Ultralab
at
ANGLIA POLYTECHNIC UNIVERSITY

KEY ISSUES IN DESIGNING AWARD-BEARING COURSES FOR ON-LINE DELIVERY

GRAHAM HART

Abstract

Key issues in designing award-bearing courses for on-line delivery.
[i]

This document explores the rise of the Internet as an academic course delivery mechanism. It examines the pedagogical perspectives, the underlying relevant theoretical precepts and the quality issues concerned with on-line course design and goes on to examine some of the implications for Institutions. Finally it makes recommendations, directed towards enabling Institutions to successfully introduce on-line teaching institute wide.

CONTENTS

TABLES

FIGURES

1 Introduction

1.1 General Comments

The transformation of data into knowledge and its recording and subsequent dissemination has been in process for thousands of years. The processes have changed and the rate of change of the dissemination processes has accelerated greatly over the last hundred years and particularly over the last fifteen.

1.2 Historical perspectives

The earliest forms of information and knowledge storage were probably cave and rock paintings, followed by and/or combined with sign language and remembered commentaries on the paintings. The commentaries developed a separate identity and became the myths and beliefs transmitted from generation to generation by word of mouth. In later years itinerant storytellers became the peddlers of myths, and over time some myths came to be accepted as the truth.

In parallel with this verbal tradition, those skilled in the newly devised written language skills started to record these myths on to clay or stone tablets, thus preserving the information or knowledge in an unchanging format. This was a slow process and did not accelerate significantly until the discovery of the art of writing on papyrus with inks.

In essence little changed for many hundreds of years, for people generally could not read or write and those who had such skills were of the ruling classes and could therefore to a greater or lesser extent control the dissemination of information. Books were still rare and expensive but libraries became established and with them seats of learning, which in turn lead to the establishment and growth of Universities. In England, Oxford for instance has no clear date of foundation, but teaching existed at

Oxford in some form in 1096 and developed rapidly from 1167 when Henry II banned English students from attending the University of Paris.

1.3 The influence of technology

There is general agreement that the first large-scale printing workshop was that established at Mainz by Johannes Gutenberg, which was producing a sufficient quantity of accurate type to print a Vulgate Bible about 1455. This invention led to the mass production of books, at least in comparison to the previously hand written texts. Significant advances were made in mathematics, which became the foundations or at least major building blocks that eventually lead to the development of computers. Probably a key event was the publication in 1617 of Napier's Logarithms, rapidly followed by the invention of the circular slide rule based on the logarithms. The next significant step in thinking was perhaps the publication, in 1854, of "An Investigation of the Laws of Thought" by George Boole. This treatise on symbolic and logical reasoning may reasonably be considered the underlying basis for computer design. By 1896 Hermann Hollerith had established his Tabulating Machine Company, which later became IBM. (1924).

.

The next major period of change came, in the UK and the United States, with the Industrial Revolution and the invention of the electric telegraph, Vail and Morse circa 1838. By 1858 a cable was laid across the Atlantic and worked for a few days. Additionally the establishment of the penny post in 1841made feasible the exchange of information and knowledge over longer distances.

By the mid 1800s the electric telegraph technology was used to manually transmit simple text messages over great distances via the use of Morse code. This technology was developed further into teleprinters and commercial telex. Later still digital imaging enabled text messages to be treated as a graphic. Thus was the fax invented.

A key, but indirect, invention in the history of educational technology was the invention of the telephone. Alexander Graham Bell, 1847-1922, and his friend Thomas A. Watson developed the telephone and on June 3, 1875, transmitted the sound of Bell's voice to Watson. The instrument transmitted recognisable voice sound, not words. Bell and Watson experimented all summer and the first patent was issued on March 7, 1876. The telephone carried its first intelligible sentence three days later on the 10th March I, The importance to education lay not in its direct use but in the use of the same infrastructure to deliver digital information over wider distances.

In 1936 Alan Turing formalised the notion of calculableness and adapts the notion of algorithms to the computing of functions. His machine is defined as being able to calculate any computable function.

