E-university - what have we learned?

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Introduction

The Open University has been developing slowly into an e-university for over a decade, introducing more courses that require PC and Internet access, offering more ICT options within other courses. The mix of courses and media is becoming more varied. What characterises the supported open learning model now is a focus on the *appropriate* media mix, depending on the objectives, the nature of the material, and the target student population. Learning what counts as appropriate is a continuing process that will be as relevant for all other universities wishing to develop e-learning.

It is a challenging task to capture all that we have learned about the e-university in the space of one article. What follows is a selective account, focusing on some of the most important elements for our survival in the e-world.

The external environment

Before turning to what we have learned from our own experience, we should turn to what the world beyond universities is telling us. Consider just three different types of perspective.

First, the survey from Motorola on 'The British and Technology' (2000), an extremely valuable annual survey which allows us to keep track of how Britain as a society is moving towards e-commerce. Rather slowly, it seems. Only 19% so far are regular users of the Internet, although half the population feel that IT training is essential for their career and some 25% feel they are not adequately trained in IT. There is quite rapid growth among those who use the Internet, from only 24% last year to 30% this year, who are using it also for e-commerce purposes. The largest single increase over the year in access to e-commerce is for women, shifting from 8% to 23% using it for e-commerce.

A critical question for universities is whether people are interested in using the Internet for education. Asked what they would like to learn about on the Net, respondents gave the highest scores to the academic areas of professional qualifications in IT, language etc., whereas the more lifestyle categories of DIY, gardening and so on, scored much lower. The message from this survey is that there is clearly a good commercial opportunity for offering higher education over the Internet.

A different kind of message for universities comes from a qualitative perspective, from future-gazers like Peter Cochrane at BT, for example, who can offer quite an alarming perspective on the e-university:

> Education on CD and online is a reality and a threat to the established institutions and there is a real pressure to return to the guide on the side. When a good masterclass is available on line or on CD there will be little room for a second. You might thus expect to see very few really great teachers and quite a lot more coaching (Cochrane 1999).

It is a good rule when faced with a dire prediction about new technology to reinterpret it in terms of the kinds of technology we are familiar with and understand. Suppose we were to put this in the context of an earlier technology, rolling back the calendar 500 years or so to the advent of the printing press and see how this kind of statement might have looked then:

> *Printed books* are a reality and a threat to the established institutions, there is real pressure to return to the guide on the side. When a good *book* is available *in the library or a shop* there will be little room for a second.

Given what we know about the explosion in access to education following the advent of the printing press, we can take a calmer perspective. The Internet is much more of an opportunity than a threat to universities.

A different perspective again comes from the e-business world considering the robustness of the concept of Internet education:

> The proliferation of Internet education companies with dubious business models has resulted in an increasing reluctance to provide funding for early stage businesses. There has been a distinct increase in the number of calls each week from education businesses seeking to be acquired. (The Education Economy, August 2000)

The messages from the world around us are mixed, therefore. There is an imperative to go online and capitalise on the increase in access and demand. On the other hand, many education businesses that do venture onto the Internet are failing. Whatever the world is telling us, we know it is important to get the balance right in whatever we do, and that will be a continuing theme.

A strategic approach

The starting point for the University's Technology Strategy in 1996 was a focus on 'meeting student needs'. This would be done through course design and through recognising students' logistical needs given the new technical infrastructure through which we were offering to deliver courses. Underpinning both of those was resource planning, external partnerships, staff development and quality assurance. A university engaging with the e-world has to ensure that it is addressing all these issues. Innovative course design cannot work without staff development and staff need upgrading and upskilling so that they are capable of producing new kinds of courses. In addition, staff development programmes must be informed by the quality assurance processes that tell us the extent to which we are meeting student needs. The strategy therefore forms a cyclical, iterative structure, which acts as a self-improving process.

Students' academic needs

Students need active learning that is efficient and enjoyable, in a supportive learning environment. This is an aim of all course design, but to what extent does new technology actively support the learning process? A few examples will illustrate some of the key lessons learned.

Balancing online and offline learning

A Level 1 technology course provided a rich online environment for students, guiding them through the information-handling skills, the Web skills and the Web resources they needed to be familiar with. It provided a discussion forum in which students could work with each other, to argue and debate the concepts on the course, asynchronously. The extent to which that actually works for students is very important. We need to have a good understanding through the evaluation studies of these courses to judge the appropriate balance between online and off-line learning.

