LEARNING TECHNOLOGIES

A Computer Based Training Package for Users of Distributed Computer Systems

ON COURSE WITH COMPUTER TRAINING

The South Bank University's Department of Computing and Mathematics was funded by the Employment Department to develop a computer based training package on distributed Computer systems. These systems are playing an increasingly important role in information technology. The project was completed in January 1992.

Project background

The first computers were stand alone units which worked independently from other machines. Users wanting to share software had to exchange floppy disks, and information needed from another computer had to be physically fetched. It soon became clear that computers could be used much more efficiently if they were linked together in a network system. This meant that a person could send messages from terminal to terminal (a practice known as Electronic or E-Mail), access information from other computers and even share equipment with other computer users. For example, there is no need for everyone on a network to have their own printer.

Businesses soon recognised the benefits offered by networks which have rapidly increased in number. It has been estimated that during the early 1980s, less than five per cent of corporate desktop computers were networked. Today, the figure is nearer 70 per cent. Some companies are now using 'smart' networks known as distributed computer systems. These offer additional features and flexibility over conventional networks.

However, the rapid growth in the use of networks has created a shortage of courses and trained personnel. This shortage needs to be addressed if business and other users are to fully exploit the benefits offered by networks and distributed computer systems.

The project team had two main aims:

- To develop a computer based package for people requiring knowledge of distributed computer systems.

- To develop and integrate a variety of network simulations which would help users develop skills without needing to use a real distributed system.

The package also had to be relatively inexpensive.

Target Audience

The project's work was designed for a variety of users including:

- Manufacturers, suppliers and consultants, who advise and supply companies with network systems.

- Company purchasing officers who decide what computer hardware and software their company should invest in.

- Managers and other office employees who would regularly use a network system.

- Technical staff whose tasks may include network management and programming.

- Course tutors who teach users about networks and distributed computer systems.

- Trainees and students on information technology courses.

The training package was designed to be modular, flexible and suitable for all types of users, from beginners to people with some experience in the use of networks. The package would also provide different levels of interactivity and be suitable for someone requiring a short overview or a full-term, intensive course. Users may also follow a prescribed course or work through the material independently.

Traditional forms of learning cannot deliver the objectives listed above and for this reason, the project group decided to use an open learning system. Such systems enable the user to control the pace, depth and direction of his or her own learning. Open learning systems are cost-effective, flexible and efficient when compared to traditional types of teaching.
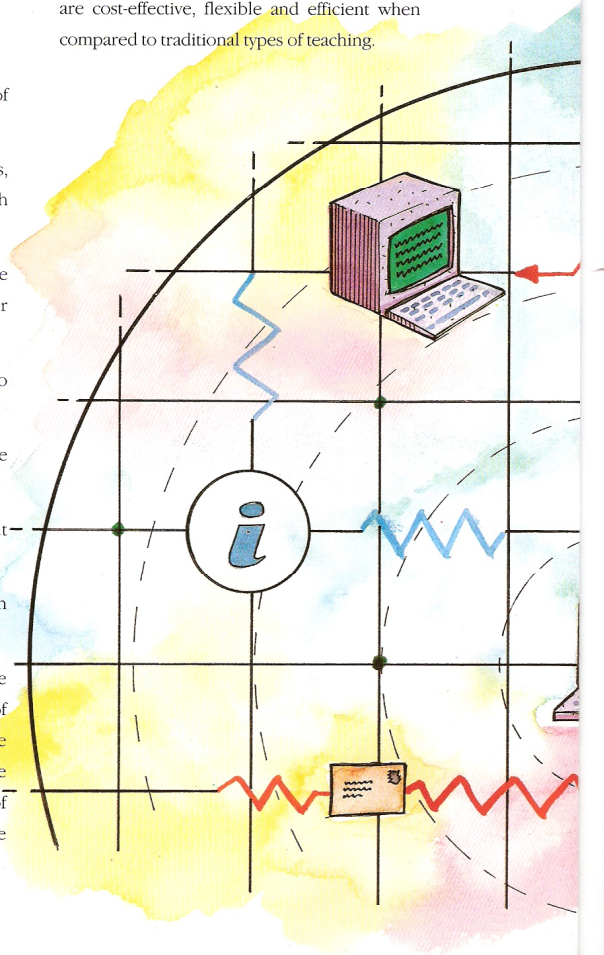
The Training Package

The project group developed the Hypercourseware Management System, which enables course developers to integrate various types of software and media (such as text, video and graphics) into an extensive course. The system is very flexible and it is easy to reshape or modify an existing course without extensive rewriting.