The late 1940s and early 1950s saw a flurry of activity and many computer technologies were developed and companies formed to exploit this rapidly expanding filed of knowledge. 1959 saw Jack S Kilby at Texas Instruments granted the first patent issued for an Integrated Circuit. In 1969 for instance IBM unbundled hardware and software and in 1971 used floppy discs to load the 370 microcode. The industry continued to develop apace and by 1977 Apple, Commodore and Tandy were selling personal computers, and by 1978 in the US alone there were more than half a million units in use and by 1980 this figure had developed to a million.1986 saw the numbers of computers in use in the United States exceed 30 million and worldwide this had risen to 100 million by 1989.

1990 saw the launch of Microsoft's Windows 3.0 and the late 1990s have seen the availability of affordable wider bandwidth systems, the problem of high-speed connectivity still remains in rural areas.

1.4 Development of wider educational access

The first widely available distance learning courses were concerned with engineering and similar subjects and were text based and literally correspondence courses delivered sequentially via the post.

During the 1960s, public debate in the UK and elsewhere suggested that there should be a much wider availability of university level education, this resulted in the government of the day funding the foundation of the UK Open University, which was granted its Royal Charter in 1969 and took its first students in 1971 since which time it has grown to be the United Kingdom's largest University with some 200,000 students. This figure represents 22% of all part time students in the UK. 70% of the students complete their courses each year and the teaching has a level of excellence that amongst the highest in the UK. Technology has always played an important part in the OU course provision. Currently some 62,000 students are taking courses that require the use of a computer and more still use computers for e-mail, assignment writing and research. Teaching support via the Internet has become an important element of the student experience in more than 150 courses, generating some twenty thousand mail messages and one hundred and fifty thousand conference messages are read each day using FirstClass as the platform. The Internet is increasingly been used as a platform for the delivery of teaching and learning by the OU.
Today's undergraduate students more and more expect the facility to use a complete range of Internet facilities, from Email through browsing the Internet and using general and specific search engines to research their various projects and assignments. The mature students go further and expect the universities and HE Institutions to be familiar with the majority of the commercially installed packages and to the latest level. Leading edge is becoming the norm not the exception.

2 Current Literature

Three main areas are of interest when looking at the new technologies and their application to education

1. The movement from didactic to exploratory learning
2. Learning and teaching theory
3. The practice of teaching on line

In practice these areas tend to overlap and are not discrete.

2.1.1 Technology

First a brief note about the technology. The importance, of this area, is that of facilitating the delivery of the chosen learning materials and sources of reference for the students. These sources are readily split into technologies for constructing web based materials and the way in which they are presented over the Internet and those that are designed for the management and delivery of such teaching and learning materials. FirstClass, WebCT and similar products are examples in the second grouping, Dreamweaver and similar products in the former. The course designer's skill must lie in integrating these two sorts of programmes and idiosyncrasies so as to optimise rather than minimise the value that they can deliver. Hurley (2001) favours such combinations of [ii]systems as they can be formed into, or are virtual campuses. Hurley sees such systems and programmes as valuable, for the opportunities they give for introducing formal support structures into the teaching` area and for informal peer group inter-action within the learning environment.

2.1.2 The movement from didactic to exploratory learning

The 1990s saw a widespread development in thinking about learning and teaching. One key change was itself the thought to put learning before teaching. Prior to this time teaching had been seen as knowledge transfer process with the learning being facilitated by appropriate stimuli. Skinner (1958) suggested that: -

> "learning by the student is measured, at its most simple, by the student matching his or her reply to the correct answer".

Later, Crowder (1960), among others, developed his work so as to give the student the choice to move down more than one path. Additionally there is difficulty in applying Skinner's simple model where there is no clear 'correct' answer or where

different answers may be equally correct in theory and only proved by practical application in context.

Later, Bruner(1966) and Mandler (1985) rejected the theory in total and espoused cognitive models, that is those that are concerned with student's understanding rather than their behaviour. Piaget quoted by Anderson (1984)

> "suggests that a student naturally wishes to explore and learn … but after some experience finds that they are in a situation that they do not understand".

