

Educational technology and education in technology

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This paper discusses the impact of new technology on education. It is concerned with new technology as a method of delivery, a subject and an object of education. Nigel Paine argues that, if the educational world does not respond to the new networks being established and the new curriculum areas being developed, then alternative means of formal and informal learning will develop. The whole issue of innovation in education is discussed looking at centralist or devolved models for educational development.

The context in Britain

In Britain at the current time we have been in the throes of fairly massive disruptions of our schools by teachers. Even though the roots of the discontent are superficially very different in England and Wales and in Scotland, the essence of the problem is very similar. It is not necessarily about money or conditions of service, it is much more about change and the reaction of a group of beleaguered professionals to change on a massive scale.

The naive amongst us believe that once the present curriculum developments have settled down, life will go back to the same old routine as it had done previously. Nothing could be further from the truth. In the last five years in Scotland we have systematically taken apart the curriculum: first 16+ at non-advanced level, then standard grades from 14-16, now 10-14 and soon post-compulsory advanced education and the later primary curriculum.

What we have done is put into place a structure that allows not permanence and solidity, but increased flexibility and constant up-dating and change. I believe that it is likely that teachers in the future (like their colleagues in Further Education) will work more hours in a day than their pupils and more weeks in a year. Time will have to be made available for staff development on a regular and enormous scale and teachers will have to learn the process of basic curriculum development skills.

Up until now most curriculum development has rested on the shoulders of the few who have worked extremely hard without recompense and that expertise

has been used by the majority. That position has now gone. The curriculum change in the education system is not happening in a vacuum, it is happening in the context of vast social change throughout Britain as a whole.

Over the last twenty years, those employed in the manufacturing industry, as a percentage of the total workforce, has shrunk by one third, those employed in mining and agriculture, construction and utilities have also shrunk by one third while the percentage employed in service industries has risen by one third.

This is a massive social change on any scale, if you consider that those people who have remained within a sector in which they started work, then that era encompasses the introduction and dissemination of new technology. Never before have so many people had to learn so much merely to stay still, and never before have so many people been thrown off that merry-go-round so rapidly.

Education is inexorably bound up with that change as the jobs within education change, and as the technologies of learning alter. But also because the nature of the world of work outside the education system reflects back on the values within it.

This social change is coupled with a dramatic fall in birth rate which will mean that of the population at work or looking for work in Britain today 70%, will still be in the workforce by the year 2000. Of those 70%, approximately 70% left school with minimal qualifications and 70% of those have had no training since.

How many of those people will be doing the same jobs in the same way by the year 2000? How many new job opportunities will appear by the year 2000 which will need new skills to master?

We need a world where adults will learn, continue learning, relearn and accept learning throughout their lives, and we need a school system that turns out pupils enthusiastic and glad to continue to learn as adults.

One of the things that Scotland does better than practically any other country in the developed world is build into its youngsters a deep bitterness, resentment and dislike of any form of training or education after they leave school and the majority of pupils are incredibly successful at avoiding any further contact with the education and training world.

We then have two major problems, the first is to focus more on the process skills of education rather than the product. We must create those capable of taking their learning destinies unto their own hands. Secondly we have to open up huge learning opportunities for adults on a scale undreamt of until now.

In a time of fairly significant cuts throughout the education system the Scottish Council for Educational Technology has doubled its budget and almost doubled its staff. You could argue that there is some bizarre freak coincidence in this or you could see it as a covert statement by those who make the decisions in education that the kinds of role that SCET plays is one which

Scotland and the Scottish education system needs to expand and concentrate upon over the next few years.

What does SCET do: as a national body it has a role to offer information and advice; to train; to offer consultancy to disperse limited funds for research and development; to receive funds to carry out research and development but what in?

SCET has been restructured into five autonomous Units each one with a different emphasis. My own Unit is called Learning Systems and we are interested in encouraging innovation in teaching and learning throughout the education and training world. There is a Media Resources Unit looking at new forms of broadcast delivery and media production. There is an Information and Communications Unit looking externally at information technology, electronic data handling and internally at PR and SCET's own information services. There are two Microelectronic Units, one looking at research and development and the other creating software for free distribution throughout the Scottish education system.

