

# **UniServe Science**

**Proceedings of  
Tools for Flexible Learning  
Workshop**

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# UniServe Science

**UniServe Science** was established in 1994, under a grant from the then Committee for the Advancement for University Teaching (CAUT), with considerable help from The University of Sydney, to act as a national clearinghouse for the dissemination of information about teaching software in the experimental sciences in Australian universities — specifically in the disciplines of Biochemistry, Biology, Chemistry, Geography, Geology, Physics and Psychology. That grant was for three years. UniServe Science is now fully funded by The University of Sydney and has added Computer Science, Mathematics and Statistics to the client base.

**UniServe Science** aims to enhance the quality of university science teaching in Australia by collecting, maintaining and disseminating information on up-to-date and innovative teaching materials. UniServe Science publishes regular newsletters which include product reviews and articles on developments related to teaching and learning materials in the earth, life and physical sciences. A database of software packages used in teaching is maintained and is accessible via the UniServe Science web site. Along with software details, the database includes UniServe Science solicited product reviews, usually done by Australian academics. Other activities include: the maintenance of electronic mailing lists for each of the nine disciplines covered; conducting workshops for teaching development; producing software guides and maintaining Australian mirrors for frequently downloaded overseas software.

## UniServe Science PERSONNEL

**Directors:** Associate Professor Ian Johnston, Dr Mary Peat

**Deputy director:** Professor David Patterson

**Educational technologists:**

Kaye Placing  
Tel: (02) 9351 2960  
BioSciCH@mail.usyd.edu.au

Anne Fernandez  
Tel: (02) 9351 5783  
PhySciCH@mail.usyd.edu.au

**Correspondence to:** UniServe Science  
Carslaw Building (F07)  
The University of Sydney  
NSW 2006  
Fax: (02) 9351 2175

**Web site:** <http://science.uniserve.edu.au/>

# Table of Contents

## Summary Paper

Flexibility Is All .....	1
<i>Ian Johnston and Mary Peat, UniServe Science</i>	

## Invited Paper

Flexible Teaching and Learning: Perspectives and Practices .....	3
<i>Roy Lundin, Queensland University of Technology</i>	

<b>Demonstration and Panel Discussion Synopsis</b> .....	10
<i>Anne Fernandez, UniServe Science</i>	

## Workshop Presentations

Videoconferencing for a Sustainable Future: A Technological Option for Science .....	14
<i>Trish Andrews, The University of Queensland and Greg Klease, Central Queensland University</i>	
Using Mathematical Packages in Advanced Science and Engineering Units .....	16
<i>Andrew Cheetham, University of Canberra</i>	
The Future of Multiple Choice Questions in Learning: Formative Assessment, Interactive Teaching Modules and Student-created Questions within WebMCQ .....	20
<i>James Dalziel, The University of Sydney and Scott Gazzard, WebMCQ Pty Ltd</i>	
Group Work in Science – How do you do it? .....	23
<i>Elizabeth Deane and Sharon Fraser, University of Western Sydney Nepean</i>	
A ‘Community of Learning’ – the UWS Nepean Science Virtual Resource Centre .....	26
<i>Sharon Fraser and Elizabeth Deane, University of Western Sydney Nepean</i>	
It’s not about putting lecture notes on the web! .....	29
<i>David Green, University of Technology, Sydney</i>	
“Mum can’t come to the phone right now – she’s in the laundry doing a rat dissection” .....	34
<i>Jenny Mosse and Wendy Wright, Monash University</i>	
Moving the Boundaries of UQ Entomology .....	37
<i>Margaret Schneider, The University of Queensland</i>	
Metabolism with Flexibility .....	40
<i>Marie-Paule Van Damme and Kaye Trembath, Monash University</i>	

## Poster Presentations

Part of a Project Funded by a UC Teaching Grant .....	43
<i>Malcolm Brooks et al., University of Canberra</i>	
WebLearn: The Experience of Two Years .....	43
<i>George Fernandez, RMIT University</i>	
Formative Self-Assessment Modules on the Web: Increasing Flexibility for Delivery .....	43
<i>Sue Franklin et al., The University of Sydney</i>	
The Use of the Web in University Science Teaching in Australia .....	45
<i>Ian Johnston, UniServe Science</i>	
Online @ RMIT and Question Mark Perception .....	46
<i>Kevin Meehan, Qmark Systems and April Weiss, RMIT University</i>	
The Application of Dazzler 5 for the Development of Interactive Tutorials in Biomechanics by the School of Physiotherapy (University of South Australia) .....	47
<i>Kevin Meehan, Qmark Systems</i>	
ChemMark-WWW: Chemical Structure Drawing and Marking on the Web .....	48
<i>Damon Ridley, The University of Sydney and Dave Proctor, Hampden Data Services, UK</i>	
Flexible Learning and Assessment Package for Teaching Data Analysis and Chemometrics in Analytical Chemistry .....	49
<i>Mark Selby, Queensland University of Technology</i>	

