

Have you seen this?

Following the introduction of the Special Educational Needs and Disability Act (2001) (effectively Part 4 of the Disability Discrimination Act 1995), disabled students have the right not to be discriminated against in education, training or research. The governing bodies of all providers of post-16 education are the responsible parties under this Act.

- All student-related services are covered by the Act, including admissions, teaching, work placements, field trips, laboratory practicals and examinations.
- Institutions are obliged to make 'reasonable adjustments' so that a disabled student is not placed at a 'substantial disadvantage' relative to other students. This may include changes to, for example, policies, course requirements or the physical features of buildings, or perhaps the provision of interpreters or course materials in alternative formats.
- The duty to make adjustments applies to disabled people in general, not just to specific individuals, and therefore 'anticipatory' changes are expected in most circumstances. Institutions and teaching/learning staff must consider what adjustments may be necessary should disabled people attend their courses and implement those adjustments before they become necessary for any individual students.
- To what extent an adjustment is deemed 'reasonable' depends on the individual situation: the service being provided; the size and nature of the institution and the effect of the disability on the individual student. Certain factors may override the necessity to make an adjustment, including: health and safety implications; the need to maintain academic standards; the cost of making the adjustment and the interests of other students. These will not be applicable in the majority of instances.
- Prospectuses, Web sites and learning materials must all be offered in versions accessible for disabled people. To be accessible, a Web site needs to follow a few basic design principles (see <http://www.techdis.ac.uk/seven/>) that ensure the information contained on the site is available to people with disabilities, be they visual, hearing, mobility or cognitive impairments.
- The issue of disclosure is important - has the student disclosed the fact of their disability to the institution? It is possible that if any member of staff has been informed, the institution as a whole may be deemed to know about the disability. Disclosure is currently a grey area for many institutions and it is therefore good practice for all academic staff to regularly and routinely offer students confidential and supportive opportunities to disclose such information.
- The significance of disclosure is lessened, however, by the legislation, which states that adjustments should be made in most circumstances in advance of them being required by a particular student.
- Learning and teaching methods and materials should therefore be made accessible at the earliest opportunity. There are many ways in which academic staff can adjust their practices to increase accessibility. For example, providing lecture notes in advance or on disk can help those with visual impairments.
- Ensuring any materials that are placed online on a Web site or within a Virtual Learning Environment (VLE) adhere to accessibility principles (see <http://www.techdis.ac.uk/seven/>). This can greatly assist all students.
- Simple modifications to lecturing techniques, such as facing the students at all times when speaking and explaining every visual aid orally in detail, can make a big difference to the learning experience of many students.
- Where effort is made to accommodate the needs of a disabled student, their progress through education can be made easier and their experience made more equal with that of non-disabled students to ensure that this becomes common practice in all institutions.

Editor's Note: This checklist was produced by TechDis, and appeared in *JISC Inform* Issue 2, Autumn 2002, p8.

In order to support the further and higher education community in all aspects of technology and disabilities and/or learning difficulties, the JISC has established the TechDis service, the main aims of which are:

- to be the primary information and advice resource for institutions on the use of ICT and how they relate to disabilities and/or learning difficulties
- to promote, transfer and broker good and innovative practices in the use of technology to support learning difficulties and/or disabilities
- to monitor, review and advise on the accessibility of current and emerging technologies used in learning and teaching, research and administration

TechDis provides guidance, advice and support

For more information, see <http://www.techdis.ac.uk> or the JISC Legal Information Service at <http://www.jisc.ac.uk/legal>

Overcoming the Barriers

Editor's Note: This article originally appeared in *JISC Inform* Issue 2, Autumn 2002, pp4-7. Our thanks go to both Karen Ford and Peter Rainger, JISC and TechDis for helping to highlight this important issue of the new SENDA 2001 which came into force on all UK Higher Education from September 2002.

Using technology to reach all our students, teachers and researchers... Why are we using technology in teaching?

Education providers have a legal responsibility to ensure that a disabled person is not treated 'less favourably' for a reason relating to their disability. Institutions are also required to make 'reasonable adjustments' if a disabled person is placed at a 'substantial disadvantage'. But what does this actually mean in practice for students and those teaching them?

Karen Ford speaks to mathematics student Peter Rainger about being a disabled learner at a UK university. His experiences illustrate the type of adjustments that might be required of an institution and the impact the legislation may have on those teaching in further and higher education. He also describes some of the assistive technologies he uses and how they contribute to his learning.

Support at school

Peter had not been very interested in mathematics until he reached GCSE level. He then developed a passion for the subject and discovered that he had the ability for it too. After GCSE success, he continued mathematics in the sixth form (as one of five A levels). It was during his sixth form study that he developed cataracts in both eyes. His eyesight deteriorated to such an extent that he was unable to continue studying in the way in which he had become accustomed, so much of his learning now relied on using other senses. Peter describes himself as a 'visual learner', having found that once his sight deteriorated, learning to use other senses (such as hearing) did not come as naturally as he might have expected.

