual lecturers and course designers will, by implication, be charged with rolling out these policies to the learners.

It is vital to note that design-for-all and accessibility must not involve any lowering of academic standards or contravention of health and safety regulations. This is written into the legislation. But with the application of design-for-all and pedagogic principles it is usually possible to provide an assessment experience in which all students can undergo a test of equivalent rigour and interest.

## **Requirements**

The range of impairments and conditions covered under the legislation is extremely broad. The definition of disability under SENDA is "a physical or mental impairment which has a substantial and long-term adverse effect on [the learner's] ability to carry out normal day-to-day activities". While we must await the decisions of the judicial system to determine precisely what is meant by 'substantial', 'long-term' and 'normal day-to-day activities', the general assumption is that the spirit of the law will be upheld and therefore broad definitions of these terms will be used. This means that in practical terms lecturers will be expected to cater for learners who are blind, vision impaired, deaf or hard of hearing, or who have a mobility or dexterity impairment, dyslexia, or possibly a medical or mental health condition. Before one collapses from the imagined enormity of the task ahead, however, we must also be realistic and point out that provision for disabled students is at this stage expected to be contextual. It is quite plain that we cannot do everything at once. Therefore we must use common sense. If an assessment is to be used by a large number of students or is used often, it must be prioritised in terms of making it accessible or employing design-for-all principles. If, on the other hand, an assessment is only used once every three years with a handful of final year students, then perhaps it may be appropriate to put it to the bottom of the priority list, and make adjustments to it only if necessary for a particular student. This contextual approach is only relevant, however, in terms of making existing assessments accessible. New assessments should from this point forward always be constructed with the principles of design-for-all in mind.

## **Assistive Technologies**

Many learners have, or can be provided with, assistive technologies. These are many and varied (see the TechDis Accessibility Database for a wide range of examples). Some of the more common technologies that teaching staff would be likely to encounter include screen readers (which read aloud the contents of text or web documents, as well as commands and links lists for example), screen magnifiers, text and spelling assistance software, electronic organisers (to assist with time management, often a problem for people with dyslexia), and input devices (such as on-screen keyboards, switches or head wands). It should be stressed, however, that although the presence of these technologies can greatly assist a disabled student, they cannot alone be expected to provide a solution. In a study by Evans and Sutherland (2003) blind and vision impaired students using screen readers to carry out simple tasks within a common proprietary VLE spent only 30-40% of their time actually 'Doing' the task in hand (the remainder being spent 'Using' the VLE and 'Accessing' the correct information) compared to the equivalent figure of 70-80% for users of screen magnifiers and students needing no assistive technology. So although the screen readers undoubtedly made the difference between the blind students being able to access the material or not, they did not completely 'level the playing field'.

## **Where to start?**

So, given the legislation, the principle of design-for-all, the availability of assistive technologies and the range of impairments and conditions that should be catered for, where do we start? Language, presentation and assessment mode are all aspects of the assessment experience which can create barriers to disabled learners, so these will be addressed below.

## **Language**

It may appear to be a statement of the obvious, but the language of assessment should always be clear and unambiguous. A learner with dyslexia or whose first language is not English (for example, a British Sign Language user) may have to take extra 'processing' time to interpret a question, which is multiplied if the question is lengthy or unnecessarily verbose. If sentences are kept short, swift comprehension is aided. Compare the following examples, which contain approximately the same number of words. The first is not easy to interpret on first reading, the second is clear to most learners:

- 1) What is the name of the process of the mixing of a lake's waters due to increased wind speeds and lower temperatures in autumn following the phenomenon of summer warming of surface waters by the sun and the corresponding stagnation of deeper waters due to decreased convection known as stratification?

2) In summer, lakes can become stratified, due to the warming of the surface waters by the sun. The corresponding decrease in convection leads to stagnation of the deeper waters. In autumn, when temperatures decrease and wind speeds increase, convection restarts, fully mixing the lake waters once again. What is the name given to this mixing process?

In addition, questions should not try to trick the learners. The aim of an assessment is to find out what a learner knows or understands, or what skills they possess, not to assess their ability to spot trick questions. For example, the lecturer may wish to ask the question "What is the name of the process of protecting, preserving and managing natural resources?" Their choice of potential responses may be a) agriculture, b) forestry, c) conservation or d) conversation. This is a common trick used in multiple-choice quizzes. What good purpose does it serve? A dyslexic student may have to read the responses several times to determine which is which, even though they know the answer to the question instantly. Erecting barriers to the learner's progress in this way, be the learner disabled or not, is simply poor practice and should be avoided.

