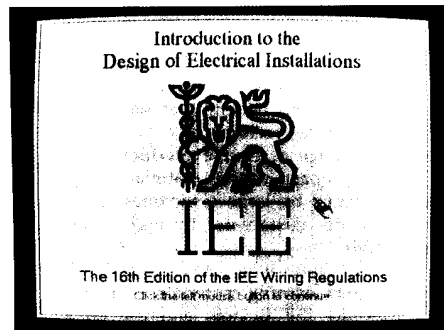


After school



Distance learning, or open learning, is gaining popularity in the ever-growing market for continuing education at the same time as the spread of technology is allowing many new suppliers into the field. The IEE is launching its own selection of courses this month, on the back of the 16th Edition Wiring Regulations

by David Spikins, Consultant

Schoolchildren everywhere would be horrified at the thought that academic work can now follow them anywhere, and they may still be taking courses and exams right through their working lives. But that is what distance learning, or open learning, means. For a price, you can take a course in almost any subject, from school to postgraduate level, without leaving your daily home-work routine.

Even the technology used to deliver the course varies from simple mail to state of the art. Distance learning can be available online via satellite. In the USA, the IEEE has been transmitting a programme of one-day video seminars by satellite since 1982, allowing participants to phone in questions to presenters. The cost of each of the more than 30 broadcasts so far has been high — access to the satellite is the major item — but as a service to members of a professional body, the value is hard to calculate.

In the UK, the best known and most accessible distance-learning courses are provided by the Open University, with which many thousands of people have studied courses leading to first degrees since its foundation in 1969. Less well known are its continuing-education courses, some of which combine to provide masters' degrees in manufacturing and the industrial applications of computers.

One factor that complicates the accessibility of distance bearing is letting potential users know what courses are available, and helping them to assess which courses are appropriate.

In the 1880s the Marchioness of Aberdeen founded the Onward and Upward Association to provide correspondence courses for domestic servants; by the turn of the century, it had over 100 branches, including several overseas, all managed by district committees that

included both employers and staff. In a society controlled by social class, this association did not survive the Great War; but it was an example of the opportunities for self-improvement provided by correspondence courses. Such courses dominated the early open-learning market, and are still widely available.

These first courses shared many elements of modern distance learning. Information was presented to the student, often using textbooks produced by the correspondence college; the student then carried out assignments, which were criticised by a tutor by post and then, often, the student took a public examination — set by university schools examination boards or a professional institution. More sophisticated versions of such courses included residential study centres and lectures at technical colleges.

Students could acquire just about any skill or qualification by this means, in languages, accountancy,

painting or engineering — and many still do. These courses were aimed at those who had strayed from the conventional educational path, whose needs were not shared by enough people in one area to justify a college course, or whose jobs prevented them from attending face-to-face courses.

These are still major reasons for 'open' or distance-learning study; a further reason has emerged with the development of technology. In many cases the technology of (for example) computer-based teaching means that a subject can be understood more easily by people of widely varying experience and knowledge when taught on an open-learning basis.

The first technology to be used in distance learning was the gramophone record, pioneered by Lingua-phone, whose boxed sets of records taught foreign languages to many thousands of people. As in every activity, the pace of development of useful technology has quickened over the years; CD-ROM-based multimedia technology is the latest to be emerging.

Broadcasting has aided teaching for many years. For example, interactive schools broadcasting has long served remote communities in Australia; the big development in the UK was the establishment of the Open University in 1969.

**Producing lecture
tape from multi-
camera
installation**

[photo: Aston
University]



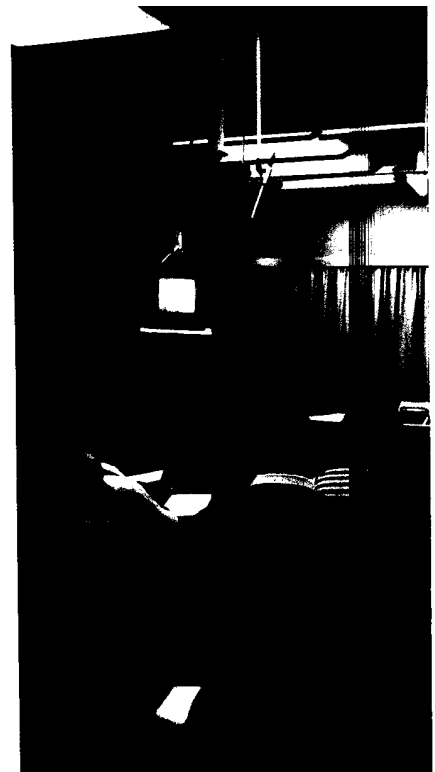
using both television and radio to provide degree courses on countless subjects. The advent of video and tape recorders relieved students of the need to work at unsocial hours, but the main benefit that has come from these technologies is that a wide range of course producers can now prepare course materials commissioned by large companies, or to offer to customers through catalogues.