<b>Workshop Participants</b> .....	50
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# Flexibility Is All

Ian Johnston and Mary Peat

UniServe Science, The University of Sydney  
idj@physics.usyd.edu.au maryp@bio.usyd.edu.au

## The background to this workshop

At an address to the National Press Club in Canberra on 25 February of this year, Professor John Niland, the Vice-Chancellor of The University of New South Wales, drew attention to the serious degree to which student interest in science in this country has fallen off in recent decades<sup>1</sup>. He expressed particular concern that the numbers enrolling in physics and chemistry have grown at only 60% of the rate at which total enrolments have increased; and that in mathematics the growth rate is negative. He argues that there needs to be a revolution in university science teaching to emphasize communication skills and cross-disciplinary awareness, and to start doing collaborative and cross-campus teaching via the Internet or multimedia delivery. And all this must be achieved with increasingly limited resources because there is bound to be further “streamlining” of departments. He went on to recommend, *inter alia*, that universities start thinking seriously about **flexible learning**.

Flexible learning covers a broad range of meanings. It implies more than simply designing more packages that will give students more choice, although that is part of it. It includes rethinking teaching structures to expose students to materials they would otherwise not meet, or that teachers can interact with students in ways they couldn't use before. It includes paying attention to teaching effectiveness, without ignoring questions of cost efficiency. And above all it includes the possibility of collaborative teaching at all levels, across departments and across universities.

We at **UniServe Science** have been overseeing the place that IT plays in university science teaching for four years now, and it seems to us that its use is subtly changing. There seems to be less emphasis on individual software packages, and more on teaching *structures*. What developmental work there is around the country seems more and more to be directed towards organizing whole courses by IT means, particularly on the web. We don't think this is a long term effect. We believe that in a few years, when universities have become comfortable with the idea of using the web as a flexible teaching and learning environment for their students, developers will again start working on individual packages to be integrated into these new structures. But it certainly means that, right now, it is singularly appropriate to have run a workshop devoted to “Tools for Flexible Learning”.

## What happened at the workshop

The keynote address was given by Dr Roy Lundin, from the Queensland University of Technology. He drew attention to the idea that Flexible Teaching and Learning (FTL) is, as yet, an unrealized idealization, and there are several directions in which it might go, the most extreme being the “virtualization” of the university itself. Whatever does happen, there can be no doubt that the role of the teacher will change. It seems pretty clear that in the end we will become *learning managers*. His message was that we had better start preparing ourselves for that. His paper appears on page 3 of these proceedings.

In the second morning session we had presentations featuring three particular *tools* for organizing and delivering learning packages. Simon Housego, from the University of Technology, Sydney, demonstrated *TopClass*. He emphasized that learning design was very important in its utilization, though it was not primarily intended for delivery of courses. Nevertheless some 12,000 individual

students make use of it in that institution. A similar system, **WebCT**, was demonstrated by Stephen Sheely, from the University of Western Sydney Hawkesbury. He described it as a “VW rather than a Mercedes”, but had many good things to say about its user-friendly interface. Different from both of these — a “billy cart, not even a VW” — was **WebTeach**, developed entirely at The University of New South Wales, and demonstrated by Lindsay Hewson. He emphasized that it really was just a bulletin board, but one about which much careful thought had been given. The outcome was a quite remarkable array of classification of teacher/student messages.

There followed a panel discussion, in which these three were compared and contrasted; and out of this emerged a pretty clear picture that each system has its own niche. There were things each could do that the others could not. An outline of the above demonstrations and this discussion is given on page 10. It is hoped that anyone thinking about putting their courses on the web will find the exchanges enlightening.

In the afternoon there were nine contributed papers, not necessarily devoted to technological *tools*, but underlining the point that flexible learning means more than just the technology associated with the web. It can encompass group learning, laboratory kits, role playing, videoconferencing and many others. If there was any single message that emerged, it was that we are all still struggling with what to do with the web in our teaching.

## Issues raised at the workshop

As has become tradition at our workshops, the last session was devoted to a completely informal discussion, with contributions from anyone who cares to make one. Much of what was said can be collected under two main headings.

### Future directions

We agreed that a sensible way for us all to go is towards more flexibility in our teaching and our students’ learning, at least in the near future. The demand in the workforce for continual upgrading of skills and in the community for lifelong learning can only increase. The days are long since gone when all, or even most, of our students were straight out of high school, intending to be practising scientists. At the same time we need to share materials we prepare as we strive to introduce this flexibility, and reduce the duplication of effort that still exists. As we concluded at earlier workshops UniServe Science is an ideal group to facilitate this, but it has to be driven from higher up the academic ladder. What we all, as a group, need to do is to start lobbying deans, vice-chancellors and the like.