## **Presentation**

The presentation of the assessment can make a great difference to some disabled learners' ability to progress satisfactorily. For example, if an assessment utilises a video clip, students who are blind, vision impaired, deaf or hard of hearing, may not be able to immediately make use of the clip. However, if design-for-all principles are utilised, providing captions for those who cannot hear the clip, and a full commentary for those who cannot see it, not only will those barriers have been removed, but the comprehension by the

entire class is likely to have been increased. Similar considerations need to be borne in mind when using any sounds or images in assessment.

Design-for-all principles in terms of presentation can include such simple things as ensuring a sans-serif font is used (such as Arial, Verdana or Comic Sans), making sure text is double-spaced on screen, allowing users to change text and background colour if required, all of which aid readability.

If proprietary assessment software is being employed, can disabled users change settings if necessary? A learner with dyslexia may require longer than the standard allotted time to answer questions, as might a deaf student whose first language is British Sign Language. If a student is using any assistive technology, you will need to check whether it is compatible with the assessment package being used (for example, will a screen reader read out questions in a quiz package?), and also to what extent it provides equality for the student, and hence what other adjustments they may require.

### **Assessment mode**

This is perhaps the most critical aspect of assessment design when design-for-all principles are to be employed. Selecting the most appropriate mode of assessment for achieving the intended outcomes can mean the difference between providing an equivalent assessment to all and making a series of difficult and time-consuming adjustments. Design-for-all does not mean a dull, bland assessment experience. If utilising an audio-visual sequence, for example, is the best way of achieving the intended outcomes for the majority of students, then there is no reason why it should not be utilised. If it is possible to make it accessible to all learners by making adjustments such as captioning or the addition of spoken descriptors, that is sufficient. If, however, it is simply not possible to make those adjustments, it is perfectly valid to create an entirely different assessment experience for the disabled learners who cannot access the audio-visual sequence. As long as the alternative assessment is equally rigorous and of equal interest (it would not be satisfactory for a blind learner to experience only text-based assessments when their peers are experiencing a range of multimedia features, for instance) then it is not necessary for all learners to undertake exactly the same assessment.

### **A valid assessment experience?**

Until recently, one gap that did exist in designing computer-based assessment is guidance on providing a valid assessment experience. If designing an equivalent experience, how can we be sure that the same rigour is placed on the student and that the same measurement of knowledge, skills and application of both is being undertaken? Might a non-disabled student be able to appeal against their mark (or even worse, sue) if they are able to prove that less rigour is applied in the assessment of the disabled student? At a time when those working in the field of computer-based assessment are demonstrating that the assessment of higher-order skills is possible with computer-based assessment, it is also vital to demonstrate that variants of the assessment created for those with impairments have the same validity.

Fortunately, IMS standards have recognised the issue of validity of equivalent assessment experiences, and some guidance on validity testing now appear in the IMS Guidelines for Developing Accessible Learning Applications. One example of a so-called “threat to validity” might be the visually impaired language student required to translate to text into English. One possible way of assisting this student would be to have someone read the text aloud while the student translated. But what if the reader was an expert in the language being translated? And what if the precise and correct emphasis that the reader placed on the words as they were spoken actually provided assistance to the student in making sense of the text? Whereas the student reading the text would have to have a clear understanding of the content first before being able to detect the nuance and emphasis contained therein. Equally, a threat to a fair assessment process for the visually impaired student could be created if a screenreader were used to read the text, perhaps providing them with a more difficult task of interpreting the screen reader rendering of words as well as the language in translation.

From this issue it can be seen that there is far more to consider in designing assessment than perhaps had been considered in the past. However, by getting the design right the first time an assessment is designed, a template is provided for future iterations of assessment content and mode. Many questions still remain for the designer of the assessment- principally, how do I know that I am getting it right, and how do I know when to stop designing equivalent alternatives?

### **Equivalence- a paradigm shift?**

If it is possible to assess in different modes using CBA, are we still serving the needs of all learners simply by designing for all or choosing equivalent assessment experiences? Perhaps there is a gap in thinking about assessment and assessing appropriately to the needs of the user. While different assessment methods have proliferated and the pedagogic understanding of assessment has deepened in recent years, many teachers still assess for ‘one size fits all’. In other words, a different method of assessment may be chosen to bring out different aspects of the students’ learning, but that one methodology is universally applied to all students on the course. The term equivalence is intended to imply that another assessment method can be employed that will have equal rigour and deliver an equal experience to the overall universal assessment. So, for example, a student with visual impairment studying an art history course may be asked to describe what they feel when assessing an objet d’art, whereas those students with no visual impairments may be asked to assess what they see. The ultimate goal of the assessment is to establish the students’ knowledge of a particular piece and to ensure that they can use the correct vocabulary to describe it, so seeing and feeling may be deemed equivalent. However, transfer this test into the online environment and the visually impaired student can no longer take this equivalent pathway. Is the equivalent pathway for this student to not be assessed online? What if the student lives in a remote area and the object to be studied is a rare piece that can only be accessed online?

