

INFORMATION AND COMPUTER SCIENCES

Principles of inclusive curriculum design

Anticipatory
Flexible
Accountable
Collaborative
Transparent
Equitable

Generic considerations

- cost and financial considerations;
- embedding student and staff well-being;
- promoting student engagement;
- use of technology to enhance learning;
- responding to different approaches to learning;
- avoiding stereotypes and celebrating diversity;
- making reasonable adjustments.

Introduction

It is the responsibility of the every member of staff within HE to respond to the requirements of equality legislation. The basic principle that can and should be universally responded to is that **it is attitudes, barriers and other forms of discrimination within the system rather than individual characteristics or deficits that are the cause of disadvantage**. Employing an inclusive approach is underpinned by the adoption of other principles of inclusive curriculum design, summarised in the adjacent text box and discussed in the introduction section of this guide available at www.heacademy.ac.uk/assets/documents/inclusion/disability/ICD_introduction.pdf

May and Bridger assert, in respect of developing an inclusive culture, “making a shift of such magnitude requires cultural and systemic change at both policy and practice levels” (2010: 2). In essence this change is represented by a shift in focus from responding to the ‘needs’ of individuals or specific groups of students to an approach that anticipates and plans for the *entitlements* of the evolving student population. Thus the onus is on institutions and subject communities to change and adapt their policies and practice rather than expect this of individual or specific groups of students.

There are many generic considerations of inclusive curriculum design, summarised in the adjacent text box, which are discussed in the introduction section. The focus of this section is on subject-specific considerations for those in those subjects aligned to information and computer sciences. Here examples of innovation and effective practice are provided to demonstrate that effective practice for one group can and should be effective practice for all. The examples, resources and ideas included in this and other subject guides have come from the sector. They were obtained directly in response to a general request made to the sector during 2010, from a review of the HEA Subject Centres or from recommendations made by colleagues teaching in the specific subject.

Where there are examples in other subject guides that may be particularly relevant or worth reviewing for further adaptation these are flagged. However, notably inspiration and ideas for curriculum design can come from many sources, therefore reading strategies employed and ideas in other subject areas can be a useful source of new ideas.

Inclusive curriculum design: subject-specific considerations

Involving users in evaluation processes

To provide relevance and encourage student to consider issues of accessibility, Multimedia students at the University of Ulster are asked to:

- research web-based resources that explain the key features of Photoshop;
- evaluate solutions to ensure both the video and content are accessible;
- respond to user feedback on the effectiveness of their videos, which is achieved by using judges from the Royal National Institute of Blind People (RNIB) (Nicholl, 2006).

Student engagement was enhanced through the real-life project, user evaluation and the incentive of a prize for the winning team. Different user groups can be involved in different projects throughout a programme to provide students with a range of experiences. For instance, users might include older adults using technology, or individuals for whom English is a second language, or children.

Examples of student projects from the University of Washington's '*Engaging student web programmers as inclusive designers*' module were generated by the students identifying how technology might exclude some people from participating in everyday activities. They then devised solutions including:

- new website for people with dyslexia;
- online shopping system for colour-blind users;
- course registration application for non-native language speakers;
- email application for users with hand pain tremors (Kane, 2007).

This approach could be adopted to include users in other stages of a project, for instance 'meeting the client' where the students identify with potential users the aspects of a design brief.

The Built Environment, Health Sciences and Practice, and Hospitality, Leisure, Sport and Tourism subject guides

provide examples for engaging end users that help to challenge stereotypes.

Involving practitioners in sharing hands-on design experience

Students working in the field of human computer interaction benefit from first-hand experience of interaction with practitioners (Sas, 2006). To overcome the prohibitive costs and make resources available for students to view again, Lancaster University has video-recorded practitioners presenting and practically demonstrating a particular method. This approach introduces students to skills of ‘knowing how’ that lie beyond the knowledge contained in textbooks and also ‘guarantees’ students access to the current design practices by facilitating their skills development (Sas, 2006). This has the potential to help all students, but can be particularly helpful for students missing the session, dyslexic students or students whose first language is not English. Subject to practitioners’ permission, the video recordings offer future opportunities for building in blended learning or independent learning activities. As with all video clips consideration needs to be given to the inclusion of subtitles and/or transcripts, which can be easier to organise during the production phase. Factoring this in at the design phase helps make the approach sustainable and accessible to all students from the outset, thus avoiding future need to adapt the resource for individuals.