### The virtual university?

There is no doubt that the more flexible university must come, with its benefits of access and equity. Social cultures are changing and people demand more flexibility in everything they do. And this includes education. But whether this newly flexible institution will be virtual, existing only in cyberspace is not so clear. As our keynote speaker pointed out, several of the much-touted American virtual universities opened to vastly fewer enrolments than they expected. Perhaps what we should remember is that people like to be together. It is part of our *homo sapiens* nature. So we do not see the ultimate goal as a virtual university, but rather as a mixture of face-to-face *and* virtual learning experiences that suit individuals’ needs. Should we deliberately steer our own course towards the setting up of consortia?

<sup>1</sup>Professor Niland’s speech is reproduced in *The Australian and New Zealand Physicist*, **35**(4), 1998, 165–174.

# Flexible Teaching and Learning: Perspectives and Practices

**Roy Lundin**

School of Professional Studies, Faculty of Education, Queensland University of Technology  
r.lundin@qut.edu.au



*Abstract: The rapid growth in flexible delivery of open learning and teaching through the use of interactive communication technologies poses significant questions relating to resource allocations, different learning environments, more demanding time constraints, the role of the teacher and new modes and techniques of communication. It is also evident that there has evolved a number of different terms for this new, rather deregulated approach to education and training, and that there is much talk of a new paradigm. Overseas and Australian examples indicate that two major developments in this regard include the development of consortia of providers and the use of the Internet to deliver programs. This paper will address the issues inherent in these developments, provide examples of ways in which new models are addressing the issues, as well as present what appear to be trends in such delivery.*

## Pressures

The 20th Century is closing with a build-up of pressures on every organisation whether it be industry or service oriented. These pressures may be listed as: economic (income versus expenditure), equity and social justice, technological, deregulation, improved productivity and quality assurance, and global competitiveness.

All universities face challenges with regard to these pressures and addressing them is crucial for survival in the competitive climate of today. This is particularly the case in the Pacific Rim area, including Asia, as well as the European Community, where countries are taking advantage of each others' learnings at an accelerated pace.

All of these pressures, of course, require universities to address ways in which undergraduate as well as continuing professional education programs are designed and delivered. Therefore, these pressures are as relevant to education and training providers as they are to commercial enterprises of all sizes. For example, due to deregulation of education and training, the growth in numbers of non-government private training providers is increasing exponentially in many countries. The challenge for all providers, whether they be internal to the organisation or external providers tendering for contracts, can be summed up as follows:

- to establish new corporatised operations as public (i.e. government tax-based) funding is withdrawn;
- to provide 'just-in-time' training;
- to deliver into the workplace or the home;
- to design programs which meet new quality standards;
- to customise training for the particular client, both in terms of the organisation and the individual learner;
- to enter into partnerships to ensure accreditation and articulation towards higher qualifications;
- to achieve economies of scale;
- to employ flexible delivery modes using a range of technologies; and
- to compete in the global market place.



Daniel (1996, 47–55) describes the three stages in the history of distance learning:

1. St Paul sent hand written letters to individual churches and asked the local elders to read them to their congregations. The churches were, therefore, like remote classrooms or study centres – asynchronous communication.
2. Two technologies, the printing press and universal postal services, enabled distance learning to move into people's homes and workplaces and these options were employed in correspondence education from the mid 19th century – again asynchronous communication.
3. Telecommunications and the development of a range of 'knowledge media' from the middle of the 20th century have introduced a new set of options for educational delivery both on and off campus – options for both asynchronous and synchronous audio, visual and graphics communication have become possible through single function technologies.

In a similar vein, higher education is entering its 'third generation' according to Moore (1993). The first, which lasted for centuries, was based on bricks and mortar technology, and one received the award from a university based in a specific place – e.g. 'The University of Queensland'. The second generation, has been only partially place-free and has involved various forms of open learning universities and agencies using a range of distance delivery modes and technologies. The third generation, Moore explains as follows:

Such restrictions are no longer necessary. With the development of the communications technologies of the 1990s – the electronic highways to our homes and workplaces – we are rapidly approaching technical readiness for the Virtual University, the third generation of higher distance education. (Moore, 1993, 4)

## **Characteristics and principles of open learning and flexible delivery**

Without becoming too pedantic about the terminology, some indication of the various labels and how they are used should be addressed briefly. Over the years the evolution of the terminology has probably been indicative of the convergence of related concepts. For example:

- Correspondence education;
- External studies;
- Distance education;
- Distance learning;
- Open learning;
- Flexible delivery;
- Flexible learning;
- Flexible teaching and learning; and
- Distributed learning.

The term 'open' in reference to education and training has become widely used and, usually, distance learning and the use of technologies for flexible delivery are considered to be important components of an open learning approach. The description of 'open learning' provided in *Queensland Access to Higher Education: On the Road to Open Learning* (Queensland Board of Advanced Education, 1989) provides a useful introductory description:

Open learning is a philosophy and system whereby all options for post-compulsory education are kept open. This approach is characterised by flexibility in terms of entry, program components, modes of study and points of exit. Learners are encouraged to negotiate learning arrangements to meet their special needs.