This scenario could be multiplied for any particular intended assessment for any number of differing student circumstances, impairment or otherwise and this is where, admittedly, the concept of design for all wears thin. Is it feasible to design many different equivalent experiences, given the added costs in time and money, particularly for expensive multimedia packages? And is it possible to design for all, when any experience could have shortcomings for one particular student? The two fundamental principles of design for all are (EIDD)

- Facilitate the use of products and services
- Ensure that users take part in the product design and evaluation processes

If the user is excluded from using computer-based assessment (as in the example above) are we then failing to design for all? The key to unlocking design for all lies in the second principle- involving the user in testing, and having the user design how best they can be assessed. This does not mean asking every person who is going to sit an exam to design their own assessment (although some education providers do encourage this), but involving those with particular needs in creating design guidelines. The current design guidelines that we have (IMS Guidelines, Wiles 2002) are our best guesses of what we should do and amount to little more than recommendations rather than specifications. Disabled students have not thus far been involved in the higher education assessment design process and the authors of this paper believe that it is time for a number of use cases to be developed that can inform the design of all assessment modes. Until this gap is filled, those working in computer-based assessment face the scenario of having to design and re-design as each fault or lack of provision in their work is uncovered, user by user.

The designer of computer-based assessment is therefore strung out between the possibilities that the technology has to offer and the needs of a variety of users to have equivalent experiences. Until recently the messages that have been conveyed about design for all have been interpreted as an appeal for the lowest common denominator to be employed- in which case no one can be excluded. But this ignores the potential richness that technology can bring to all computer-based learning processes. By lifting our vision above simple equivalence we can perhaps achieve a paradigm shift in our attitude towards assessment- not one universal assessment with adjustment or equivalence, but many modes of assessment that will suite many users. In the example of the visually impaired art history student who can feel the objet d'art and then describe it, it is equally possible that a non-visually impaired student may wish to take this as her assessment pathway. The great difficulty facing those who design assessment is to let go of control of the assessment pathway, in the same way that teachers of much more diverse audiences have had to face losing control of the learning pathways chosen by students. Assessment has long been the stopper in the bottle of innovative practice in education- we can learn in flexible modes and in different timescales, in different time zones, and we can choose which elements we wish to learn and which we wish to discard- but we must return to that final summative assessment, fixed as to place and time. Computer-based assessment frees us not only from this

constraint, but also from the need for one universal assessment for all. In this way computer-based assessment can take accessibility beyond equivalence and open up the creative pathways that the concept of design for all intends.

## Conclusion

In designing accessible computer-based assessment, we have many tools at our disposal- both technological and pedagogic. Add to this the ideas contained within the principle of design for all and the ability to provide an equivalent assessment experience and it is possible to see that accessible CBA is a case of minor works. However, perhaps not minor works only- perhaps there is a duty upon those people working to innovate in assessment (and most of these people work with computer-based assessment) to drive towards that major renovation of how we use and apply assessment processes to students- addressing the when, the why and the who of the control of assessment. Perhaps computer-based assessment innovations and practices can help the teachers to set the standards- but help the students choose how they wish to demonstrate those standards to us. For design for all we may in future read 'innovation for all'.

## References

Disability Discrimination Act 1995.

<http://www.hms0.gov.uk/acts/acts1995/1995050.htm>

EIDD (European Institute for design and disability)

<http://www.design-for-all.org>

Evans, S., and Sutherland, A. (2003) *Virtual Learning Environment User Testing Project*. TechDis and Royal National College for the Blind, Hereford.

<<http://www.techdis.ac.uk/resources/VLE002.html>

Guidelines for accessible testing and assessment

<http://www.imsglobal.org/accessibility/accessiblevers/sec9.html>

IMS Guidelines for Developing Accessible Learning Applications available from <http://www.imsglobal.org/accessibility/accessiblevers/index.html>

Special Educational Needs and Disability Act 2001.

<http://www.hms0.gov.uk/acts/acts2001/20010010.htm>

TechDis Accessibility Database <http://www.techdis.ac.uk/access.html>

Wiles, K. (2002) *Accessibility and computer-based assessment: a whole new set of issues?* in Access All Areas: disability, technology and learning. Phipps, Sutherland and Seal (eds). ALT, JISC, Techdis available from <<http://www.techdis.ac.uk/accessallareas/AAA.pdf>>



**SIMULATION AS A TOOL FOR  
COMPUTER ASSISTED FORMATIVE  
ASSESSMENT:  
FIRST AID AS A CASE STUDY**

**Andrew Young and Steven Cafferty**