Anderson (1984) suggests that the student wishes to restore a position of equilibrium (understanding) and does this by re-interpreting the experience to fit their existing internal structure, or if this fails, the student modifies the internal structure. When this happens, learning may be said to have occurred. This becomes the starting point for "Constructivist" models where the perception is that students themselves are active in the construction of understanding and knowledge.

Prior to 1921 Piaget had standardized Burt's test of intelligence and did his first experimental studies of the growing mind. This led to his observations of his children Jacqueline, Lucienne and Laurent whose intellectual development from infancy to language he studied. His researches in developmental psychology and genetic epistemology had one unique goal: how does knowledge grow? His answer is that the growth of knowledge is a progressive construction of logically embedded structures superseding one another by a process of inclusion of lower less powerful logical means into higher and more powerful ones up to adulthood. Therefore, children's logic and modes of thinking are initially entirely different from those of adults. Later work by Piaget, reached different conclusions. Hanfmann, E & Vakar, G (1962)[6] comment that Piaget that; -

> "the difference between child and adult thinking was qualitative rather than quantitative."

Bruner J (1962) in the introduction to Hanfmann and Vakar, quotes Vygotsky: -

> "The new higher concepts (learned) in turn transform the meaning of the lower."

Bruner goes on to comment that; -

> " there is a repeated emphasis on man's capacity to create higher order structures, that in effect replace and give new power to the conceptual structures that one climbed over en route to higher order mastery."

He quotes Vygotsky: -

> "in passing from one level of meaning to the next, the child does not have to restructure separately all his earlier concepts...Once a new structure has been incorporated into his thinking...it gradually spreads to the older concepts..."

Vygotsky, in Hanfmann and Vakar (1962) page 99 says : -

> "Writing also requires deliberate analytical action (on the part of the child)."

Thus surely is so of all writing by persons of any age and is perhaps a key pointer to the design of courses to be remotely delivered, whether by traditional correspondence or electronic means. If we demand written assignments rather than multiple-choice tick-box answers, we cause the students to evaluate the information provided and to respond in a logical constructively argued manner. Thus this should eliminate chance from the answer and aid the transformation of the previously learned (lower) concepts. Whilst Vygotsky's work was with children much of his work on thought and language is equally applicable to adults. Typically we cannot study economics without accepting that the specific meanings that economists attach to some words are different to that with which we are familiar. Thus the teacher must ensure that that the contextual definition of a word is clear and unambiguous to the student. This extends the students use of the language of the subject and aids learning.

Vygotsky's(1935) best-known theory is his "Zone of Proximal Development" or ZPD as it is often known. According to Cleborne, Johnson, and Willis (1997): -

> "ZPD emphasizes his (Vygotsky's) belief that learning is, fundamentally, a socially mediated activity. Thinking and problem-solving skills can, according to Vygotsky, be placed in three categories. Some can be performed independently by the child. Others cannot be performed even with help. Between these two extremes are skills the child can perform with help from others. Those skills are in the ZPD."

As Vygotsky puts it: -

> " What the child is able to do in collaboration today he will be able to do independently tomorrow."

Cleborne, Johnson, and Willis go on to say that: -

> "Whereas an extreme interpretation of Piaget can lead to the conclusion that teachers teach best who get out of the way and let a naturally unfolding development take its course, Vygotsky's theory requires an involved teacher who is an active participant, and guide, for students".

It is unlikely that anyone who has taught will not argue with this view. Thus it may be argued that assisted learning is far more effective than didactic teaching. This is a close fit with the views of Ramsden. (1992)

Ramsden (1992) suggests that: -

> "learning is fundamentally about changes in the understanding of reality, and that teaching should be directed towards helping students understand phenomena in the way that subject experts do."

Rodenburg (1998) declares that: -

> "there has been a shift in pedagogical perspectives from a 'transmission' model to a more 'constructivist' model"

and goes on to say: -

"This means fostering chances for the articulation of, and reflection on, their (students') own conceptual models."

