

# SECTION ONE: THE RESEARCH



## THE CHANGING NATURE OF EDUCATION & TRAINING



In order to provide effective guidance to those who want to design and deliver virtual education courses, it is absolutely essential to examine the context in which this will take place. While this context is continually changing, some principles remain constant, so the following overview looks at the current state of virtual education, predicts some trends, and discusses the constants that will always apply to educational course design and delivery.

## **ASSUMPTIONS**

Before beginning any discussion of virtual education, it is important to make explicit some taken for granted assumptions that form the background to the arguments presented here. While some of these assumptions can, and probably will, be contested by some observers, we believe that most of the following would receive widespread agreement. The main underlying assumptions in this discussion are:

- that knowledge can now be acquired from many more sources, more easily, than ever before
- that new knowledge is being acquired faster than ever before
- that knowledge can now become obsolete much faster than ever before
- that conditions in the workplace now mean that education has to become a continuous, lifelong process for most people
- that emphasis is shifting from teaching to learning, and especially to self-directed learning
- that technology provides the option of freeing educational delivery from time and space, both of which are scarce resources for most educational consumers
- that distance education is a global and growing market that is becoming increasingly commercialized

- that the distance education market is increasingly competitive for both public and private providers
- that conventional universities now face the difficult challenge of having to operate in real *and* virtual space in order to remain viable in the educational marketplace
- that the need for more flexible learning in educational institutions and in the workplace has greatly increased, and new technology to meet that need is constantly being developed
- that post-secondary education, including workplace training, is at the beginning of a huge paradigm shift that presents challenges to educational institutions, as well as public and private employers.

A word also needs to be said about the difference, or lack thereof, between education and training.

'Education', tends to be more associated with 'knowledge' and therefore held in higher academic esteem than 'training', which tends to be more associated with 'skills'. Although the two have always contained elements of each other, they were usually perceived as distinct. In Canada this division has been accentuated by the terms of the BNA Act, which gave responsibility for 'education' to the provinces but left 'training' to the federal government.

The obvious convergence of the two has been happening for some time and is another element of the paradigm shift. Now it has become increasingly difficult to differentiate between them, beyond the convention that education is something that happens in educational institutions and training is something that happens in industry. That convention should continue to be challenged.

Both industry and academia provide education AND training, and both deal in the transference of knowledge, skills and attitudes. For these reasons, in this report, education and training are used synonymously.

## **CHANGE IN MACRO STRUCTURES**

The paradigm shift identified in the foregoing assumptions, which is affecting all aspects of education and training, has already begun to influence the very structures of educational delivery organizations, and present them with some huge challenges.

The increasing demand for, and development of, virtual education is one of the biggest influences on these structural changes. It seems that no organization can successfully deliver technology-enhanced courses without itself undergoing some form of change, although these changes may be neither anticipated nor immediately apparent. It is therefore important for educational and training decision makers to be aware of how the shift to virtual education might affect their own organizations.

Two papers detail aspects of this paradigm shift in terms of structural changes at the macro level.

The first is a paper, commissioned by Sims Latham Associates from Dr Robin Mason, who is Head of the Centre for Information Technology in the Institute of Educational Technology at the Open University in the UK.

The second is a paper by Pat Latham that is currently being used in the Open University's MA in Open and Distance Education.

Edited excerpts from both papers are reproduced below. Full versions of both papers are available on the Sims Latham web site: [www.simslatham.com](http://www.simslatham.com).

## **New Models for Delivering Lifelong Learning - Robin Mason**

### **Background**

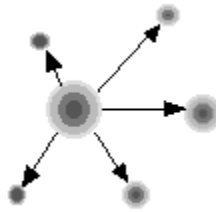
A growing sense of crisis in the Higher Education sector over the last decade has given rise to a multiplicity of new organisational structures designed for meeting the new challenges of post-secondary education and training. Almost all of them exploit the developments in information and communication technology to design, manage and deliver courses and training modules.

