Accessibility and adaptive technology

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Background and rationale

Experience gained during an earlier project (Musgrove, Homfray & Addison, 2001) supported the premise that providing appropriate specialist hardware systems and adjusting software interfaces could improve accessibility to Information and Communications Technology(ICT) and consequently to Technology Supported Learning (TSL) supported modules for certain additional needs students.

School of Applied Sciences (SAS) and School of Art and Design (SAD) already have a large constituency of additional needs students which has a potential to increase through normal recruitment as well as through School or University initiatives (e.g. Flexible Access Projects and Widening Participation) and transfer from linked F.E. colleges and other institutions.

The project aims to enhance learner support by implementing such specialist resources, infrastructure, training and support, as will enable additional needs students to fully exploit the increasing use of software, TSL and on-line facilities

The project is supported by the broad experience of the team; two members have specific ICT skills as well as specialist subject skills and are involved in SAS TSL developments and the third has considerable experience in supporting additional needs students.

The innovation

The system remains largely as described previously (*ibid*):

- SAS Printer Account Software allocates each learner a unique user name and log on password which controls access to the SAS 'Assembly'[1] facilities and to individual student 'printer accounts' and enables 'needs profiles'.
- The computer specification remains the standard SAS configuration[2] but with the graphics cards replaced with Matrox G400 or G550 cards. These permit synchronous output on two monitors, provide magnification facilities and output to LCD Flat Screen monitors.
- Hewlett Packard ScanJet 5370C scanners are linked to each computer. These devices can be operated in different modes according on the nature of the output required (i.e. either scanned images or OCR files for saving in text or 'talk back' formats) and are implemented through two disparate scanner programs with appropriate icons on the desktop.

There are three principal additions:

The effects of flickering by fluorescent lights and from CRT monitors on individuals who suffer from epilepsy and similar conditions has been well documented and we have equipped one machine with an LCD flat screen monitor to help alleviate this effect. An LCD monitor on its own may not be an adequate solution; flicker from adjacent CRTs will impinge on

1 The 'Assembly' in the new SAS computer facility

2 RM P111 866MHz, 128MB SDRAM, 20 GB Hard Drive, CD Rom Drive, 100 MB Zip Drive

the user's 'peripheral vision', and some form of screening or 'flicker' isolation may prove essential.

Two 'voice control' software packages have been installed and have been pilot tested. Initial results are encouraging and the facility within both these programs to 'read back' Word documents may be particularly useful to some students.

Many students have differing preferences of display styles and colours, whilst others have specific needs for particular combinations, as documented by Stein and Wilkins in papers presented at *Current Research in Visual Instability*, Oxford, September 2001[3]. The choice menu system enables students to select a combination of foreground, background, and where appropriate font colours as well as font styles and sizes applicable to desk tops and Windows display options.