Evaluation studies have shown that online collaboration, where students can work together either in small groups or in large conferences, can considerably enhance the learning experience. Students value the collaborative learning it offers, especially in the early stages of a course. However, the great value of online learning is the flexibility it offers, and these studies show that the structure and timetable constraints of collaborative learning necessarily *reduce* that flexibility. Regular, sustained participation in group activities does not fit the demands of normal life for online students. Students feel guilt and stress about failing their colleagues in a collaborative project. Therefore, we learn from this that the appropriate balance is to offer collaborative learning as a support at the beginning of the course and then reduce it towards the end, as students become more independent, and need more control of their own schedules.

A Level 2 programming course gave students an interactive practical environment in which they were guided and given feedback. This

was integrated with Web resources, with video, with interactive multimedia, and with print materials. It was a genuinely 'multiple media' course. The media mix worked for some students. They were pleased with the stimulating and interesting working environment, and they felt the course achieved its objectives for some students:

> "The course deserved to have the highest praise for creating such a comprehensive, stimulating and enjoyable learning experience."
>
> "This media achieved its objective in my case, and was easy and enjoyable to use."

However, the evaluation showed that students printed out a high proportion of the online material: 33% of the text of practicals, 45% of Web pages, 54% of the conference messages. Much of this is narrative text, which is hard to read on the screen. These programming students are used to working on the screen, they are used to reading on the screen, but they also want to work in alternative media. Students do want to have the option of working from print, not necessarily to be always working from the screen.

With the addition of new media, there is inevitably a temptation to give the students more and more *material*, which is a problem. Evaluation studies for e-learning courses show that 40% students spend more than the allotted time on the ICT materials. This affects withdrawal. Workload is one of the major reasons given by students who withdraw. It is important, therefore, to be very careful about achieving the right balance between print and Web material.

Balancing interactive and non-interactive materials

Interactive adaptive programs on CD or DVD offer the opportunity for active learning of a kind that cannot be achieved with print. A Level 1 science program requires students to control the movement of a carbon atom such that it completes the full carbon cycle. They have to move it from one reservoir, e.g. the atmosphere, to another reservoir, e.g. carbonate rocks, and in order to do so, describe the scientific process by which that transformation occurs. Assistance is available in the form of video and audio-clips to explain the processes. Once the cycle is complete, they can select a quiz to test their understanding.

Evaluation studies of materials of this kind show that, for students, the value of the interactivity is precisely that it enables them to check their understanding in the way they cannot do with text. The video-clips support them and the audio-clips help to guide them through the material. As a result, students are able to see very clear advantages of this kind of medium over printed text or videocassette:

> 'Being interactive, you are forced to make decisions. And I found this very helpful in making me think very carefully about what was happening.'
>
> 'It's more enjoyable, more easily retained due to active learning and participation.'
>
> 'As it was interactive I found I was less likely to switch off while using it, so it helped me to retain information more effectively than video or book.
>
> 'The CD format was an improvement over having to read many pages of text to achieve the same level of understanding.'

What students value is their involvement with the material, which is much greater than it tends to be with either print or video, and the efficiency of this kind of interactive learning.

A similar result was achieved in a second-level arts course. The course on *Homer, Poetry and Society* brought together the Homeric poems with information about the archaeological sites of Ancient Greece. The normal print and video version of the course had achieved this successfully, but the CD version brought the material together in quite a different way. The narrative line was the same, but the narrative was deconstructed to enable the students to make their own way through it. Instead of reading through the academic's comparative analysis of the characters for example, students could use the search environment of the CD on which all of the data – the Homeric poems and the archaeological sites - were stored. They could use this facility to explore how a character was described in the two books, compare and contrast them, explore the links

with the archaeological material, make their own notes on the Notepad and then see the extent to which their analysis matched that of the academics. In the context of the book, they can only read straight through the narrative. With the CD, they are compelled to carry out their own exploration and analysis before they can compare it with the expert's. Students see this kind of design as enhancing their quality of learning. It is a powerful learning medium:

> 'You can switch from literature to archaeology and still continue on the same line of thought.'
>
> 'It's the interactivity – it's exciting.
>
> 'It reinforces the information better. In the Units, if I reach a bit I'm not particularly interested in I'll skip through it. This encourages you to sit and complete the activity before you pass on.'

We learn from this that students appreciate the quality of the active learning that interactivity makes possible.