Whether it is cause and effect, or mere chance, the fact is that as the need for open and flexible learning has exploded, so the technology to support new methods has been developing at an equally fast pace. The term 'information and communication technology' (ICT) encompasses all the computer-based teaching systems, such as CD-ROM, as well as all the telecommunication systems, such as computer conferencing, the Web and videoconferencing. ICTs can support all aspects of teaching and learning from course development, presentation, delivery and support, to administration, registration, assignment handling and marking, even when the student body is widely dispersed and never meets face-to-face.

### **New Models for New Needs**

In the typology of structures which follows, I have used evocative images to categorise existing and planned organisations. As with all such terms, the analogy is only appropriate up to a point. Furthermore, there is inevitably some overlap such that any organisation belonging primarily in one category, may have some attributes of another.

## *Brokerage*



The brokerage model consists of a new organisation set up to provide courses for the life-long learning sector, but using the teaching and course resources of existing institutions. The new organisation has a very small number of permanent staff, mostly administrators, but also possibly editors, educational technologists and curriculum designers. The broker puts students in touch with course providers. Frequently, the broker commissions courses which fit into a pre-determined curriculum.

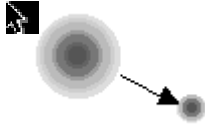
A classic example of this model is the Open Learning Agency in Australia. Existing universities bid to provide courses requested by OLA, and all providers agree to give credit transfer to courses within the programme.

Furthermore, there is the notion of a pick and mix system with short modules which can be combined to fit with the existing credit points system. The aim is to meet employers' demands for just-in-time training of just-the-right-amount.

Another example is the Jones Education Company (formerly Mind Extension University). JEC markets and registers students on courses designed and tutored by staff in associated universities.

In theory there are many advantages to this model: it builds on existing resources in existing institutions; it helps to focus existing providers on the demands of the marketplace; it has low start-up costs. In practice, however, there are difficulties centered around ownership of courses, institutional loyalties, lack of prestige and in some cases, staying solvent!

## Partnership



The partnership model relies on agreements amongst existing universities, often in other countries. Typical partnerships consist of one large or prestigious university from a developed country working with smaller or newly forming universities in

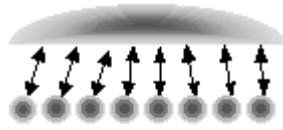
developing countries. Existing courses are offered to the partner with or without modifications, and may be tutored locally or by staff from the providing institution. Examples within national boundaries exist, but two way partnerships (i.e. with each partner both providing and receiving courses) are rare.

The UK Open University is a large and visible example of the partnership model in practice. Agreements exist with very many developing countries in Eastern Europe, Africa, Asia, and the Middle East. Increasingly partnerships are being formed with North American institutions, drawing on the OU's vast resource of high quality print and video based distance education materials.

The positive aspects of this model derive from the way in which new institutions can 'stand on the shoulders' of existing expertise to get started in the field, building up their own infrastructure gradually before becoming self-sufficient. There is also an efficiency gain in extending the use of existing teaching materials to a wider student population before they become out-of-date.

The limitations of this model are fairly obvious: accusations of imperialism, imposing an already dominant cultural perspective, and lack of reciprocity.

## *Umbrella*



The notion of an umbrella model is one where existing institutions pull together (instead of competing with each other) under the aegis of a slim superstructure, to provide new courses in

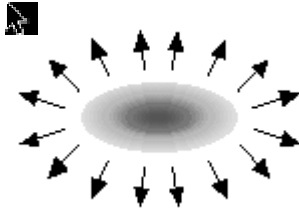
new ways. This model has many similarities with the brokerage model, but the difference is in the vision of the institutions who choose to come under the umbrella: 'individually we are small and vulnerable; together we can be more than the sum of the parts'.

A good example of this model is the newly emerging University of the Highlands and Islands in Scotland. The 'superstructure' is located in Inverness, but the existing organisations – one university and many colleges – are spread throughout the area.

Another example of the umbrella model is the Western Governors University (WGU) which has formed to address the need for accessible, relevant lifelong learning. It acts both as broker and as course provider.