The Australian Senate Employment, Education and Training References Committee in its first volume of a report on the inquiry into open learning in Australia (1994) also make a good attempt to clarify the term:

The term 'open learning' means different things to different people and it is not always possible to be sure that those who use the term are talking about the same aspect of education when they employ it. For the Committee, the term 'open' learning implies a freedom and diversity of learning options for the student. Open learning as a concept has been in existence for many years, as the long record of distance education in Queensland attests. But

open learning is not simply distance education under another name. Open learning needs to be flexible, student centred and to offer opportunities and choices that structured and conventional delivery of courses may not presently allow at least in higher education – whether on campus or off campus.

All forms of flexible delivery for education and training should remain valid in an open learning approach. That is, the so-called ‘traditional’ face-to-face option where teachers and learners are in the same location, must continue to be available, particularly when there is a need for some form of special high level interaction or use of rare or expensive resources. However, various forms of face-to-face human interaction can now be effectively replicated through emerging communications and information technologies. Indeed, every possible subject area and all forms of skills have been successfully taught at a distance through interactive technologies. Further, there are increasing examples in the literature of new, creative techniques and strategies for teaching and learning becoming available through these technologies which are not possible through a face-to-face approach.

Open learning, however, also implies flexibility in policies and delivery ‘on-campus’ as well as ‘off-campus’, and therefore the term is seen as a broad approach to increasing access and choice in learning. There is still some debate as to the applicability of an open learning approach in schools, but for university, college and industry training as well as all types of professional development, this approach facilitates flexible delivery to suit the work patterns and professional needs of adult learners.

The Australian Technical and Further Education (TAFE) National Flexible Delivery Working Party (1992, 47–48) has also provided a clear definition and set of principles regarding ‘flexible delivery’. With very few editorial changes to incorporate a range of training and development situations, these can be taken as the basis for any approach to open learning and flexible delivery:

### **Definition**

Flexible delivery is an approach to vocational education and training which allows for the adoption of a range of learning strategies in a variety of learning environments to cater for differences in learning styles, learning interests and needs, and variations in learning opportunities.

Flexible delivery is characterised by:

- flexibility in terms of entry, program components, modes of learning and points of exit;
- learner control and choice regarding the content, sequence, time, place and method of learning;
- appropriate learner support systems;
- the application of learning technologies where appropriate;
- access to information on courses and services;
- access to appropriate learning resources; and
- flexible assessment processes.

Flexible delivery finds expression in many ways including:

- the delivery of learning at a variety of locations including the workplace, the community or neighbourhood and the home;
- resource-based learning with tutorial support;
- the application of technology to enhance delivery or improve access opportunities; and
- the extension of educational opportunities through access programs, literacy programs, second and third chance opportunities for obtaining qualifications and bridging courses.

The main issue, however, is that ‘flexible delivery’ implies a one-way direction from provider to learner. The interactive technologies, on the other hand, empower professionals to send as well as receive, and thereby initiate professional development networking that goes beyond the unidimensional implication of ‘delivery’. It is, therefore, necessary to re-look at the terminology and perhaps place the emphasis on ‘flexible teaching and learning’.

There are four major dimensions to flexible teaching and learning. Firstly, there is the flexibility that can be provided through a range of teaching and learning strategies, including various resource-

based options, such as: lectures with tutorials; independent study; discussion/seminar groups; debates; computer based education; and many more. Secondly, flexibility may also be provided in the curriculum by permitting alternative pathways through modularisation of the content, allowing learners to choose the sequence and negotiate assessment. Thirdly, there can be flexibility in organisational arrangements such as summer schools, block programs, emersion programs, part time evening programs, distance learning (off-campus) and mixed mode. Finally, the most difficult of all, is the provision of flexibility through the institution's administrative policies and procedures, such as open entry and exit.

However, these ignore the major power shift being experienced in post-compulsory education and training. That is, the shift in power from the institution to the learner. Whereas previously universities used to be able to dictate entry requirements, entry times, sequencing of curriculum components, content of curriculum components, timing and mode of delivery and assessment requirements, this is no longer possible in the deregulated educational marketplace. Learners can now choose from a range of providers and negotiate these elements of their learning. Such new demands from the 'clients' means that there needs to be increased flexibility in administrative procedures as well as curriculum content and delivery.

The result is that we are truly confronting a major paradigm shift for teaching and learning, and that many of the components of the new mainstream paradigm come from the distance/open learning tradition. This new paradigm is based on a new 'philosophy' of higher education which is inexorably linked to the applications of communication and information technologies.

Resistance from traditional/conservative universities and staff is severe in some instances, because of their elitist philosophy of higher education. This is based on a Middle Ages view of education being not only elitist but also part of a secret society. So in those days there was the masses without the privilege of education and the cloistered academics practising their literacy. The story goes that this led to magical practices among the masses when, for example, they developed chants and words like 'abracadabra' which was an imitation of the monks reciting the alphabet.