The learning package is simple to use. The user sits in front of a computer screen which displays a mix of text, graphics and animations.
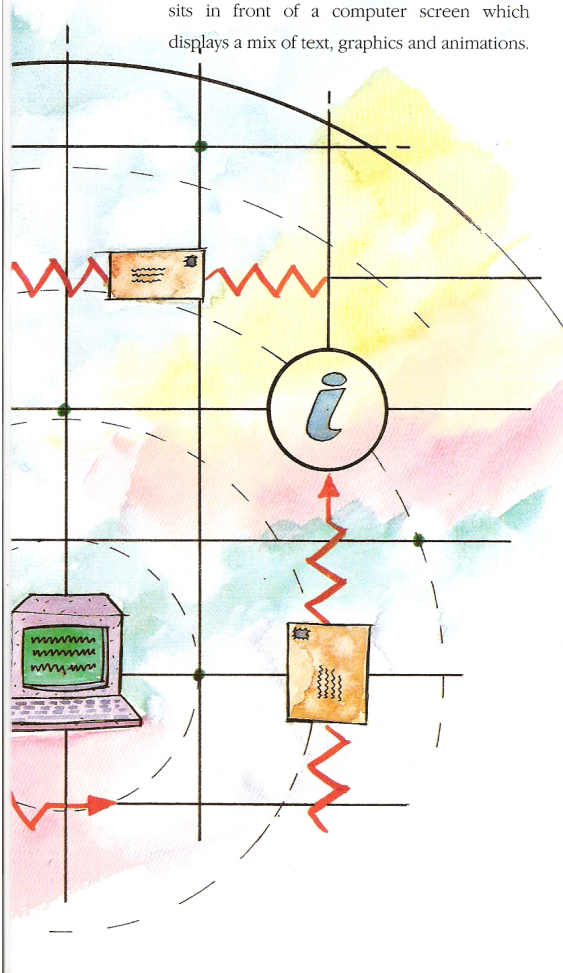
Users can select items from on screen menus and explore, browse or study the various types of information. The system also provides help and advice, eg the computer may suggest which topics are studied after the current topic. The student is, of course, free to follow or reject this advice. The courseware contains over 30 hours worth of material in the form of assignments, presentations, assessment activities and simulations.

The Simulations

In an ideal world, trainees would acquire skills on a real network system, but such an approach has a number of disadvantages. For example, it can be expensive and requires lots of resources. The trainee is often limited in the number and type of operations they can make, and such exercises may mean that other people cannot gain access to a computer. There is also the possibility of a trainee's actions damaging part of the network system. Another problem is that it is hard for the trainee to gain an overall view of how the network operates.

Computer simulations can overcome many of these problems. Users can watch pre-set simulations which show the network operating under various conditions or they can alter parameters (such as the amount of data being sent around a network) and observe the effects. In the South Bank system, a text box provides a running commentary and statistical information which may be printed out. Users can observe the whole or part of a network and the simulation can be run continuously or in a step-by-step fashion.

Project results

The training package was used by the university's undergraduate and postgraduate information technology students. The results have been very positive with the students finding the package both interesting and informative. There has also been a positive response by staff. In fact, the package has been so successful that it has been adapted and used by South Bank's Electrical and Electronics Engineering course.

The training package and Hypercourseware system have been described in various journals and presented at a number of scientific conferences. There has been great interest from over 14 educational institutions around the world.

South Bank University has produced demonstration software and is planning to organise an inexpensive licensing system for educational users. The university is also targeting commercial producers and users of computer based systems and commercial clients for the Distributed Computer Systems software.

Summary

The project has shown that open, flexible learning systems can help resolve the current shortage of persons trained in the use of network systems. The training package produced is both versatile and flexible and offers many commercial opportunities.

Technical Terms

- Distributed Computer System. A 'smart' network system which has more features and greater flexibility than a conventional network.

- Interactive. A system which allows users to control what they see and hear. Compare this to watching a television programme which is passive.

- Network. A series of interconnected computers.

- Simulation. A real life system or situation presented on a computer screen. Users can often alter various parameters and observe the effects.