There is little to dislike about this model except the difficulties of carrying it off. Institutional politics, market protection, collaboration hostilities can only be overcome by near life-threatening crises, which command people to work together against a common threat.

## *Greenfield*



Setting up an entirely new organisation has considerable appeal in the face of the difficulties of the other models. A new organisation is not hampered by existing systems, outlooks or procedures. It can be designed to exploit

new technologies for management, administration as well as course design and delivery. It can target the students and the areas of the curriculum most ready for technology delivery. It can focus on teaching and hire dedicated and outstanding teachers, rather than compromise teaching quality in favour of research credibility. Not surprisingly, there are many such organisations springing up around the world. Most of them have 'virtual' in their title, their mission statement or their implementation.

One whole class of examples are the computer and telecommunications companies: Deutsche Telekom's Global Learning network, Microsoft's Online Learning Institute, IBM's Global Campus. In most cases the name is grander than the actuality, but the impetus and the direction are clear – technology-mediated, short modules, just-in-time, just-the-subject-you-want. There is usually no face-to-face component in the courses at all; tutoring is online, as are the course materials.

Another, smaller class of greenfield organisations are the new 'open universities' e.g. in Greece, various Indian states, in the Arab states etc. These can build on the experience of existing open universities, but start with a technology base of the 21st Century.

A good example of one of the new, for-profit corporations is Magellan University, set up with the guiding principle, 'Excellence in education, anywhere, anytime'. The distinguishing feature of the Magellan environment is the division of course content (consisting of video recordings of outstanding teachers) and course support (consisting of classes of about 15 students managed by a tutor using Lotus/Domino software).

As a new institution, Magellan is free to find its faculty from around the world, selecting them on the basis of their teaching excellence. The tutors are paid on a per student basis, and are expected to interact asynchronously with students, as well as to mark their assignments. The Electric Library consists of over 400 online lessons developed initially by the Plato Laboratory at the University of Illinois. Each lesson takes between one and two hours, and includes examples and self-tests. They are aimed at life-long learners wanting to brush up their knowledge of particular subject areas, or get a taste of new subjects.

## *Network*



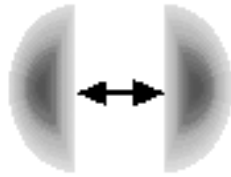
Existing universities and education providers collaborate in a variety of combinations to produce courses for the life-long learning market. This model is the most loosely organised, as there is no central driver of the

programme. However, it has the advantage of being founded on natural working relationships, rather than the forced arrangements which other external systems impose.

One minor example of this model is a European Commission funded project called VirtUE, which simply stands for, Virtual University for Europe ([www.europace.be/project/theta/thetasum.htm](http://www.europace.be/project/theta/thetasum.htm)). The collaborating partners in the project agree to produce some joint courses which are delivered by ISDN videoconferencing. The model expands and contracts as the partners respond to their perceived need for courses, and new partnerships can be formed for each course.

This model is the least innovative and could be a development of existing arrangements and working relationships, with the injection of some extra resource for expansion: a “do it more” approach.

## *Dual Mode*



The idea of teaching the same courses both face-to-face and off campus has a ring of efficiency about it which has led to the very widespread practice known as dual-mode. The Australians are most noted for this, and

have found that there have been benefits for both categories of students e.g. the printed and Web materials developed for the distance students are a help to the campus students and in some cases, videos of the campus lectures are made available to the distance students.

In fact, there has been an explosion of dual-mode teaching in higher education over the last ten years. Figures from 1994 indicate that over half of UK universities, 42 out of 69 Canadian universities and 'almost all' US universities teach at least one programme of study by distance learning. Since then the proportion is closer to 80% teaching in both modes. One of the more successful examples of this model is the University of Phoenix . The guiding philosophy is characterised by choice and flexibility for the working adult, by short courses (5 - 8 weeks) which are taken sequentially, and by active and interactive study materials.