In summary, flexible teaching and learning is an idealised state where there is a mixture of educational philosophy, pedagogical strategies, delivery modalities and administrative structures which allows for maximum choice for differences in student learning needs, styles and circumstances. It is characterised by:

- a shift in the emphasis of responsibility for learning from the teacher to the learner;
- the use of a range of teaching and learning strategies;
- the ability of the learner to negotiate various aspects of the learning program;
- flexibility within the curriculum to provide learners with alternative pathways through the content to suit learner needs;
- a range of delivery systems, including the use of communication and information technologies;
- flexible administrative procedures; and
- increased learner support systems, including guidance services, pre-packaged learning resources, library and information services and access to computer facilities, in the recognition that there are several sources of information and knowledge, especially on-line electronic sources.

There is no single model of flexible teaching and learning which can be superimposed on a particular university setting. Rather, a university may adopt as a principle a commitment to increasing flexibility for its clientele, and exhibit and develop a variety of manifestations of flexibility in practice.

The extent to which these forms of flexibility will apply in a given situation will depend on the needs of the learners, the nature of the subject and its objectives, the approach of the teacher and the

feasibility of the various options. These four elements are considered further as a decision-making model later in the paper.

## National and international contexts

There are at least three major developments in higher education which require flexible approaches to teaching and learning:

- increased flexibility for students in terms of access to and progression through courses to move closer to meeting their needs, including delivery of courses to where they work and live;
- use of a range of technologies, but increasingly the Internet on-line, for delivery; and
- globalisation of markets and delivery.

Often referred to as the constructivist paradigm, the move by institutions to more flexible teaching and learning is being recognised as part of the shift to ensure learners' needs are met more adequately than they have been previously. These needs are often linked to **equity of access**, but the same shift has with it the potential to extend markets nationally and internationally. Coupled with shrinking funding and increased competition, the movement, in Westernised countries particularly, is accelerating. There now exists the possibility for people in Australia to enrol in university courses from overseas, for credit, which are delivered by satellite television or through the Internet. It is possible, for example, to undertake a Masters in Business Administration from Duke University in the USA through the Internet in 20 months for \$US19,500. There are as yet no regulatory controls in Australia to cope with this type of 'educational invasion'.

Universities in Australia, however, have not been slow in recognising this potential for their own purposes. Open Learning Australia, for example, is moving into the Asian market-place using the ABC and its learning packages, and several of them already have courses on-line on the Internet. USQ, for example, has a Graduate Certificate in Distance Learning available internationally on the Internet.

The **use of communication and information technologies** in higher education has been a major aspect of change in the past 10 to 20 years. Whereas universities were using various single function technologies (e.g. audioconferencing, satellite television, electronic mail) during the 1980s, they are now moving to multimedia formats, such as CD-ROM, videoconferencing and on-line Internet, which itself is becoming increasingly 'interactive multimedia'.

**Globalisation of delivery and markets** is evident in the examples above. It will become less feasible, and perhaps less socially and politically desirable, for increasing numbers of overseas students to come to Australia to study on-campus. Universities in the USA, for example, are advancing their delivery directly into overseas countries or they are exporting their expertise to assist overseas universities in developing countries to become self sufficient.

## International examples

### United States

*Western Governors University* <http://www.wgu.edu/>

*National Technological University – Colorado* <http://www.ntu.edu/>

*GSAMS – Georgia* <http://www2.state.ga.us/departments/doas/gams/v2/master.html>

### Europe

*Europace 2000* <http://www.europace.be/>

*Coimbra Group* <http://www.coimbra-group.be/>

*University of Exeter – T3* <http://telematics.ex.ac.uk/T3/>

## **Decision-Making Model**

The choice of open learning/flexible delivery options should be based on four decision-making considerations:

### **1. Assess the needs of the participants/clients and practitioners:**

- Personal needs: age, gender, abilities, learning styles, nature of employment and work patterns, home responsibilities, nature of isolation, other special personal needs;
- Professional needs: program relevance, experience and qualifications, present knowledge level;
- Access needs: location, distribution (geographic), disability, number of participants/practitioners; and
- Choice: types of programs/courses/services available, place, pace, time, timing, duration, individual or cohort preference.

### **2. Clarify the objectives of the program, nature of the processes and the relevance of the content:**

- Interaction and participation needs: level and type of interaction required among the participants such as live (i.e. synchronous, immediate/real time) versus delayed (asynchronous) interaction, level and type of supervision required, number of participants/practitioners;
- Teaching/learning strategies most appropriate for the content and objectives; and
- Content demands: need for audio, need for visual component (e.g. still graphics, colour and motion), type of knowledge, skills and attitudes needed to be acquired and/or demonstrated.

### **3. Consider the choice and skills of the practitioners:**

- Confidence and skills in particular mode of delivery;
- Program strategies chosen as most appropriate; and
- Support available.