Robert Barr (1994) suggested that the old (college paradigm) still existed. He suggested (in 1994): -

> "that this current paradigm is that the purposes of colleges is to provide instruction".

Accepting that this is the case it becomes necessary to address issues about how students learn, what their learning needs are and what it is that we are seeking to change. This may pose major challenges for most lecturers, since they are rarely given the opportunity or luxury of evaluating the learning needs of a specific group of students. In trying to meet the needs, of the many, rather than a few, students on a module, the most that many lecturers can hope to achieve is the contextualisation of the materials that they are constrained to deliver. However this contextualisation can itself affect the approach to learning that the students take, Marton and Säljö (1976) quoted by Ramsden.

More recently a move has been made to " learning outcomes", with a con-commitant move to assessing the ability of students to demonstrate the achievement of those outcomes. This moves some way to Ramsden's ideal quoted above. If handled in a sensitive way it can and will lead to a deep approach to learning. However to achieve deep learning even the move to outcomes will require the outcomes to be more widely drawn and to support demonstration of evaluation, analysis and evaluation rather than demonstration of rote learning. However the move to a paradigm that produces "learning" should change everything and in turn, the common student and staff purpose should become the achievement of learning and success in the student.

Hurley (2001) also suggests that, as the shift in learning programmes is away from input toward outcomes, so the role of the academic staff becomes more one of managers of learning and increases their role in providing guidance and support.

The development of the new paradigm gives on-line materials a multi-faceted role. There may be true stand-alone distance learning packages, used in distributed

learning, supported by face-to-face learning, or they may be used as reinforcement for traditional face-to-face tuition. What is clear is that on-line materials are as at home in traditional situations as in distance learning. In truth on-line becomes another the mode of delivery rather than a clearly defined sector of resources of teaching and learning.

Hurley identifies six elements of a learning programme. He lists them as: -

Teaching and Teaching materials
Learning and learning resources
Assessment
Academic guidance
Learner management
Student support
He has developed an interesting table that splits the above into two clusters as follows: -

The teaching/learning cluster	**The guidance support cluster**
Teaching - providing instruction and direction of learning	Academic guidance - helping students to develop their learning by the provision of information and feedback
Learning - the acquisition of knowledge and skills, undertaking independent student-managed study	Learner management - reviewing progress and planning learning
Assessment - measuring the achievement of learning outcomes	Student support - structured skills support for student achievements

Table 2 Elements of a learning programme

The value of this table to the educator lies in the 'route-map' that it provides, around which the activities of both tutor and student may be positioned.

2.2 Learning and teaching theory

Work by Penelope Reed Doob (1995) in the Unites States and elsewhere has shown that: -

> ”students achieve more by participating in study groups out of class”

Quoting from an article in ERIC_Digests suggests that the developing available technology increasingly allows us to positively exploit this group learning effect by providing frameworks that will support the formation of: -

> “heterogeneous groups where collaborative learning, problem solving and high order thinking skills can be developed...These are processes can be difficult to encourage in the normal classroom, but are the norm in well designed and constructed distance learning packages, including those delivered via Video-conferencing and the Internet.”

Alavi, Yoo and Vogel (1997) found that: -

> “student attention at remote sites is enhanced by the more direct involvement and feedback attainable through data links”.

Previous reference has been made to the work of Doob (1995) and the benefit of student groups outside of class, Alavi, Yoo and Vogel also find that: -

> “Students, faculty (staff) and institutions all learn while becoming actively involved in exploring concepts and removing uncertainties”.

The transition, from the didactic college instructional 'teaching' paradigm to the exploratory 'learning' paradigm, can only be successful where account is taken of the different styles of learning that we individually espouse. At the same time account must be taken of the level of learning that we wish the learner to achieve.

Deriving their ideas from the work of Kolb (1984), Honey and Mumford (1986) developed the learning styles idea by producing a set of inventories that can help students and teachers to realise the great diversity that exists in any group of people. They suggested that there are four styles: Activist, Theorist, Pragmatist and Reflector. Each of us can predominantly express one or more of these styles, and the Learning Styles Inventory (LSI) can be used to plot areas of deficiency in academic prowess.

