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ABSTRACT

This position paper explores the potential of new technology to radically alter both distance education and conventional higher education. It hypothesizes that technological developments could even lead to the demise of the conventional campus-based higher education institution by the year 2000. Instead, people of all ages would be able to study at any period of their life through a mixture of home learning, study at work, and occasional visits to "old" campuses, whose primary function by then would be research and curriculum development. It is predicted that the determining factors for the materialization of this scenario will be political and institutional, not technological or even financial. The following sections are discussed in the context of this hypothesis: Print, Television and Culture; New Communications Technologies (Cable Television and Video-Cassettes, Computer Conferencing, and Computer-Based Audio-Graphic Systems); New Institutional Models; and Political and Institutional Barriers. (THC)

NEW TECHNOLOGY AND ITS IMPACT ON CONVENTIONAL AND DISTANCE EDUCATION

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Changing the System

New technology has the potential not only to alter distance education radically but also conventional higher education. It could even lead (optimistically?) to the demise by the year 2000 of the conventional campus-based higher education institution as we know it. Instead of a system based on full-time attendance for three or four years for a select few between the ages of 18 and 24 on a large campus, people of all ages will be able to study at any period of their life through a mixture of home learning, study at work, and occasional visits to "old" campuses, whose primary function by then will be institutes for research, and for curriculum development. If such a scenario fails to materialise it will not be because of technological or even financial limitations. The determining factors will be political and institutional.

Print, Television and Culture

For 2000 years, from Socrates onwards, the main medium of teaching was the teacher in direct contact with the learner. Then the invention of Gutenberg press had a profound impact not only on education but on all aspects of life. Neil Postman argues in "The Disappearence of Childhood" (W H Allen & Co) that our modern conception of childhood stems from the need to learn to read to become an adult. From this need grew the modern concept of schools and universities - institutions at which learners had to spend a good deal of their time to develop the skills needed in society, and above all, the skill of reading. However, books did not replace the teacher, but became a partner in education.

Equally, the development of modern communications technology is having a profound effect on both society and schooling, although it is difficult for us, like fish in water, to appreciate fully the effects. Postman argues that skills required for reading put political life on a rational and intellectual basis; television on the other hand is resulting in a more intuitive and impressionistic approach to politics. Issues are rarely debated at length; personality and impressions are more powerful determinants of voting behaviour than argument.

New Communications Technologies

Television though has been with us for more than 30 years - long enough for its long term effects to start to be appreciated. It has also been a relatively remote and peripheral part of the education system. At this moment though, the range of media available to teachers is rapidly expanding. Video and audio cassettes, cable and satellite TV, viewdata and teletext systems, and above all the microcomputer, between them provide a bewildering range of choices. Each has strengths and weaknesses, but in suitable combinations they can lead to radical changes to our education system.

I want to take just three examples to show their potential for distance education.

Cable television and video-cassettes. There are several important features of cable TV and video-cassettes which distinguish them from broadcasting and which hold promise for higher education. First, cable TV is local. Teaching materials can be delivered off-campus to studentswithin reasonable travelling distance of an institution, thus combining the flexibility of home or work-based study with less frequent but perhaps essential visits to the campus. Cable distribution could also stimulate increased recruitment to an institution's courses. Secondly, the rapidly growing home ownership of video-cassette recorders means that the disadvantages of broadcasts - their ephemerality, their lack of integrated study activities, the need to be in a fixed place at a fixed time - can be avoided. Thirdly, video can provide unique learning resources in the students' homes not easily available even on campus: rare experiments, field visits, case-studies, manufacturing processes, etc. Fourthly, production costs can be far less for cable TV or video than for broadcast production, particularly if production facilities already exist on campus. Fifthly, cable allows for live interactive programmes, with students telephoning questions and participating in discussion "on air".

Lastly, materials can be shared, or coproduced, between different institutions, and distributed between cable systems via satellite links, on a European or even world-wide basis.

Computer conferencing. Using a cheap home micro-computer, a moden linking the micro to the telephone system; a word-processing package costing around £50, a student can type up essays or leave messages or queries for a tutor. The information can be batched and sent down the telephone line in a burst (to save line costs) to be dumped on a main-frame computer. The tutor, also at home, can call up all the essays one by one from the mainframe on his own micro, mark them and add comments or further work, and using a secure code-word, enter the grades against the students' files. If the tutor wishes, all students can access each other's essays and comments. Students can comment back to the tutor, or with each other, either before or after preparing their assignment. "Conversations" via the key-board can be had in real time via the computer, or messages or queries left by students or tutors to be "collected" when convenient. No computer skills are required - just a list of codes to identify students and tutors, and commands to choose functions. The software which provides this facility can be bought "off-the-shelf" for £6000, and can handle up to 200 simultaneous connections, dependent on the main-frame capabilities.