### **4. Determine the feasibility of the program:**

- Access to equipment and systems for production and delivery, by participants/practitioners;
- Costs and availability of funds;
- Local support for participants (e.g. local site co-ordinator, training in the use of the technology, learning centres, information); and
- Institutional support (e.g. library services, production services, administration services).

## **Future issues, trends and unanswered questions**

Future predictions usually fall short of reality both in terms of actual developments and the pace of change. The major areas that will impact on flexible delivery of professional development are associated with:

- changing role of the provider;
- globalisation;
- deregulated climate for advanced education and telecommunications;
- compulsory continuing professional development;
- increased technological options; and
- virtual learning.

The changing role of the provider involves the way in which educational and training institutions organise themselves. There are evolving consortia at national and international levels, there is a very rapid increase in private providers, and learners are demanding increased flexibility in terms of who they contract with for various programs.

With regard to globalisation, in addition to institutional consortia mentioned above, it is increasingly possible for providers to transmit both synchronous and asynchronous education/training programs anywhere in the world. For example, the National Technological University provides masters degrees to several countries via satellite television and electronic mail interaction; Duke University provides a 20 month Masters in Business Administration on-line for US\$19,500. The globalisation of the virtual university or the international virtual higher education market place has some exciting potential, but there are also several issues to be considered in putting it all together. Questions that may be asked include:

- How will learners determine the quality and authenticity of such programs?
- How will credit be obtained for subjects taken from another country?
- Who will the teaching staff belong to if they are teaching through another institution?
- Who will the students belong to?
- What are the regulatory and cultural implications of the globalisation of education?

At best, this globalisation will provide new opportunities and access where little or none previously existed; at worst it will result in educational invasion.

Due to the move to ‘open learning’ options in advanced education, the rise in private providers who are being encouraged, the corporatisation of government services, deregulation of telecommunications, cuts in government funding for education leading to a user pays system, and a general devolution of authority in education systems, we are entering a deregulated climate in which future developments are very difficult to predict. This type of catch-as-catch-can competitive environment may cause concern if it leads to lower quality of programs and a fragmentation of the curriculum for professions. Attempts to overcome this are evident in terms of the setting of national and international standards for learning outcomes, as well as requiring providers to become registered in the country in which they are operating.

Increased technological options, especially through the convergence of modes of communication onto the Internet, indicate that all of the above areas of development will expand exponentially. This, plus the increased miniaturisation of computer technology, the increased flexibility of computer use, the personalisation of communication contacts and the personalisation of search engines, will make it possible for adults to tap learning just-in-time from sources anywhere in the world to meet life and work needs as they arise. This type of virtual or ‘feral’ learning will not necessarily have any overall sequence or plan and educational institutions will be challenged in terms of learners fronting up for recognition of prior learning. The learner, whether professional adult or young child will be able to say: ‘I am my school’ or ‘I am my university’.

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## Demonstration and Panel Discussion Synopsis

**Anne Fernandez**, UniServe Science, The University of Sydney  
PhySciCH@mail.usyd.edu.au

The aim of this session was to familiarise workshop participants with some of the web-based options available for flexible teaching and learning, by showing just a few of the more commonly used tools. After that there was a question and answer session with a panel of experienced academics. The tools chosen were: *TopClass*, currently used at the University of Technology, Sydney; *WebCT*, currently used at the University of Western Sydney Hawkesbury; and *WebTeach*, developed at and currently used by The University of New South Wales. Our panel of experienced academics was comprised of: Simon Housego (Simon.Housego@uts.edu.au), UTS; Stephen Sheely (SD.Sheely@uws.edu.au), UWSH; Peter Love (Peter.Love@mq.edu.au), Macquarie University; and Lindsay Hewson (l.hewson@unsw.edu.au) and Chris Hughes (c.hughes@unsw.edu.au), UNSW.

### Introduction

The important issue is the learning environment, not the technology, so the tools were to be viewed, not in terms of which buttons are prettier, but really which is going to best support the sorts of learning strategies that you are interested in using. Hence this synopsis outlines the educational uses made of the tools, rather than documenting features of each tool in turn.

### Educational uses

When considering using web-based learning environments, some of the available activities are: private mail between students and the lecturers; private mail between students and students; discussion groups; multiple choice quizzes; delivery of course work; bulletin boards; chat rooms; asynchronous communication; synchronous communication; calendar; ongoing record of what's happening; student presentation facilities; and collaborative learning spaces.

On-line quizzes can be valuable revision aids for students. However, if the lecturer wants the quiz to contribute to the student's assessment, authentication and security are still issues. Whilst UTS have found quiz authoring in *TopClass* to be very awkward, particularly if diagrams and graphics are required, it does not seem to be any worse than other authoring environments such as *WebCT* or *Question Mark Perception*. Even so, students at UTS are making extensive use of the quizzes that have been developed. *WebCT*'s quiz facility caters for both formative and summative assessment and is used by UWSH for assessment in some subjects.