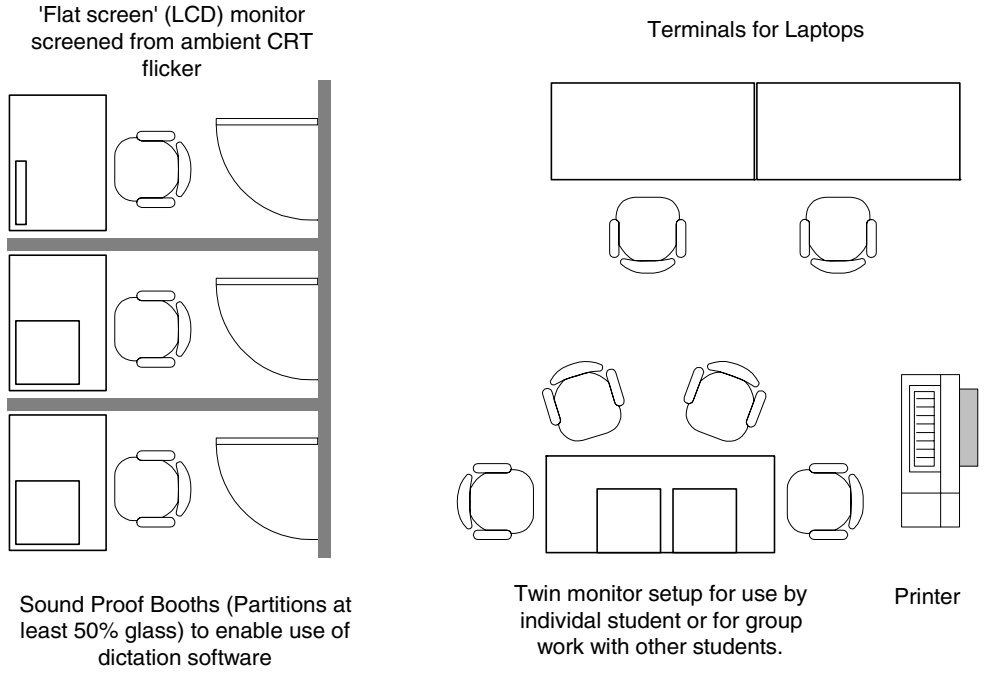
Their selection will be written to their log on script and, given certain constraints, will be invoked whenever the student logs on to an 'Assembly machine'. The principal constraints are centred on font size and the appropriateness of the chosen size for the monitor size in use; the commonly used monitor size in Assembly is 15" although there are a small number of 17" monitors on the machines in the Spatial Information Suite.

Some larger font size needs can be catered for through using the larger monitors on the 'Accessibility' machines or through the use of smaller standard fonts viewed under magnification on the same machines.

These preferences will also form the basis for individual templates for use in Microsoft ® Word and for backgrounds and display options in Excel and other program suites which have similar facilities. Individualised templates will be stored on the students personal file storage area ('V drive')

Outcomes

We have equipped and designed (albeit not yet housed) an Accessibility suite capable of catering for up to 6 learners simultaneously. The figure below shows a potential configuration.



3 J Stein, *The Visual Basis of Reading Problems.*
A Wilkins,. *Improving Reading Fluency using Specific Colours*

Evaluation:

The choice system was tested on a group of student volunteers who were asked to run through the basic choice routine and then fill in a simple questionnaire. None of the panel declared themselves to be dyslexic, colour blind or to have any known major eyesight problems.

The most popular option was the ability to change font style followed by font size; however some students selected a colour change option either on its own or in concert with font size or style changes whilst others chose a reduced font size with some font types and colour combinations.

All respondents considered the choice option a useful feature, particularly in view of the independent nature of engagement, which should be a standard feature of all SAS machines.

The responses from the panel support the view that the simple adjustments to interfaces and displays to meet individual needs or preferences can provide a useful adjunct to our standard provision particularly where they can be implemented without compromising the security of the system as a whole.

The general availability of the choice options will permit individuals to specify personal settings and display choices which may be sufficient to meet their needs without 'flagging up' an additional needs status.

The read back facilities from both 'voice produced documents' and OCR scanned text were well received by those students who experienced them, although the somewhat wooden and stilted presentation inherent in these systems caused some confusion and not a little amusement.

The dictation software programs need a concerted effort on the part of the user to 'train' the software; our provision is perhaps most appropriate to those learners who have been recommended to use or are already using these systems as part of the Disability Advisory Group/Disabled Students Allowance assessment and where previously 'trained files' may be imported to the system.

The configuration of our proposed Accessibility Suite will provide 'exclusive' facilities where students can work in privacy and functional isolation, for example for learners using the dictation or read back provision, and at the same time provide 'inclusive' facilities where students can work with their peers and collaborate on 'group' projects or tasks.

The proximity of the technical teams remains a *sine qua non* and their availability to provide support both in system and software and in subject specific areas should form a major component of an 'Additional needs in ICT strategy'.

References

Musgrove,N.J., Homfray,R.P and Addison K. (2001) Development of ICT provisions for Additional Needs science students in Moore,I. Gale,H and Soden,C. (eds) *Learning and Teaching Projects 2000/2001:Changing Practice Through Innovation and Research.* University of Wolverhampton

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