Teaching and the New Technology: Managing the Transition

Linda O'Brien, Information and Education Services, University of Newcastle
Linda.OBrien@newcastle.edu.au

It looks as though the future will be more public, more private, and more technology.
Roderick West, Campus Review July 2-8 1997, p.3

Introduction

Within every university we are witnessing a ground swell of interest in applying 'new' technology to teaching. By 'new' technology I am referring to the linking of the power of a PC with networks to achieve new ways to apply technology. Most universities now have staff using technology in their teaching, whether through a successful teaching grant application or simply through their own initiatives. They may be giving PowerPoint presentations or using video clips in lectures, placing their lecture notes on the web or generating student discussion through email listservs. This conference will assist you, as participants, to find and incorporate graphical images in your teaching using technology and undoubtedly you have been attracted here because you believe it is time for you to enhance your use of technology in your teaching. But several questions must be answered before you can successfully take the ideas from this conference and apply them in your teaching.

- How will you find the resources to do this? the time? the money?
- What facilities will you need access to? equipment? software? information? professional help?
- What facilities will your students need access to?
- What skills do you need? Do your students need?

And before successfully applying these ideas some more fundamental questions must be answered.

- How will your students benefit from this?
- How will you benefit from this?
- How will the University benefit from this?

Broad-based integration of new technologies into university teaching is inevitable. This paper explores the reasons why this is so by examining the changing context and new paradigms for higher education, the potential of the new technologies and the subsequent shifts and tensions within the higher education sector. It closes by explaining that successful integration of new technologies into teaching and learning cannot be done in isolation from the University's broader planning, policy and budget processes.

The Environment: Changing Context and New Paradigms

The characteristics of the environment in which higher education institutions must now operate may be summarised as follows.

- Australian universities now operate in a global knowledge economy[1].

[1] IDP believes Australia can expect to attract 5% of the world's international students by the year 2000 and 7.5% by the year 2010 which would make them 26% of our student population. Between 1996 and 1997 we saw a 17% increase in our numbers of international students. (Yetton, 1997, p.32)

- Government funding and government regulation is reducing[2].
- There is an increasing emphasis on learning rather than teaching and recognition of students as customers.
- Universities must acknowledge the pervasiveness of information and communication technologies and view information technology as a strategic resource and market differentiator.
- Universities must plan and seek continuous improvement.

Within such an environment we are seeing the emergence of a new paradigm for higher education. The table below[3] shows the two boundaries of this paradigm shift though it should be acknowledged that in many senses this is a continuum.

Old Paradigm	**New Paradigm**
University as a city	University as an idea
Terminal degree	Lifelong learning
Student as a 'pain'	Student as a customer
Delivery in classroom during semester	Delivery anywhere and anytime
Government funded	Market funded
Competition is other universities	Competition is everyone
Technology as a cost	Technology as a differentiator

The Potential of New Technologies

'New' technologies are those technologies that are now possible through the advent of cheaper and more powerful personal computers and the spread of networking — desktop video conferencing, networked audio, video and graphics applications, computer mediated communication, and the Web. The development of these new technologies provides the potential for technology to be applied to teaching and learning in new ways which enhance the quality of learning rather than simply providing an alternate method for teaching. The technologies provide opportunities for innovation which go well beyond the automation of existing teaching processes. Technology can be used to 're-invent' the learning process, to enhance learning in ways which were not before possible rather than simply automating the existing teaching paradigm. For example rather than replicating lecture notes on the Web or providing a video tape of a lecture an academic can create a rich resource-based learning environment, linking in other information sources, integrating video, graphics and sound. They can also provide problem-based learning opportunities through simulations, interactive activities, discussion forums and group work.

The learning potential which can be achieved through effective use of new technology may be summarised as follows:

2 Watts, 1996 noted that between 1981 and 1993 government grants to universities in Australia went from 90% to 60% of their total income.

3 Adapted from Exploiting information technology in higher education, 1996, p.10

- it enables self paced learning and the potential to increase learning productivity;
- it enables interaction, discussion and collaborative learning;
- it empowers students to have greater control of their learning;
- it provides solutions for learners with disabilities; and
- it provides access to large amounts of information.