With large classes, often in excess of 500, with multiple lectures per week and on several campuses, communicating relevant administrative information to students is a real issue. UTS uses *TopClass* to overcome this problem. While not directly related to student learning outcomes this is viewed by students and lecturers as a step forward.

Training staff and students in the use of the tool is important, but is often a logistical nightmare. UTS have found that in workshops with a ratio of two staff to twelve students, projection facilities and good quality web access, students pick up *TopClass* in about half an hour. However it is not possible for the central support team to train approximately 12,000 students in the first two to three weeks of semester. So the issue of how students will learn *TopClass* is left to the lecturer. Some lecturers provide laboratory/tutorial time for students to learn *TopClass*; others encourage students to help each other. Staff training generally focuses on the pedagogical issues rather than the technical

ones as staff tend to learn how to use the tools fairly quickly. Student training need only be enough to get them started. What is being provided by these systems is a set of utilities for which different students will choose different pathways, in order to achieve comparable, but not necessarily the same ends. Some will also follow paths the designer did not envisage. UWSH are working on a “virtual icebreaker” which will be available to all *WebCT* based courses to introduce students to the environment in which they will be working.

*TopClass* has been designed with transmission in mind, i.e. training, rather than communication and discussion. This is reflected in some of the features e.g. the search facility allows you to search course work but not discussion folders. *WebCT* is interaction-based and the developer, University of British Columbia, is quite responsive to requests for improvements from institutions which are currently using the product. The look and feel of these products is not always intuitive for academics. For example, the task bar within *WebCT* is path oriented rather than task oriented i.e. if you want to put up a bulletin board you can't find a button that says bulletin board, instead you find buttons like ‘course management’, ‘organisation’ etc. *WebTeach*, however, has been designed with the teacher-student relationship in mind. It focuses on the educational pedagogy rather than the technology and attempts to facilitate the sorts of activities which foster deep learning. Hence terms such as “quiz”, “discussion”, etc. are what the teachers and students see. The individual lecturers should determine those aspects of the tool which facilitate learning in their particular subject or educational environment.

On-line discussion forums have been found to be very valuable by UTS and student feedback has confirmed this. However, there is a trap here – the notion that on-line discussion saves time, when in fact, the lecturer often gets drawn into responding to the discussion at all times of the day and night. The on-line discussion is often in addition to, rather than instead of, existing components of a course. The structure of a course discussion should be determined by the lecturer. UWSH's primary aim for the use of *WebCT* is to promote discussion. Hence the main uses are email, chat rooms, and bulletin boards.

Bulletin boards are classic threaded discussions in a virtual environment. *WebCT* has an interesting feature, the Compile function, which allows you to go through the bulletin boards and pick out the contributions you want to retain. This facilitates including in the assessment a component based on the student's contribution to things like threaded discussions, chat rooms etc. Using the Compile function, the students can extract comments they've made to bulletin boards, comments other people have made in reply to their comments on bulletin boards, compile them and then edit around them to produce an assignment which they can submit or present for marks. *WebCT* also offers “My Record” and “My Progress”, which allow students to track their visits to the web site and their assessment. So if you've made, for example, part of their involvement in the subject that they have to visit the web site five times and they have to contribute to four different discussion forums, then they can track how far they've come down that path. *WebTeach* is basically a sophisticated bulletin board. It offers, for example: a notice board, which only teachers can post to; a seminar room, where the teacher initiates activities such as discussions, case studies, and formal debates; and a coffee shop where teachers or students may start or contribute to an activity. When a posting occurs on any of the activities within *WebTeach*, email is sent to all interested parties e.g. when a teacher posts a notice on the notice board all students in the group are notified. Teachers and students using *WebTeach* may choose to be anonymous. This was introduced to allow a teacher to break a long silence in a discussion session but has proved to be useful in promoting interaction. *WebTeach* also allows for the highlighting of messages, and the inclusion in the discussion of meta comments, which are coloured blue and indented, comments about the process rather than within the process. For example, the teacher might add a meta comment such as ‘I think we've heard enough on that let's move on’.



The idea of having a collaborative learning space – being able to brainstorm on-line – is very exciting. *WebCT* offers this facility in the form of a ‘Whiteboard’. However, there is one small flaw, any one of the participants can wipe the board clean! *WebTeach* also includes a brainstorm facility. Another useful facility is that questions can have imposed time delays on responses. For example, the *WebTeach* feature in which the teacher poses a question, students submit their answers which are held until the teacher decides there are enough to generate useful discussion, then they are released and the class enters discussion mode.

Putting course material up on the web for delivery requires a sound educational reason. For example, The University of Newcastle uses *TopClass* for content in some areas, particularly where it is dynamic or hotlinked. If material works better in paper based form it should remain as such. UTS and UWSH have both left much of their course material in paper based form and are using *TopClass* and *WebCT* to supplement or support these with web-based interactive processes. If a student has an old computer and a slow modem, expecting them to download course material involving pictures and large amounts of text is unrealistic. In addition, at UTS, the printing of coursework from the web by students at locations outside the particular school is effectively outsourcing the printing costs and this is causing administrative friction.