Involving students in action research

Action research projects provide a mechanism for enabling students to understand and experience the way in which researchers test out different technology. Involving students in real research can increase the relevance of the teaching and learning activities and student engagement, as in the following example where students support evaluation of a new approach to assessment feedback.

An action research project at Liverpool John Moores University ‘ExAEF: *Exploring the efficacy of audio email feedback in information management assessment*’ has been exploring the use of formative audio feedback for their students in Information Management and Systems as an aid to improving learning. This project uses familiar technology to enable students to offer feedback and involves them in evaluating how technology is used. In effect the action research approach becomes a basis for students to offer their feedback and engage with the process as well as the product. In addition to project reports the website includes links to a range of resources that others

working in Information and Communication Science programmes could use and other subjects adapt (Macgregor, 2010).

Paired programming as an aid to assessment and retention

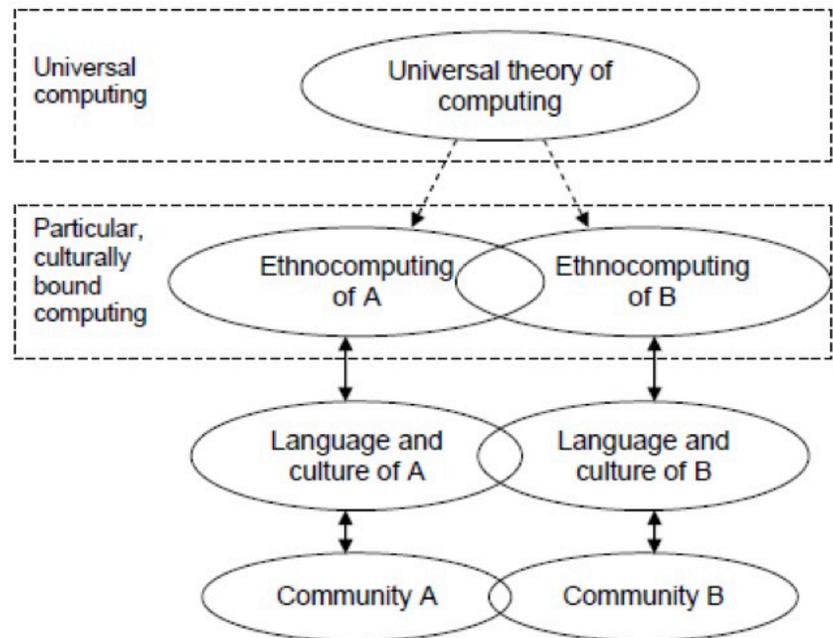
Finding ways of increasing attendance and ensuring students engage at the start of their degree is particularly important for all students; some students may find bonding with an individual helps them have that sense of belonging and increases commitment to the module.

Building on the idea of paired programming between industry and university students, the University of Ulster introduced an idea developed in the United States, that of paired practical assessments for students on a first-year programming module. The motivation for this change in learning and assessment was to tackle retention and encourage greater engagement by students. To ensure both students gained from the experience they completed the practical and were assessed in pairs, but on the basis of their individual contribution. Both students had to be present at the assessment to obtain their individual mark and were asked individual questions about the practical to demonstrate their individual understanding. By conducting the assessment in this way, no individual student received credit for their partner's work (Coleman, 2010: 2).

For examples of student collaborative activities see the Art, Media and Design, and Education subject guides.

Challenging the idea of universal assumptions

Ethno-computing refers to a cultural perspective in problem-solving methods, conceptual categories, structures and models used to represent data or other computational practices (Tedre et al., 2002: 195). One way of enabling students to appreciate that their cultural, educational and personal learning approaches may influence how they undertake a task is to [include readings about equality and diversity issues](#), in this case ethno-computing, in bibliographies and use this as a focus for discussion in seminars. The relevance of this broader perspective can be encouraged through use of questions or pre-seminar tasks to invite students to identify Web 2.0 materials or commercial and other learning contexts where cultural sensitivity and awareness may be effective, economically sound and, according to Tedre *et al.*, “go hand in hand with creating ethnically fairer science” (Tedre *et al.*, 2002: 196) that challenges the idea of universal theories of computing.



The relationship between particular and universal computing
(Source: Tedre et al., 2002: 198)

Kaczmarczyk (undated) working in the US, advocates working with intercultural colleagues to challenge universal assumptions and increase understanding of students 'learning style culture'. This was valuable in raising awareness of Computer Science staff and students that culture can influence "perceptions of authority, respect, correctness of collaboration on coding, the importance of completing assignments on time, regular class attendance, asking questions when confused, how to study for exams" (Kaczmarczyk, undated: 2).