We have a name that is almost unpronounceable and certainly incomprehensible to most people and one that puts off the person asking the simple question "can I say who is calling?" to a degree that has led us to change our name from the Scottish Council for Educational Technology to a more basic monosyllabic acronym - SCET. In effect, that means that we are involved in two key areas: a) the encouragement of a more systematic approach to education, the encouragement of innovation in the processes of education and b) an attempt to build in the use of new technology as both a subject and object of the education system. We are lodged with the inevitable responsibility for covering both educational technology and education in technology. The two are certainly distinguishable but they are difficult to divide.

When we try and get people learning in new ways through individualised learning; project based learning; role play; case study and simulation; make more use of outside visits; make more use of media and make more use of new technologies for teaching and learning we are really doing two things: we are making the learning more interesting and stimulating but we are also building in new processes which we hope will last beyond the school curriculum and take adults into a new relationship and attitude to their training needs. We are also attempting to reflect a changing curriculum into the education world. What we need to be convinced of is the importance of keeping the education system aligned with the needs of a changing society and there is every indication that that kind of shift is as traumatic in education as it is beyond.

What is open learning?

One of the most significant developments in the area of learning innovation is open learning. It can cope with the need for both increased delivery of learning, an emphasis on new methods of learning and a new curriculum for learning. Open Learning is a term used to describe education and training schemes which are designed specifically to meet the varied requirements of individuals - for example as the what, where, when and how they learn.

These freedoms of time, pace and method are made possible by providing the learner with a carefully planned, flexible learning package which is given both tutorial and administrative support by a learning centre. The learner can then study, for as much of the time as is necessary, away from the direct supervision of a teacher or trainer. The emphasis in open learning is therefore on broadening access to education and training on the one hand and developing provision that is made as flexible as possible on the other.

Within the umbrella of open learning a wide variety of different models can be used. This can vary from conventional distance education delivery where the learner may be living away from the learning centre and therefore will have only telephone and correspondence contact with it. A second example is the flexible use and development of the learning centre itself where the learning takes place in the centre but it is open flexible hours and contains a wide variety of multimedia learning opportunities.

Between those two extremes there is what has become known as the flexi-study program which allows learners to study mainly at home but with the support of regular attendance at the local centre for seminars and tutorials and the option of making use of the centres facilities such as the library, computer equipment etc.

Using open learning it is also possible to split the support and tutorial responsibility between the centre based expert and the local manager, supervisor or mentor of the learner. This second figure can be employed by the learning centre, an adult education body or the student's employer.

Open Learning does not demand entirely new skills of the teacher but simply sharpens up existing good practise such as formulating objectives, providing adequate support for learning and defining need and target learning group clearly. Open Learning requires a new relationship between the learner and the learning centre and a more dynamic relationship between what is taught and putting that into practise in a work based setting.

How open?

There is no such thing as a completely open course just as there is no such thing as a completely closed course, it is much more important to consider the relationship between closed and open as a number of related continua.

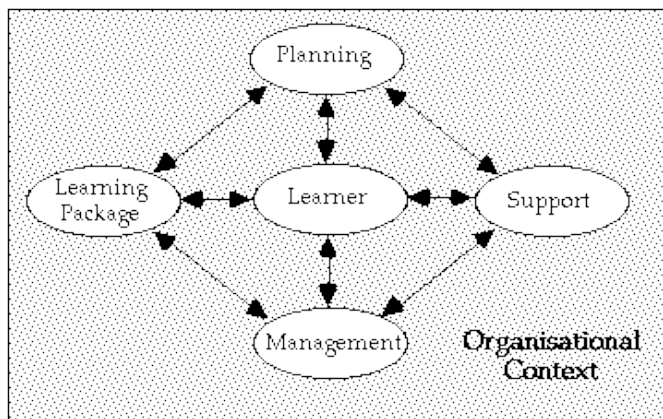
Open	Closed
Open Access	Fixed Start
Self Pacing	Lock Step
Open Exit	Fixed Finishing Point
Negotiated Curriculum	Imposed Curriculum
Multiple Mode	Single Mode
Open to all	Specialist/Qualification barrier
Where you want	At a fixed place
When you want	Set time

Any course can be placed on each of the continua above. Open learning courses will tend towards the left hand side of the continua, more

conventional courses to the right hand side. Few courses are now wholly on the right hand side of the continua just as it would be very difficult to imagine a course wholly on the left hand side of the continua.

The way forward in moving into open learning is not to move from one extreme to the other in one leap, but to select those continua where openness would be more appropriate and concentrate on increasing openness in those at a pace that can be coped with rather than insisting that all elements must be covered.