There are many more venerable examples of dual mode teaching worldwide: the University of Southern Queensland, Penns State University and University of Wisconsin, to name only a few. All of these programmes now use a variety of telecommunications technologies to delivery the distance education courses: computer conferencing, audio and audiographics, video and of course, the Web.

The advantages of dual-mode institutions are:

- they can provide a wide spectrum of courses - usually more than the dedicated distance teaching institutions, which tend to have large numbers on a few courses;
- they have a wider choice of teaching strategies than dedicated distance teaching institutions: they can mix print and video lectures, or campus-based evening classes with print, Web and computer conferencing, or resource-based learning using both campus facilities and network access;
- they can offer options to join the campus-based courses for certain periods and in many cases use the same staff to teach in both modes, thus providing parity of academic standards.

The disadvantages of dual mode teaching are:

- having to put in place systems to manage and administer both kinds of courses, students, and assignments, with the inevitable perception that one mode will be secondary, less desirable and less well resourced;
- maintaining cross fertilisation between the two programmes, so that each benefits from the other, at all levels of provision - the students, staff and administration.

## **Conclusions**

It is apparent from this survey of existing models that there are several elements common to all structures:

- flexibility - in meeting the needs of adults, fitting learning in with a range of other commitments
- interactivity - in supporting students in their learning processes
- accessibility - in making the courses available to students in the location, the amount and the subject they want.

There are several themes common to all approaches as well:

- re-conceptualising the nature and delivery of learning materials
- re-using existing course materials and sharing resources
- re-organising the structure of existing institutions to meet the requirements of the new learner.

## **Models of Technology-enhanced Educational Delivery - Pat Latham**

### **"The Enterprising Professor"**

In this model a teacher, who is intrigued by the possibilities of new technologies, experiments with delivering his/her courses in new ways, such as putting course material on the web. This may act as a catalyst for involving other members of a department, and a more systematic use of new technology in the educational institution as a whole.

Examples (just two of many):

- *Tom Creed* of St. John's University who uses technology to enhance his courses, including "Principles of Learning and Behaviour"
- *Rik Scarce*, who teaches at a Montana University, and uses email discussion groups to teach his sociology students

### **"The Enterprising Institution"**

While no university has, as yet, totally converted to a distanced mode of delivery, several are experimenting in distanced, electronically delivered courses. While this is a heartening development, it seems to be occurring in a fragmented fashion that is not conducive to an optimal use of resources. Given that technology-enhanced and distance courses may be more expensive to develop than conventional courses, this could stretch individual universities to breaking point.

Examples (just two of many):

- *University of Colorado at Denver*, US, is a world leader in technology-enhanced and distance education and has online campuses
- *Central Queensland University*, Australia, has a distance education department

### **"The External Catalyst"**

Some universities are enticed into experimenting with new technologies by the injection of government funding and/or are energized into doing so by the intervention of a commercial company. It is not surprising that these are often computer hardware or software companies who donate hard and software to the educational enterprise.

Example:

- One such organization is the *TeleLearning Network*, whose administration is based at Simon Fraser University. This network of universities across Canada receives support from "sustaining members" who include a host of corporations and some government departments.

### **"The Purpose Built Distance University"**

This type of university is rare compared to its more conventional brethren, but examples are beginning to multiply. One of the earliest, and the most commercially successful, is the UK's *Open University*, which delivers distance courses to a vast number of students annually. Many examples in other countries are based on this university.

Other examples:

- *Athabasca University* is Canada's "first fully accredited open university" ... "offering university education to more than 12,500 students across North America each year."
- *The Open University of Israel* has a campus in Raanana and involves 100 centres and colleges
- *The Open University of India* has as a major objective "Promoting the concept of distance learning"

### **"The Professional Association"**

Many professional associations are organizing their own technology-enhanced or electronically delivered or distance courses and, of most importance, are providing their own accreditation. Because these are tied directly to employment in the specific profession, these courses are attractive to many students.

Example:

- *The Canadian Institute of Financial Planning* is listed in the yellow pages under "Schools, colleges and universities" and offers correspondence and community college courses. It boasts "Canada's longest established educational program leading to CFP TM certification."