Implications for resource planning

Once we have demonstrated that learning technology improves the quality of learning, the university must then consider the extent to which this kind of development is sustainable. The Open University now offers ICT access on some 200 courses, so academic time and software designer time has grown to match that. Some of our calculations have shown that changing just 20% of the course material to ICT materials increases academic staff time by 40% and more than doubles production staff time. For any university considering extensive ICT development, there has to be a clear focus on workload planning, costing tools, and the productivity methods that bring down development costs.

Resource planning has benefits for students as well as staff. It is important, as we have seen to plan student workload carefully, especially when ICT methods are added to traditional methods. We must learn how much time it takes for students to study through the different forms of ICT.

One of the tools currently being tested as support for resource planning is the Course Resource Appraisal Model. This is a spreadsheet model, offering the course team the opportunity to plan the student study time for each different kind of study method: for print, video, tutorial, interactive computer marked assessment, computer based tools, computer-based resources, Web-based resources and so on. The academic has to decide how to distribute the student's limited study time over all those different kinds of methods. The model then interprets those planned figures in terms of the staff workload needed. Planning workloads is difficult. It is very hard to put a figure on how long it really takes to write a unit, or to write an online assessment question. However, this kind of resource planning is extremely important if the move to new technology is to be sustainable.

It is important, therefore, to explore techniques for reducing the development and production load. One is to prepare for reversioning. By converting authors' text from Word to XML then academics writing course units can use all the features of Word but then generate a document that can be delivered either as print or as Web-based material. It is then possible to re-version material from one course to another, or from one version of a course to another version of a course. Metadata tags the material so that it can be more easily archived and retrieved for re-versioning.

A second technique is to allow for customisation of software. There are three stages of design: (i) to identify a proven concept (such as the Homer activity), which has successfully taught students, (ii) develop a generalised version, and (iii) customise it for other subject areas. This technique is being piloted in partnership with three other universities to test the extent to which customisation is feasible.

Quality assurance

Innovation in learning technology is complex and expensive. The quality assurance process adopted will enable the lessons to be learned, and further innovation to build on those lessons. The types of evaluation study quoted here provide very valuable feedback. They enable design to improve. Equally important is the improvement of service. The e-university has to develop standards of

delivery that are quite unfamiliar to the campus university. Services will include the copying and delivery of discs, online submission, marking, and monitoring of assignments, and a helpdesk system, open all hours – because students are working all hours. Achieving the quality standards that e-commerce is setting is inevitably a challenge for universities. A robust quality assurance system, which ensures that feedback is acted on, is essential.

Summary

Becoming an e-university means increasing the complexity of learning and teaching. It means stretching the capacity of existing systems and staff. It must also mean improving the extent to which we meet students' needs, both academic and logistic – or else why are we doing it? To summarise some of the most important lessons learned over the past few years of innovation: students appreciate the active learning and support environment offered by ICT:

> we must focus on achieving the right balance, between ICT and non-ICT, between interactive exercises and communicative, collaborative work online;
>
> we must manage the expectations of demand for more innovative, and more sophisticated materials, while also providing a robust service and delivery environment for them;
>
> workload planning for students is essential to avoid drop-out;
>
> workload planning for staff is essential to ensure sustainable development, making use of techniques such as re-versioning and customisation;
>
> academic staff need more help and support from specialist staff;
>
> academic and support staff need to do more R&D and innovation in teaching - and this must be recognised and rewarded;
>
> quality assurance providing feedback on all of ICT-related activities, will ensure the continual process improvement needed.

Any university contemplating the move to e-learning will need to address all these points, and to inaugurate a culture of innovation and investigation throughout their processes of learning and teaching.

The Open University community is highly responsive to e-services, and that will extend to other HEIs who wish to move into e-learning for part-time, adult, lifelong learning. Whatever we offer, there is tremendous take-up and demand for more. However, ICT is highly labour-intensive. In the short term, at least, costs increase. We need to control costs if the new business is to be sustainable. Therefore, we need continual process improvement, for online services and for materials production.

It is important to keep a balance between the ICT and the non-ICT. We must be clear about the concepts of the 'e-university' and 'e-learning'. At the Open University, we are clear that we are *not* defined in terms of the technology we happen to use. In the 1960s our founders refused to see us as 'the University of the Air'. We are not about to become 'the University of the Net'. For universities, it is important to be defined in terms of their core values. Although we may work with the concept of being an *e-university* we must remain, fundamentally, a University, responsible for research, scholarship and teaching. The means by which we carry out those core activities remains incidental to them.

References

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