Developing an open learning system



The clearest and most explicit model of an open learning system was explored in an MSC/NEC publication called the Open Learning Toolkit. It sets the learner at the centre of the model but relates the package, the management of the scheme, the support offered to the learner and the planning development in an overall framework which is conditioned by and takes account of the particular organisational context in which open learning occurs. What this means is that the actual way a particular scheme develops would depend much more on the organisation in which it is located and the kind of resources which are available than on other external factors. Open Learning developments ought to be based realistically on what a learning centre can cope with rather than what it would ultimately like to see taking place. For example, it would be pointless offering open access in terms of start date to a range of courses if the administrative structure in place simply could not cope with the variety of students at different levels in the course. In those circumstances it might actually be more learner centred to restrict entry times to the course at a level which the administrative structure can easily cope with. Once experience is gained it is much easier to begin to open up the system offered than impose restrictions once the scheme has been developed.

The essential difference between developing an open learning scheme and a more conventional one is the amount of time and energy necessary to plan and produce materials prior to first student enrolments. The "up front" commitment by staff is far greater than on a conventional course. It would

thus seem appropriate that more attention is paid to the necessity for the course and the size and type of the target group before development begins when considering open learning. Once the development phase has passed, suitable materials have been devised and the delivery and support system built it is then very easy to offer a different delivery mode for different groups of learners than it would be in a more conventional course but that increased flexibility can actually impose fairly large demands on the teaching staff for providing institution. The shift can be indicated on the diagram below.

Teacher -----	Facilitator
At your place -----	At their place
In your time -----	At their pace
Expert mediation -----	Package mediation
On offer, on your terms ---	Increased demands for new modes of delivery
Only local access -----	Access at a distance

Essentially the role of the teacher or lecturer alters and the balance of control of the learning experience shifts away from the deliverer to the receiver. This opens up exciting possibilities in terms of new models of learning and new relationships between the learners and the learning centre but it would be foolish to under-estimate the problems this can also cause.

What are open learning materials?

An attempt is made to create materials which engage the learner in the learning process and can cover the context without expert mediation. They differ from the classic text book in the following ways:

<i>Textbooks</i>	<i>Open-learning materials</i>
Assume interest	Arouse interest
Written for teacher use	Written for learner use
Designed for a wide market	Designed for identified groups
Rarely give objectives	Always give objectives
One route through	Many routes through
Structured according to logic of the content	Structured according to needs of learner
Little or no self-assessment	Major emphasis on self-assessment
Ignore likely learner difficulties	Address learner difficulties
Rarely offer summaries	Always offer summaries
Impersonal style	Personal style
Dense in content	Content unpacked
Densely packed appearance	Well-spaced-out appearance
Packaged for sale	Packaged for use
No mechanism to collect learner views	Learners' evaluation sought
No study skills advice	Provide study skills advice

(Paine and Lewis, 1985)

The lists in the table suggest two opposed products. There is, of course, a grey area, e.g., the text book that includes some of the features of the open-learning package.

The basic processes of teaching in a conventional class are incorporated into the key features of the learning material:

<i>Conventional class</i>	<i>Study guide equivalent feature</i>
Now this next part of the course examines the main features of the banking system in the UK	Aims and objectives
The set text by Foster and Preston makes the points clearly and concisely in Chapter 14.	
Could you turn to that chapter then (it starts on page 206). Read it quickly. Ignore the final page as it contains information we are going to cover next week. Now you will come across the concept of "negative credit". This means ...	Signposting Routing Unpacking
When you have finished that I want to have a brief discussion covering main points, then you can attempt these worksheet questions.	Summary and assessment
At the end of the class I'll give you a handout covering the main points. Any questions? ... Good, if there are no problems, then turn to page 206 of Preston and Foster. You'll find it quite straightforward.	Review Anticipating problem Encouragement

The study guide replaces some of the commonest roles that the face-to-face tutor has to play. It should establish exactly the same kind of relationship to the textbook as the lecturer would: the textbook informs, but the lecturer guides and shapes. (Paine and Lewis, 1986)

Issues facing Scotland in open learning

Given the high materials' development time and concomitant costs involved it would seem foolish that no mechanism has yet been devised which would allow regions or even Colleges within regions to share materials that have been developed. There are countless examples in Scotland of many different centres going ahead and developing the same materials simply because access to already existing materials has been blocked.

It is also true that the pattern of support for staff involved in open learning has yet to be established. I believe a paper looking at staff conditions of employment for Further Education (FE) lecturers involved in open learning was sent to the Scottish joint committee several years ago and has yet to emerge.