The new technologies also have the potential to provide solutions to meet the challenges of the global knowledge economy and reduced government funding by:

- opening up new markets;
- easing pressures on time and space;
- enhancing academic productivity; and
- providing economies of scale and mass customisation.

These two areas of potential can be integrated as there is no simple relationship between cost and value to a student (Open University, 1996, p.5). It is possible to create effective learning experiences of value to a student whilst minimising cost. To give an indicator of the potential savings from more flexible delivery of teaching and learning the Open University currently graduates a student at less than half the cost of a regular UK university (Rumble in Lockwood, 1997). Moran (in Lockwood, 1997) concisely sums up the challenge for universities:

The question is becoming, not whether flexible learning can enhance the cost effectiveness of traditional teaching (important though that question is), but whether a university will survive and prosper in the next century without rapidly integrating the various dimensions of flexible learning into its process, culture and value.

Shifts and tensions

The environment in which universities operate and the paradigm shifts which are required are causing many tensions and shifts as each university grapples with the challenges ahead. Course design and delivery has traditionally been a serial process largely controlled by an individual academic. Now if we require the development of media to support a subject or course we require different sets of skills, a project management approach to subject/course development and a different budget framework. Previously curriculum development was largely a hidden cost (Laurillard, 1996) which now will need to be explicitly recognised. We are seeing tensions not only within universities but between them as they seek to determine a balance between collaboration and competition. The shifts and tensions which must be managed may be summarised as follows:

• knowledge driven	• customer driven
• collaboration	• competition
• quality	• economies of scale
• autonomous academic process	• planned production process
• academic as ‘sage on the stage’	• academic as ‘guide on the side’
• academic freedom	• rise of the ‘para-academic’
• educational culture	• corporate university model
• delivery costs	• development costs

Critical Success Factors for integrating new technologies into teaching

The limitation will be the time it takes universities and staff to develop the skills needed to effectively exploit the medium, and how universities handle the associated cultural change. Those that have effective staff development and technology diffusion policies and structures in place, and who view

information technology as a strategic tool in attracting new students, will be at the forefront. (Boalch, 1996 in Yetton, 1997, p.49)

There are a number of factors which will determine the success of integration of new technologies into teaching. These include:

- the university's planning and policy framework;
- the strategies in place;
- the quality and extent of infrastructure; and
- the culture within the university.

Planning and policy framework

Yetton (1997, p.9), in examining the management of technology in Australian higher education, points out the different approaches taken by economists and strategists: the economist's view of market outcomes assumes all firms are similar and success is dependant upon the bottom line whereas the strategists argue that organisations are successful because they are unique and differentiate themselves from their competitors. Given that universities exist for greater aims than 'the bottom line' we must therefore think how we will be successful through differentiation. How will we be unique and what will differentiate us from our competitors? What does this mean for our approach to integration of technology into our teaching? The University of Wollongong (Yetton, 1997, p.24-25), for example, plans to grow its fee-paying post graduate students to 23% of their EFTSU by 2000 with delivery via distance through PAGE, SBS TV or Wollongong Online.

For true success each university should have a commitment to the level of application of new technologies in teaching with agreed shared plans and goals and appropriate policies at an institutional level. For example the university must have:

- course planning, development and approval processes which allow for flexibility and responsiveness;
- university-wide plans to develop the required infrastructure;
- teaching release and promotion policies which recognise the importance of academic involvement in the development of subjects and courses using new technologies. Most current university promotion policies don't recognise teamwork, a necessary prerequisite for effective use of technology in teaching, nor do they reward academics for advanced curriculum design or effective use of technology in teaching;
- appropriate copyright and intellectual property policies and procedures in place which protect both the university and the creator of the materials; and
- a sustainable budget model which recognises the change in cost structures necessary to facilitate effective use of technology in teaching.

Edith Cowan (Yetton, 1997, p.31), for example, has moved to resource based learning and flexible delivery and to achieve this shift has changed the University's policies regarding resource allocation and course validation and review.

Strategies

A university's overall strategic plans and policies are one very important element in the extent to which technology can be successfully integrated into teaching. But underpinning this must be appropriate strategies to achieve a successful outcome. To effectively integrate new technologies into teaching may require skills and knowledge in knowledge presentation, instructional design, technical

knowledge, project management skills, resource design and production skills, systems analysis, programming, graphics, sound and video skills.