### **"Corporate Outgrowth"**

Many companies, especially those in the computer field, have discovered that courses originally developed for in-house use provide the additional benefit of being marketable in a wider arena, usually starting with their own customers. Not only have these companies developed an expertise in new methods of delivery but also in teaching with the new media. In some cases these companies invite the collaboration of educational institutions, but they are really developing a market for their products and using the universities and colleges as their delivery mechanism.

Many corporations regard educational institutions as a growth market for their products and services but some already see education as a market in itself.

Some Examples:

- *The Centre for Excellence in Distance Learning* – This is an AT&T initiative through Lucent Technologies. It creates, for example, training seminars, courseware, and videotapes.

- *The 21st century Campus* – This is Microsoft's vision of the future for higher education. "Microsoft and the American higher education community will build the 21st Century Campus in the The Connected Learning Community."

- *The Global Campus* – This is IBM's version. "Through IBM Global Campus, colleges and universities can build a distributed learning system that suits their specific recruiting, strategic, and *business* objectives."  
[My italics]

### **"Education Inc"**

There are a host of companies that offer a wide number of specialist courses on any number of topics. Many use new technologies to achieve two main goals. One is to reach the most students at the least cost, and the other is to provide training in the use of new technology itself, which is seen by many students as a means to employment in the information or knowledge economy.

These companies do not necessarily offer courses online, but often use computers for course delivery, and some of them have highly organized web sites, so that online delivery would be relatively easy to develop. While some of these companies could be categorized as fly-by-night, many are providing a worthwhile and valuable service.

Many are specialized into niche market areas but, increasingly, the information technology giants are entering this business arena; sometimes offering "accreditation", sometimes offering "accredited instructors", and sometimes as a *de facto* corporate "university".

Some (Reputable) Examples:

- *Canadian Business School* offers a range of "computer certificate courses and other programs." It has "Microsoft certified professional instructors."

- *DeVry Institute of Technology*. Well known for its TV ads, this organization has a mission to "provide high quality career-oriented higher education programs in business and technology to a diverse student population."

- *Motorola University*. This is the "strategic learning organization of the [Motorola] corporation", providing for their clients "the best value in leading edge training and educational solutions and systems to be their preferred partner in developing a Best in Class work force."

### **Implications**

The last four models demonstrate the considerable competition that conventional universities face in the educational marketplace.

Whether technology is forcing or simply enabling the change, there is increasing pressure for all the delivery models to move nearer to the last (i.e. the full commercialization of education). In fact several observers have suggested that the new mega multinational of the next millenium will be an "Education Inc". This means that conventional educational institutions face several dilemmas:

- **Should they stick to “commercial free” education** that concentrates on what Professor Porteous of the University of Victoria (Canada), writing recently in the *Globe and Mail*, calls “the selfless search for discovery or devotion to learning which we traditionally expect of universities”?

If this is not a generally held opinion, and there are counter arguments that posit an essential role for public education in the creation and dissemination of more applied knowledge, then universities will need to make a conscious decision to enter the more rough and tumble educational marketplace. The problem here is that, while education may be a growth industry, the market is becoming increasingly fractured because new technology is offering a variety of delivery options.

• **Should they increase their activities in the field of professional re-training** that occurs after undergraduate and post-graduate degrees have been obtained, and addresses the increased need and demand for continuing education? If universities are serious about getting into the educational marketplace, they will need to shift focus and redirect considerably more resources into the adult, continuing education field, and this means getting into the whole area of distance education delivery. One good reason for them to do so is that it will also enable them to deliver undergraduate courses at a distance. This may be necessary not only to satisfy and even stimulate student demand (distance education can also be cheaper for the student) but also to reduce supply costs. Then again, costs are another whole problem!

• **How can they deal with the problem of costs** that occurs when they have to operate in real AND virtual space?

Many institutions have looked to technology to see if it can help reduce the costs of delivering education. Too often this correlation between the use of technology and a reduction in costs is taken on faith. It is still too early to evaluate this with any precision. While there are indications that technology-enhanced courses may cost more to develop but have lower marginal costs, the methods used to calculate such findings are often based on highly questionable assumptions.