With the support of his teachers and family, adjustments were made to existing practices to ensure that Peter could continue to learn effectively alongside his classmates. The mathematics teacher talked through examples as clearly as possible to ensure that Peter could follow the working of examples on the board. To supplement classroom delivery, teachers made written notes that Peter's mother read back to him at home. An effective method for making his own notes and workings was also essential; the solution:

"I got five A levels using a large marker pen and an A3 pad!" His achievements in mathematics throughout A level study prompted his teacher to suggest he study for a degree in mathematics. Although no assistive technology had been available to support his sixth form studies, the level and type of support available from his teachers and mother (combined with small class numbers) had ensured that he was able to complete his studies successfully.

Corrective eye surgery was carried out towards the end of his sixth form study and this resulted in a period of normal vision for Peter. Shortly afterwards, however, a new condition developed that meant by the time Peter left home for university he had no vision in one eye and was partially sighted in the other.

Accessing support at university

On Peter's arrival at university in 1998, staff were not aware of his visual impairment because the form that would have alerted staff asked only whether the applicant had a 'registered disability' (which Peter didn't!). Consequently, his needs were not assessed until a few weeks later after a friend told him about the Disabled Student Allowance (DSA) and the university's Assistive Technology Centre (ATC), which provides advice on assistive technology and supports disabled students in their studies whilst at the university.

The DSA has allowed Peter to purchase a desktop computer with a scanner and Kurzweil 2000 - a scanning Optical Character Reader (OCR) package that has a number of features. Peter uses this to scan his mathematics course notes and store them as a book of images. For text-based activities, the text-to-speech feature allows scanned text documents to be read by electronic voice. To magnify his course notes and textbooks he uses a CCTV at the library or the ATC, and also a variety of handheld magnifying devices.

The assistive technology tools provide a level of independence for study that Peter did not have during his sixth form studies, giving him the freedom to organise his personal study time without having to rely on someone else to help him.

The learning experience

Although Peter now has the tools to allow him to study independently, his ability to do this effectively is dependent on the teaching staff delivering the coursework in a way that is appropriate for a visually-impaired learner and the assistive technology tools being used.

Mathematics is a very visual subject, and unlike plain text, which is read in a linear way, mathematical meaning is derived from the relational position of the symbols and numbers. The mathematics course is delivered in a traditional style: primarily lectures and follow-up workshops. Peter's first-year lectures were attended by many students, and lecturing staff typically took the 'chalk and talk' approach to delivery. The level of verbal explanation given by the lecturers to accompany the examples worked through on the board was far less extensive than those given at A Level. As a result, Peter was unable to glean much of any value from the lectures. His learning, therefore, relied almost entirely on working through the notes from each lecture and workshop, which he obtained from each staff member and/or fellow students.

Obtaining the notes has not always been a simple matter and initially required a lot of 'running around'. Although staff are supportive, only a third of lecturers use Information and Communications Technology (ICT) to produce electronic copies of their notes, which means working with handwritten notes of varying quality. Notes are sometimes provided after the lectures and a workshop, which has meant that Peter has constantly had to 'catch up'; because mathematical knowledge is cumulative (with each experience building on the last), 'getting behind' can have real consequences. To exacerbate matters, the level of sight in his functional eye has fluctuated throughout the course of his study and he has had to take time out from study to undergo surgical procedures.

Supporting others

Throughout the course of his study, Peter has shared the benefit of his experiences by working as a Student Union

representative for disabled students. He sits on a number of university committees and provides advice to both disabled students and the departmental staff supporting them. He has also worked in an advisory capacity with university services, including the library and the estates department.

Balancing the equation

Peter's experience illustrates that, while assistive technology tools can play a supporting role by facilitating independent study, disabled learners are still likely to experience difficulties if course delivery does not take their needs into account. Enhancing Peter's learning experiences when he arrived at university in 1998 would have required a significant change in learning and teaching practices throughout the department - something that Peter noted would not have been feasible at the time. However, he advocates that the type of changes that would have made a difference (such as providing notes in advance in electronic format) may well have benefited his fellow students too.

Peter has witnessed significant changes over the past three years, both as a disabled student and as a representative for the Student Union. The ATC at his university has expanded and is now located in a purpose-built facility, providing increased support to students and advice to other institutions. At a national level, the recent changes in legislation mean that institutions, teaching and support staff may be required to change their learning and teaching practices to ensure that disabled students are not treated 'less favourably'. There is no doubt that this will require considerable time and effort on the part of those delivering the curriculum, but the results are likely to be beneficial to all their students by providing a greater range of learning experiences.

As for Peter, his plans for the future are not fixed at the moment. Because of health problems during his finals, he is going to finish the last year of his degree part-time at another university (application pending). He is now planning to work in a completely different area from mathematics and is investigating options for working in the field of assistive technologies and accessibility.

+++STOP PRESS+++ The Maths, Stats & OR Network is interested in creating a networking support structure to help maths, stats and operational research academics to share their experiences, what worked and what did not, in their efforts to support teaching and learning of students with special needs. We invite you to:

- join, share your experiences and seek advice from colleagues via a newly created JISCmail email discussion list at <http://www.jiscmail.ac.uk/lists/DDA-LTSNMSOR.html>
- write articles on maths, stats and operational research teaching and learning implications and developments arising from the legislation for both *MSOR Connections* and a web based quarterly DDA-LTSNMSOR series
- contact info@mathstore.ac.uk with any other ideas