Academic staff cannot be experts in all areas required and Tinkler, Lepani and Mitchell (in NBEET report on education and technology convergence, 1996) suggest the need for the emergence of 'co-professionals' (other authors have referred to 'para-academics' (Fowell and Levy, 1995)) and to break down the barriers between academics and professional staff. Collaborative partnerships with instructional designers, information professionals, web designers and IT professionals will be critical to success.

The staff and students must have the necessary awareness and skills required to use the new technologies through appropriate training and development. The university as a whole must be aware of the potential of the technology and be able to learn from its successes and failures through quality assurance mechanisms. Denise Bradley, Vice-Chancellor at the University of South Australia, (Yetton, 1997, p.67) believes the development of curriculum materials for distance-mode delivery is a powerful form of staff development for academics as it changes their focus from a transmission model of teaching to a learning model — instead of thinking of delivering content they must think about what type of learning they expect their students to gain from the material.

Infrastructure

To successfully integrate technology into teaching there must be an appropriate infrastructure in place. The technical infrastructure, both internal and external to the university, must be adequate. There must be sufficient network capability and network access to deliver media using networks. For example standard phone line connections to the campus are not yet multimedia 'friendly' in that the slow speed of the line works against use of high bandwidth applications. Nor can it necessarily be assumed that the student has a suitably configured PC. Such considerations must be taken into account before developing materials which cannot then be accessed. There must also be appropriate technology available in the classrooms to present material. The software systems available must meet academics' needs.

The student administration processes and systems must have the required flexibility to cope with more flexible delivery of programs and there must be the necessary human infrastructure in place for the required administrative support.

Culture

However, it is apparent that, in the global environment described above with increasing accountability, market competition, changing roles and a more corporate strategic approach to the provision of higher education, a shared or negotiated vision of the enterprise is essential at all levels of the organisation. (Hughes in Yetton, 1997, p.73)

The university must have a shared vision of where it is going and how it plans to differentiate itself from its competitors. Hesketh (in Yetton, 1997, p.38) suggests that the scale is such that the cultural change required within universities to move to IT-mediated learning will take a minimum of three to five years to embed. Working against such a cultural change is the academic perception of corporate planning and policy as anathema and the resistance to any change which appears to control or interfere with scholarly autonomy. Changing a university's culture to support innovation in teaching and learning through the application of new technologies is perhaps the greatest challenge of all.

Conclusion

Integration of new technologies into teaching is inevitable. It will be driven by a number of factors including:

- a genuine desire on the part of academics to improve the quality of student learning;
- attempts by universities to expand their markets and achieve savings; and
- the need to be competitive in the marketplace and meet 'customer' needs for flexibility.

Within such an environment universities must seek to successfully integrate technology into their teaching and learning. This cannot be done in isolation by individual academics. Whilst such 'trail-blazers' can play a key role in demonstrating what is possible true success lies in the development of an appropriate university-wide planning, policy and strategies to make it happen and the development of a culture which supports innovation.

References

Australian Vice-Chancellors' Committee. Exploiting Information Technology in Higher Education: an Issues paper. AVCC, October 1996. http://www.avcc.edu.au/avcc/pubs/eithe.htm

Fowell, S. & Levy, P. Developing a new professional practice: a model for networked learner support in higher education, *Journal of documentation* 51(3), September 1995, pp.271-280

Laurillard, D. & Margetson, D. Introducing a Flexible Learning Methodology: Discussion Paper. Occasional Paper (Griffith Institute of Higher Education) no. 7, 1996

Lockwood, F. An overview of flexible learning: International scene and current trends. A paper presented at Southern Cross University, 1997 http://www.scu.edu.au/services/tl/lockwood.html

NBEET report on education and technology convergence, 1996

Open University Senate. Technology Strategy for Academic Advantage: Discussion paper. Office for Technology Development, March 1996

Watts, R. The 21st century university. Talk presented to the Higher Education Round Table 22nd October 1996

Yetton, P & Assoc. *Managing the introduction of technology in the delivery and administration of higher education*, Canberra: DEETYA, 1997