• **How can they deal with entrenched attitudes** that hamper attempts to innovate in the area of distance or technology-enhanced education.? The job security of the faculty in conventional universities is not generally reliant on keeping up with new technology, as it is for many jobs in the commercial world. Yet they will need to deal with:

- New learning unit structures
- New course development structures
- New course delivery structures
- New course administrative structures
- New student services structures
- New assessment structures
- New validation structures

Many of these new structures will threaten the academic freedom of the faculty as it is now defined in many institutions. Universities will be forced to consider new definitions of academic freedom!

- **How can they deal with the rapid obsolescence of knowledge** that demands the continual creation of new courses? While some universities are still on the cutting edge of discovery, faculty members in many institutions are having a hard time keeping up with new knowledge acquisition let alone creation. In the face of ever-faster changing technology, this role has been transferring to the corporate world.

Universities will need to respond quickly to all these challenges or their students will disappear to other educational providers, and the value of their human and capital assets will diminish. Some of these challenges also face corporate training providers. For example, it is increasingly expensive to train employees in-house, especially for smaller corporations. It is in the context of these structural imperatives that virtual education is being developed.

## **EDUCATIONAL CONCERNS**

Many educationalists are becoming increasingly concerned that technology is driving educational course design and delivery, instead of enabling and improving them. This section therefore looks at some basic educational issues and the effects that technology may have on them.

### **Educational Aims**

It is obvious that the main aim of an educational course is to teach someone something, but there are many side issues and many stakeholders in the process that also affect decisions about aims.

First the stakeholders. Teachers, administrators, students, validators, sponsors and employers will all have views on educational aims that do not necessarily concur.

Second, what to teach, when to teach it, to how many and where, are all very basic decisions that can have huge consequences for specific course aims.

Third, underpinning all those considerations are issues of quality, cost and relevance.

Virtual education can have a large impact on all these parameters. For example, there is a heated debate about the potential loss of quality in the educational experience as learning shifts from the classroom into cyberspace, with apologists for both sides insisting that their type of education has unique advantages.

## **The Basis of Curriculum Content**

While course content is most often envisaged in terms of bodies of knowledge, education has always delivered more than this. Most curriculum development models are built around the basic premise that content is concerned with knowledge, skills and attitudes. Education aims, on which educational courses are based, will likely contain elements of knowledge, skill and attitude development, and course content is increasingly described in terms of all three.

### ***Knowledge***

A more modern word for knowledge is 'information' but it can have a variety of other labels: 'data', 'concepts', 'theories', 'laws' and 'findings' being but a few. Knowledge, therefore has to be considered debatable and the search for 'truth' a constant educational goal.

### ***Skills***

While the pursuit and dissemination of knowledge have always been educational goals, the development and transference of skills have often in the past been viewed as a 'a lesser type of educational endeavour. This has changed as the importance of literacy skills, mathematical skills, analytical skills, and lately 'computer skills' and 'people' skills, has been recognised. In fact some courses can now be almost entirely skill-based.

### ***Attitudes***

Although the acquisition of knowledge and skills can be discussed quite openly, the acquisition of attitudes is often viewed with suspicion, even distaste, identified as it often is with 'brainwashing' and other negative connotations. Nevertheless, attitudes are inevitably part of any educational course and are nowadays becoming more overtly addressed.

Examples of attitudinal aims may be to 'instill a love of learning' or 'to increase the confidence of the learner'. They may sometimes masquerade as skills: the emphasis in many modern training courses on making people "good team players' may well require learning some skills but it almost certainly will often require some shift in attitudes.

## **Models of Pedagogy**

### ***The 3 D's***

In order to study the relationship between educational aims, pedagogy and the use of technology, we devised a simple typology of pedagogical methods.