Computer-based audio-graphic systems. It is now possible to use standard, low-cost micro-computers to design teaching materials which combine graphics with the teacher's voice, without requiring any computer programming skills. The system consists of a standard micro-computer, a stereo audio-cassette recorder, a light pen, and a software package in the form of a chip. This enables a teacher using a light pen to draw diagrams in colour on the TV screen, to type and move words using the micro keyboard, to edit frames via the computer using a menu of commands, and to provide his or her own commentary, synchronised with the graphics via the stereo cassette recorder. The video pictures are converted into sound signals by the micro-computer, and can then be stored on the sound track of the audio-cassette, for use in an independent learning mode.

Alternatively, the system can be used in real time for distance tutoring. Because the video pictures have been converted to sound signals, these can be sent down a standard telephone line and decoded back into graphics on a TV screen at the other end. Using standard telephone conferencing facilities, and two lines, one for sound and one for graphics, a teacher can run a tutorial with up to six distant students. Each student and teacher can see or alter what is on the screen and hear each other.

The Open University version of this system, called CYCLOPS, ran successfully in the distance teaching mode in 18 centres for three years, and the independent study mode has also been successfully piloted in schools. The key point is that teachers can now create their own audio-visual materials, using their natural (rather than synthesised) voice without the need for computer programming skills (although some practice and training is desirable).

These are just three examples. The significant points about these and other emerging technologies is that they are easy to use by teachers; they are relatively low-cost to develop and use; they use technology which is becoming readily accessiable in people's homes; they leave the individual teacher in full control of the teaching process; and above all they allow the learner to interact with technology, so that learning remains an active process, but at the convenience of the learner.

New Institutional Models

A major obstacle to the development of distance education has been the need to set up large specialsit institutions with high starting costs, such as the Open University. However, these new technoligies now offer the possibility of an alternative model to the large, centralised, specialist system, requiring sophisticated learning packages designed by large course teams.

New communications technology will enable conventional education institutions to expand into off-campus teaching at relatively low cost, using either on-campus staff, or more interestingly, specialists from industry or the public sector. The role of a higher education institution could therefore become that of providing a communications system which allows for a combination or on and off-campus teaching, and through which tutors, students, and administrators can communicate with each other.

Perhaps the most valuable spect of such developments though is the potential for economies of scale. Already for instance the Open University could handle many more students without extra cost to the Exchequer, since the student fee now more or less covers the cost of adding one more student to already existing courses. Well-designed systems should thus enable many more students to be handled at the same cost, without lowering of standards.

Political and Institutional Barriers

The technology, by and large, is not the problem. For it to be successfully introduced and used though in a cost-effective way, major changes in political and institutional attitudes towards distance education are needed. Most distance education - including Open Tech initiatives - is still primarily print and tutor-based. The one institution already well placed to capitalise on these new technologies - the Open University - is in serious financial difficulties and is having to contract its activities rather than expand. Technologically-based education will require some investment, if only of a pump-priming nature. It will need more than rhetorical statements of support from Ministers and senior decision-makers. For instance, despite the UGC's recent submission to the Government on continuing education, it does not apparently intend to seek more money for such activities.

But the main barrier is the inability of large institutions to carry through the fundamental changes in organisation, financial arrangements and teaching strategies that are essential if flexible off-campus teaching is to be achieved. A coherent financial system which accepts off-campus teaching as an essential cost, and the ability to treat the costs of off-campus teaching as an integral part of undergraduate teaching, are essential. There is a need for a major training programme on the selection and use of communications technologies for existing academic and administrative staff, who also need to understand these technologies. This does not mean courses in compututer programming, but raising awareness of the functions of the various technologies, their costs, and organisational requirements, with suitable technical support for users of these new technolgoies. There is a need to protect and expand instructional design services within institutions, and finally a need to integrate administrative and teaching computing systems, so that all communications regarding fees, enrolment, examinations and teaching can be handled by the same system.

Even with pump-priming, there is unlikely to be a substantial increase in funding for distance teaching activities in the current financial and political climate. This means the changing priorities and current, frankly inefficient, on-campus teaching practices to release resources for new developments, and much greater use of "off-the-shelf" software and courseware.

If all this sounds like a lot of effort, it is salutary to consider the consequences of not doing this. The need to up-date engineers, businessmen, managers, etc. throughout their working life will not go away if higher education institutions ignore it. New technologies such as computer conferencing do not need campus-based institutions. Already a private entrepreneur has set up the "Electronic University" in the U.S.A. This is basically an agency which puts people in need of professional up-dating with specialists in the field. The sp ist is paid a fee, and the "Electronic University" provides the facilities required for the teaching.

The dangers of such practices are obvious, but nature abhors a vacuum, and failure by conventional institutions to respond imaginatively and positively to the new technologies will result in thier increasing isolation from society.