Student access and equity are still issues. Many students do not have access to the web from home and have never used email. Each institution needs to be very aware of their student mix. However, access and equity are improving over time. UTS has gone from less than 30% of students having access to the web from home to more than 80% in the last few years. The designers of *WebTeach* were always conscious of this issue and so the target interface has always been a standard browser that is independent of platform, location and company.

*TopClass* is centrally supported by 3 people at UTS; *WebCT* is centrally supported by 2 people at UWSH; and *WebTeach* is supported by 2 people at UNSW. When deciding which environment to choose, the institution must consider technical support requirements and training of support staff, academics and students. UWSH has about 12 subjects live on *WebCT* and about 50 in the development stage. A very important message that came through was that uptake is very rapid once you have central support in place and a known point of contact.

Students need to be taught what is acceptable practice in the use of this kind of medium. When setting up a subject, staff at UWSH are encouraged to put something in the content about netiquette, effective use, and respect – all things that are important in face-to-face teaching in tutorials but which tend to be conveyed more impersonally in this environment.

Most of these systems have facilities to import files created in other environments and to export files to other environments. *WebCT* can import files created by some other package provided it is HTML.

Does using these systems improve student learning? Good question. It is probably too early to tell but what is important at this stage is to evaluate student learning regularly. UWSH has in-built evaluation processes in most of their *WebCT* based courses to track student profiles, responses and progress. Indications at this stage are that students are finding *WebCT* easy to use. However, this does not mean they like using it and the response is quite varied. For distance students in particular it is a real plus as any interactivity is better than none.

Unless there is an educationally sound reason for doing so don’t bother to tailor icons etc. Even if the tool being used has some short coming it is usually more cost effective to work around it than modify it. Focus on learning not tuning the technology. Carry out staff and student evaluations regularly and respond to these needs rather than what you perceive to be the needs.

## Questions and Answers

1. **What should I consider when determining which tool to use?** Investment in terms of business time, business effort, business dollars, individual educator's invested time in knowledge and materials, institution's invested time and dollars in technical support. Some tools offer facilities the others don't so institutions are likely to find themselves supporting more than one. One way of trying to protect academic investment is to have the academics understand what they're trying to do educationally, irrespective of the technology. Aim for academics to have a grounding in good teaching, good assessment, alignment of objectives, method and assessment, and what teaching strategies work best in their discipline, then make use of whatever technology comes along. This also provides an independent yardstick by which to critically evaluate the tools. Teachers should not have to learn new teaching strategies to use these tools, the tools should support the use of existing classroom strategies.
2. **How do you use any of these without technical support?** Universities could cooperate – answer support questions or even host courses from other institutions if the product licensing allows it. Some suppliers, such as *WebCT*, allow institutions to run a limited number of courses from their server. The software supplier may offer the technical support, as in the case of *WebCT* and *WebMCQ* (see Workshop Presentation on page 20 of these proceedings).
3. **To what extent has *WebTeach* been taken up to replace on-campus activities?** Colleagues are tending to use it in addition to lectures and tutorials to conduct ongoing discussions which are not included in the student's assessment. One course is actually using it to try to improve participation in tutorials by posting the tutorial questions ahead of time and allowing on-line preliminary discussion. Lindsay and Chris, themselves, have used it as an integral part of their courses and have built participation into the course assessment.
4. **What sort of reactions have you had from academic staff when introducing them to *WebTeach* and which disciplines do you envisage it being used in?** *WebTeach*, with its strong underlying theoretical base, challenges the teaching style of many academics. We have found that we have to listen very carefully to the academics requirements rather than telling them what they need because each discipline is different e.g. management, law and medicine tend to use case studies whereas others don't. It's a slow process of them becoming aware of the functionality and what that implies educationally and us listening to the ideas they have. It's being used by Microbiology, postgraduate discussion groups, Medicine, Higher Education, Philosophy, librarians, and school sector mentoring.
5. **Is there evidence that pedagogy benefits from this technology?** Examples of where the pedagogy has been advanced and enhanced by the technology: brainstorming; questions with imposed wait times on responses; and flexibility in handling group dynamics. Teachers are finding that the quality of submissions in on-line discussions is a lot higher than in face-to-face classes, they are more thought out, better structured and better expressed.
6. **If I use *WebCT* for most of my course material but I prefer *WebTeach* bulletin board, can I link my course material to your bulletin board?** Technically yes, but copyright is an issue.
7. **How do you get staff involved?** Edict from the Dean. Word of mouth. Showcasing good examples. Pressure from students. However, approach should be qualitative adoption rather than quantitative adoption – requires considerable discussion before hand to establish the academic's requirement and whether or not it is an appropriate use of the medium.