For those who produce and sell distance-learning materials — a field that the IEE is now entering on a large scale — the issues are quite complicated; but, of course, there are simple rules that can help one to create a substantial and worthwhile undertaking:

- Is the product specification right?
- Is the most appropriate technology being used?
- Is there a large enough market?
- Is the price right?
- Is it being launched at the right time?

The IEE will launch distance-learning courses on the IEE Wiring Regulations 16th Edition, using a combination of video recording and computer-based teaching (CBT); it is to be hoped that they will meet the criteria.

Video recording now has a well established place in distance learning, and has been used by course



producers and educational institutions in many ways, ranging from illustrative support for a text-based course to a full video presentation akin to a conventional lecture.

It is here that the problems begin, both for producers and users. Many producers spend little effort on their productions, and even today poor presentations, unstructured material, low quality, confusing graphics and poor camera work are still offered to users. The image of distance learning among potential users has suffered from such poor-quality materials. All this is changing, but prospective buyers are still well advised to base their choice of material on the reputation of the selling organisation, and particularly to seek to preview material before buying.

Linear video as a training medium has the advantage that every user receives the same message — an incalculable benefit to a company that has to train large numbers of people, as found by the users of the awareness course on electrostatic discharge made by Talkback Training, under the auspices of the 'Video Courses in Industry' programme funded by the Department of Trade & Industry.

The drawback is that, unless a course has a modular structure, every user has to go through it from the beginning — a disadvantage over-



Now filming — an MBA lecture at Aston University. Note the video camera pointing vertically down from above the lecturer's desk

[photo: Aston University]

dents each year for use by distance learners. Over 50 students per year enrol on this course, which has the advantage of being right up to date — for example, a distance learner can see and hear on video an analysis of the Chancellor's Budget in the week it is presented.

Aston has also recently developed a system to produce low-cost but acceptable video presentations by specialists. One objective was to keep the use of the specialists' time to a minimum — currently about 2 hours for a 40-60 minute presentation. All the graphics are based on sets of sketches produced by the specialists, and reproduced by computer.

The lecture is edited to take out corrections and create a good flowing presentation, and the graphics are inserted. The same editing facility can be used to incorporate video film, slides and other taped material. Finally, music and titles are added to produce a good but relatively cheap product. With careful planning, the entire process can be completed in around 3 days from start to finish.

The IEE has used a similar technique to create its Individual Learning Programs series, and the IEE hopes soon to start identifying a range of topics for video-based expert presentations for its portfolio.

Several universities and polytechnics in the UK have now developed the skills and have the experience to

produce good-quality video courses — many having been encouraged by the DTI Video Courses in Industry programme, which offered grant aid for the development of courses in electronics and information technology.

Alongside the academic institutions, many specialist companies, some with a long history in the area of training films, have entered the open-learning market. Longman Training, which took over Rank Training last year, has an established reputation in the areas of sales, management and health and safety; Applied Learning International, which has probably the most extensive catalogue of all, is strong in computer skills, from basic operator instruction to advanced programming. Applied Learning also has a range of 'human-resource development' and manufacturing management courses.

This month, under the title IEE Distance Learning, the IEE launches courses in four areas: software engineering, management for engineers, communications and regulations, and codes of practice and standards. For its catalogue the IEE has drawn on its vacation schools, and has also commissioned a range of courses, which are monitored for technical accuracy and completeness of coverage, relying heavily on the technical skills of IEE members as contributors and

come by interactive video and the new multimedia technologies. Computer-based teaching also deals with this problem.

Video courses have been made with both large and small budgets. Although a bigger budget does not always mean a better course, there is probably a lower budget limit below which it is difficult to produce material acceptable in a market accustomed to the quality of television documentaries.

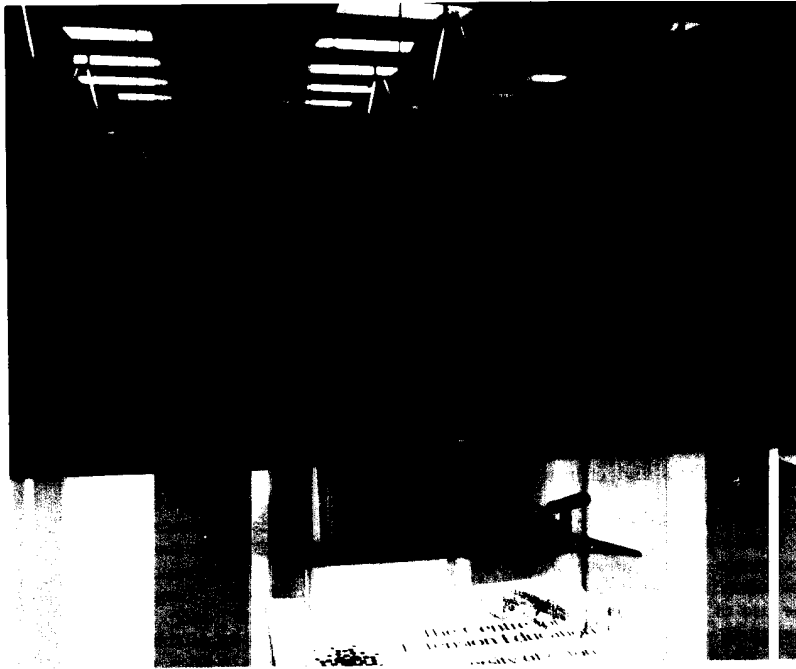
The cost of a video-based course depends to a large extent on the amount of location film needed and the amount of editing that the material requires. Most video courses are accompanied by printed material — notes and workbooks — which again may vary widely in cost. As a rule of thumb, between £15 000 and £30 000 for an hour of edited video material with supporting notes is a reasonable guide. The ratio of production cost to purchase price, of course, depends on the size of the market as perceived by the producer.