There has been no general agreement on how teaching hours are allocated for open learning students where face to face contact is at a minimum. Neither has

any coherent attempt been made to establish how much time a teacher or lecturer should be given for developing materials. Added to this no one has really taken into account the changing teachers role when dealing with open learning students. Often time for assessment (marking and commenting on assignments) is allocated whereas time for support is not.

There is also no clear model of staff development in existence for coping with the introduction of open learning systems. Whereas staff often receive training for producing open learning materials, staff rarely get a chance to discuss the change in roles that supporting material will impose.

Finally there has been no clear agreement on demarcation between Colleges offering similar courses to students. Given an open learning mode, a student in Dundee might well prefer to come to a College in Glasgow than a College offering the same course in Dundee because the open learning provision is more attractive in terms of support or the materials are more useful. Once the tyranny of distance is taken away the learner has much greater choice about how and where they will access learning opportunities.

Current developments in Scotland

Over half of Scotland's FE Colleges are either involved in open learning or in the process of getting involved. A handful of Colleges have a significant proportion of their part time students through open learning and therefore a significant amount of pointage tied up with open learning. All Colleges of Education (with one exception) are considering a whole range of open learning options for in-service courses. Some of these would involve the transformation of a course from conventional delivery to open learning delivery such as the computer training course at Moray House, while others would offer a mixed mode combining open learning materials with on campus block programs (such as the FE Lecturers qualifications at the school of FE).

The Manpower Services through the Open Tech program have spent almost 3 million in supporting 12 Open Tech projects in Scotland which range from offering a small practical training facility in Invergordon and the Highlands to a large Programme of electronics and oil related materials development at Telford College. Open Tech projects are either:

- Production Projects essentially developing materials.
- Delivery Projects essentially marketing those materials and building local delivery systems.
- PTFs (Practical Training Facilities) offering "hands on" experience of mostly high tech hardware and software.
- Support projects helping the other projects towards viability and training staff etc.

The Open Tech Programme is due to finish in March 1987 when it is widely suspected that Open Learning will become a major element of a whole range of MSC programs rather than be left within one single (rather small) program of its own.

The SCET publication called the Open Learning Directory lists over 500 courses available to people in Scotland by Open Learning. Although this is a very small percentage of total courses available across a complete spectrum in Scotland it does make an impact on courses available for adults. And with our own Action Plan Project we are helping four regions develop packages from 16+ Modules in order to broaden adults access to the new National Certificate. This is a growing area of interest which stretches from purely adult based learning through open learning delivery in a variety of regions. This will do much to open up the Action Plan for adults but does present significant obstacles in terms of organisation of assessment for the providing centres. SCET has also recently published the School's Guide to Open Learning which reflects a large amount of interest in schools wishing to open up the curriculum.

The College would become more of a resource for its local teachers and more staff would be involved in developing materials than at present and those materials might well be shared between Colleges.

A "training the trainers" role would have to take place where resources developed by the College of Education could be used with colleagues in a tutorless group back at the school of College and there would be a need to set up efficient communication lines to allow teachers access to expert help at the College, by phone, electronic mail and so on, in an efficient way. The Colleges would have to establish an electronic network for such communication and use that, to some extent, to publicise training opportunities. All of these things pose questions relating to assessment and certification which would have to be urgently addressed especially as many teachers would be studying on a largely modular basis where credit would be requested for fairly small chunks of learning.

What it would enable the College of Education to do is to cope with a wider geographical spread of teachers than they can at present making the College a natural point and focus for continuing staff development. It would also cut down the gap between the tutorial element, the information element and the advice element of any particular learning opportunity. Staff would be dealing far more with teachers on a one to one basis rather than on a group basis.

Issues: Why move into open learning?

- Have you the resources to do it properly?
- Can you take the teachers with you?
- What are the priority areas?
- What staff development is necessary?
- What is the next stage?

References

- Paine, N. and Lewis, R. (1986). *Selecting media and adapting materials*. Glasgow: Scottish Council for Educational Technology.
- Paine, N. and Lewis, R. (1985). *Communicating with the learner*. Glasgow: Scottish Council for Educational Technology.

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Based on a paper presented at EdTech'86, International Educational Technology Conference and Exhibition, University of Western Australia, Perth, 2-5 December 1986.

Please cite as: Paine, N. (1987). Educational technology and education in technology. *Australian Journal of Educational Technology*, 3(1), 57-66.
<http://www.ascilite.org.au/ajet/ajet3/paine.html>