The three pedagogic methods outlined below are, of course, ideal-typical constructs that in real life tend to merge into one another, or be used in conjunction with one another in order to achieve specific educational aims. All three methods can be used effectively in technology-enhanced education. Course teams designing technology-enhanced delivery systems need to decide which (or which combination) will be best for achieving the specified educational goals, and then how technology can be used to maximise their effectiveness.

### ***Didactics***

In this method a perceived body of knowledge, such as a set of facts or theories, are imparted in a one-way interaction from teacher to student(s). The active participant is the teacher and the learner passively receives teacher output. An example is the university lecture.

In the traditional classroom, the number of students is limited by the size of the room. Technology can extend this to any number, over any distance, and at any time. The use of print to disseminate "lectures" was an early example of the use of technology to provide didactic education at a distance.

While didactics can be a very cost-effective method for imparting knowledge in terms of staff costs, it may not be effective for teaching skills and may have little effect in changing attitudes.

While the traditional classroom might be thought to provide for more satisfying interpersonal relations, in post-secondary education one professor often lectures to too many students to allow any meaningful interpersonal interaction to take place. This is important to remember in comparing conventional and virtual classrooms.

### ***Discourse***

In this method facts or theories are imparted through a two way interaction between teacher and student(s). An example is a seminar. The teacher and students are both now active participants in the educational process. Discourse can be private (usually between teacher and individual student) such as discussing grades or educational problems, or public, such as in the form of seminars.

This is relatively easy to translate into more distanced applications, through audioconferencing or on-line chat groups, which can retain the active participation of students, indeed technology can encourage student to student discourse and shift the norm from one teacher to many students to one learner accessing many teachers or other experts.

The use of technology can reduce the need for and, therefore, the cost of teaching staff but may be more costly in terms of technical support staff, especially if badly planned, and, again, will require more time for planning, which must also be costed.

### ***Discovery***

In this method experiences, facts or theories are explored through an interaction between the student(s) and a variety of sources. In this scenario students have taken active control of the educational process. In its purest form, it could obviate the need for an educational institution at all, unless the student requires some form of certification of their endeavours.

The problem for the student is that the quality of educational experience that can be acquired for “free” may well not be satisfactory for the student’s needs. For example, while the Internet had ‘free’ knowledge as an original ideal, this is being challenged by the fact that it costs money to acquire and organize knowledge, and these costs may need to be recouped. In addition, unstructured as opposed to structured discovery may be a very inefficient way to acquire knowledge and skills. Once again careful planning is needed for efficient guided or structured discovery.

## Teaching and Learning

The three Ds of pedagogy can be seen to range along a continuum of passive to active learning, and the shift to more active learning, whether forced or simply enabled by new technologies, is affecting the balance among teaching methods used. The role of the teacher is changing from teaching to facilitating, so the popularity of didactics is supposedly on the decline.

Yet the problems of costs and time may be working against this shift to more favoured methods. Unstructured discovery can be very costly for the student in terms of time, and time also costs money. On the other hand, well structured discovery can be costly in terms of teaching, both in time and financial terms.

This is an important consideration because a large element of the paradigm shift is an increasing emphasis on lifelong education (or learning), where students are more likely to be studying part-time and may well be holding down a full-time job as well. While the joys of discovery may be legion, especially for younger students, those already in the workforce may well prefer the short cut of "talented didactics" to acquire new bodies of knowledge.

So a mixture of pedagogies may still be the best option for achieving successful outcomes and customer satisfaction.

As Tom Creed of St. John's University describes it:

"I view my role in the course, then, as setting up the environment so that my students will most likely learn the material as well as possible, but I do spend some time playing expert and transmitting information ."

It seems likely that, while the need for the certification of educational effort and the organization of knowledge acquisition still exists, there will continue to be a role for educational institutions, where teachers take on a facilitative role and aid students in the organization of their acquisition of knowledge, skills and attitudes.

## Learning Styles

In the vast literature on learning styles there are almost as many models as there are academics working in the field. What is generally accepted is that people learn in different ways, and that this diversity of learning styles needs to be accommodated by course designers.