Video materials for training have been produced by recording lectures in universities and polytechnics, using two cameras, one recording the diagrams and tables used by the lecturer, from a position above the lecturer's desk. This can produce a very acceptable budget course. Aston University uses such a system to record its MBA lectures to internal stu-



Output from up to three cameras is mixed to produce a tape

[photo: Aston University]



Before filming — the view from the sharp end

[photo: Aston University]

assessors. There will also be a few courses that, although not produced by the IEE, have been made by reputable academic institutions and commercial organisations and have been carefully assessed before being included in the catalogue of IEE Distance Learning.

Although more distance-learning material is available on video than on other storage media, the newer technologies — interactive video, computer-based learning and multimedia — are gaining ground.

The term 'Technology Enhanced Training' was coined by the Services Sound & Vision Corporation, whose long history in the retraining field started with conventional films made for the armed services, but now serving a much wider range of customers.

In the 1980s several new technologies appeared to aid the design and production of educational and training materials. There is no doubt that the right technology, properly used, can substantially enhance any in-company training activity, even if techniques such as video, interactive video, computer-based learning and multimedia cannot fully replace direct contact between teacher and student.

How far distance learning can compete with conventional courses depends more on the quality of presentations — their planning and delivery — than on the particular technology used. Even so, interactive systems have provided the most sig-

nificant step forward in technology for the enhancement of training.

Interactive video has been in use for 10 years or so. It offers the huge advantage that stored information — video pictures or graphics — can be accessed anywhere on the disc on instruction from the computer whose software manages the system. This is the technical key to the problem of planning courses that allow interaction with the user, and many course producers have taken advantage of it.

The National Interactive Video Centre (now closed) listed no fewer than 30 different authoring packages in its 1990 yearbook — all aimed at developing courseware to run on various computer systems, and to control the Laservision Videodisc player, which holds the information. Typically, apart from the disc player, the user needs an IBM AT or fully compatible PC, with a hard disc and a colour monitor.

Interactive video has a reputation for being expensive to produce — which it is — and expensive to use. In practice, however, it is very cost-effective if the numbers of trainees in a company are relatively large, or if the producer can find enough users who are prepared to buy the specialist hardware. Again, there are many suppliers of suitable workstations, and even more suppliers of elements for users who can assemble their own systems. Computer-based learning (CBL) offers the benefit of interactivity but without moving pictures or sound. Again, a PC is used, but all one needs is the AT-compatible computer and often a mouse.

Authoring packages abound; the IEE has chosen the Guide system from Office Workstations Ltd., and has encouraged its contractors to use it for the first generation of CBL courses. Again, courses are expensive to produce, but the cost to the user, of both hardware and software, is relatively low in the large markets for which most courses are planned.

'Multimedia' has become an early buzzword of the 90s, and holds great promise for distance-learning applications. The question is: how soon can that promise be fulfilled? For many purposes, such as the storage of text, the answer is 'now' — an (unillustrated) encyclopædia can be stored on one side of a compact disc. Moving pictures and all the other features we can expect to see in interactive training packages for the 1990s should be available soon.

The IEE's distance-learning programme will include multimedia-based courses, initially in the area of software engineering, where moving pictures are a luxury, not a necessity.

The great debate centres on the compact-disc system that will become the industry standard for education and training. The audio compact disc was the first optically read digital storage system, but for moving pictures the CD is limited: in the consumer market, a 12 cm disc can hold about 6 minutes of video with sound and a further 20 minutes of audio.

In the professional market — databases, archive storage and training — CD-ROM with a 600 Mbyte storage capacity is established as a basis for large service manuals accessed through a hypertext system. CD-ROM XA (for eXtended Architecture) has tried to overcome the storage limitation. Another development is the chip-based digital video interactive (DVI) system, which relies on data compression.

The industry will inevitably resolve the problems that face the multimedia course producer; but how fast? In July 1990, I was told that it would be possible to make a sensible choice by the end of the year; in July 1991, the story remained the same.

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