Some learning styles differ along dimensions associated with the senses: that is, some people are primarily “auditory learners” some primarily “visual learners” and some primarily “tactile/kinesthetic learners”.

Other models take into account conditions in which learning takes place or “instructional preferences” such as environmental (sound, light, temperature etc), emotional (motivation, persistence, responsibility etc), sociological (individual, pair, team, class etc); psychological (perception, analytic mode etc).

Yet others differentiate learning styles by intellectual functioning related to input channels (concrete sequential, abstract sequential, abstract random, concrete random) or by personality type (introvert/extrovert, sensing/intuitive, objective/subjective, judgemental/perceptive)

The central message in all this is that learners will learn more effectively if they know (or are helped to discover) their own best learning style and are allowed to employ it.

The use of modern communications technology focusses attention on more active learning, and also increases the choice of delivery mode. This should increase the learner’s ability to employ his or her own learning style.

For example, the use of multi-media allows a learner to choose from a variety of sensory inputs (visual, auditory, tactile) in order to optimise their learning style. And non-synchronous delivery modes allow a greater freedom to learn at one’s own pace.

## Technology and Education

There is a lot of hype surrounding the subject of what technology can do for education. There's no doubt it can do a lot but unless it's used wisely it can create more problems than it solves. How to use it wisely? First you have to decide what you mean by "education." A simplistic definition is: any situation in which people learn something. But simplicity here may have some merit because *learning* is the key.

We have already discussed the three basic ways that people learn: didactics, discourse, and discovery; but how are these methods of teaching/learning affected by technology?

Technology enables teachers and taught to be freed from each other in time and space and therefore it tends to shift the emphasis from didactics to discovery. Is this a good thing?

Yes and no. There are advantages and disadvantages in all three methods, which technology can alleviate or exacerbate:

*Didactics* can be the most effective method for transferring a lot of information in the shortest possible time. Its disadvantage is that it may not engage and motivate all the learners. It is also heavily reliant on the talent and skill of the individual teacher.

*Discourse* may engage more learners by involving them more actively in the educational process, but it may lengthen the time taken for the transfer of essential information to the average learner, and it still may not involve all learners to a sufficient degree.

*Discovery* may ensure that ALL learners become actively involved but may be an even more time consuming method of information transfer. It may also be inefficient in other ways. The learner may NEVER discover some of the essential information. They may only learn a great deal of irrelevant information. To set against that, learners may discover new and useful information that is beyond the original learning aim.

***How does technology help or hinder these processes?***

It can help to solve one of the biggest problems associated with *didactics*: not all teachers are good lecturers. If technology, say videotaping, is used to expose more learners to teachers who are good at lecturing, a scarce resource is optimized in use. But if technology is simply used to expose more bad teachers to more learners, the problem is multiplied.

If technology can free *discourse* from time constraints, by using asynchronous computer communications such as e-mail or bulletin boards, learners can engage in dialogue with other learners or teachers at times convenient to all. But if synchronous chat lines are used without some prior training and agreement about communication protocols, this can result in poor quality communications, such as non sequential questions and answers, and poor language presentation due to lack of fast enough keyboarding skills. In addition, long times spent at computer keyboards and screens are not good for the eyes, wrists or the back!

As for *discovery*, technology has made enormous information sources available to learners, but searching the web does not automatically teach search skills. Poorly conducted web searches constitute unstructured research that is of little value. Carefully structured web searches (for which teacher input may be necessary) can produce well-researched projects in much less time than otherwise.

As with many things, a judicious mixture of methods will usually be best. For example, if you want a gifted speaker to reach more students, record him/her and provide this to students to play back in their own time. Then engage the students in a dialogue about the information, ideas and implications posed by the speaker, by using an electronic bulletin board on which they can post comments. They can also be asked to research specific points raised using the Internet, and share their findings asynchronously with other students via a listserv or bulletin board, and/or participate in synchronous discussion with other students via a chat line.

If used in this way technology can enhance learning, not create more problems. Not only are all the methods of pedagogy used to their best advantage, but students can employ the learning style that is most effective for them.