2.2.1 The practice of teaching on line

Recently a number of authors have appeared in print with books concerned with the practice of facilitating the practice of teaching on line. There is an emergent view that there is no single solution to the process of teaching on-line. Hurley (2001) comments there are: -

> " a wide range of on-line opportunities…(that) can provide additional resources for conventional, institutionally based learning and for distributed and distance learning".

H

My experience of distance learning with post-graduate students suggests that many of them are entirely task orientated and wish to contact with the tutor at their instigation and not necessarily as an on-going regular timetable activity. For many courses the time spent on support may well be significantly greater than the time spent in formal teaching situations, once the materials are developed. Academics will need to produce and educational establishments will have to monitor and audit strategies

for adequate support of on-line students. The strategies will have to be student centred and flexible enough to cater for differing learning styles and varying student needs.

A major issue for on-line learning is the growing usage of third party sites. How can the information on such sites be validated for content? That is, is it fact, knowledge or opinion and if opinion from a valid commentator or readily identifiable as opinion? Does it represent a biased point of view? And if so does that really matter?
Is it reliable in terms of its scholarship, that is has it been checked and/or verified by the organisation that posted it?
Is the coverage at a level appropriate to the students and is it complete or partial?

These are real issues that will affect the student's learning, appreciation and possibly effective application of their newly found knowledge to real life situations. The ease of access on a global basis makes these issues very important.

3 Pedagogy of Internet course design

3.1 Learning styles

Ramsden (1992) suggests that: -

> "learning is fundamentally about changes in the understanding of reality, and that teaching should be directed towards helping students understand phenomena in the way that subject experts do."

If this is the case it will be necessary to address issues about how students learn, what their learning needs are and what it is that we are seeking to change. Since most students are locked into some system of credit accumulation, so that they may achieve some named award, there always some who will adopt a "surface" approach to learning, whilst others on the same programme or course will adopt a "deep" approach. (See Ramsden page 81)

The College Instructional paradigm, Robert Barr (1994) or "input" approach to teaching almost inevitably reinforces the shallow approach to learning.
In trying to meet the needs, of the many, rather than just a few, students on a module, the most that many lecturers can hope to achieve is the contextualisation of the materials that they are constrained to deliver. However this contextualisation can itself affect the approach to learning that the students take, Marton and Säljö (1976) quoted by Ramsden.
More recently the move to " learning outcomes", with a con-commitant move to assessing the ability of students to demonstrate the achievement of those outcomes, moves some way to Ramsden's ideal quoted above. If handled in a sensitive way it can and will lead to a deep approach to learning. However to achieve deep learning even the move to outcomes will require the outcomes to be more widely drawn and to support demonstration of evaluation, analysis and evaluation rather than demonstration of rote learning.

The way that students approach the learning task will significantly affect how and what they learn. This approach to the learning task is characterised by four styles that are the outcome of research by Honey and Mumford (1986). They developed a classification of learning styles that proposed that people could be identified as belonging to one of the following groups of learners, Activists, Reflectors, Theorists, and Pragmatists. To enable people to discover for themselves to which category they belonged, Honey and Mumford developed a questionnaire. The truth is that most people will be found to exhibit all the characteristics to a greater or a lesser extent. (Completing a questionnaire verifies the truth this observation.) It is useful to recognise that the four styles are in fact circular in nature and that with recognition of this we can all modify our learning behaviour to embrace this circularity. This is important at the higher levels of learning where significant emphasis is put on the process of reflection and theorising as a means of advancing ones understanding and application of knowledge gained.

This circularity is shown in figure 1 on the next page taken from Honey and Mumford.

The student 'learns' by the activity identified above the style label. However most will recognise in themselves some resonnance with the activities in all the stages, but will also confess to a dominance of one style as the one with which they are most comfortable. If we move from this very simplistic view of how we learn, we can relate the learning style or combination of styles to the work of Bloom who with others developed a taxonomy of learning objectives which has some parallels with this work.

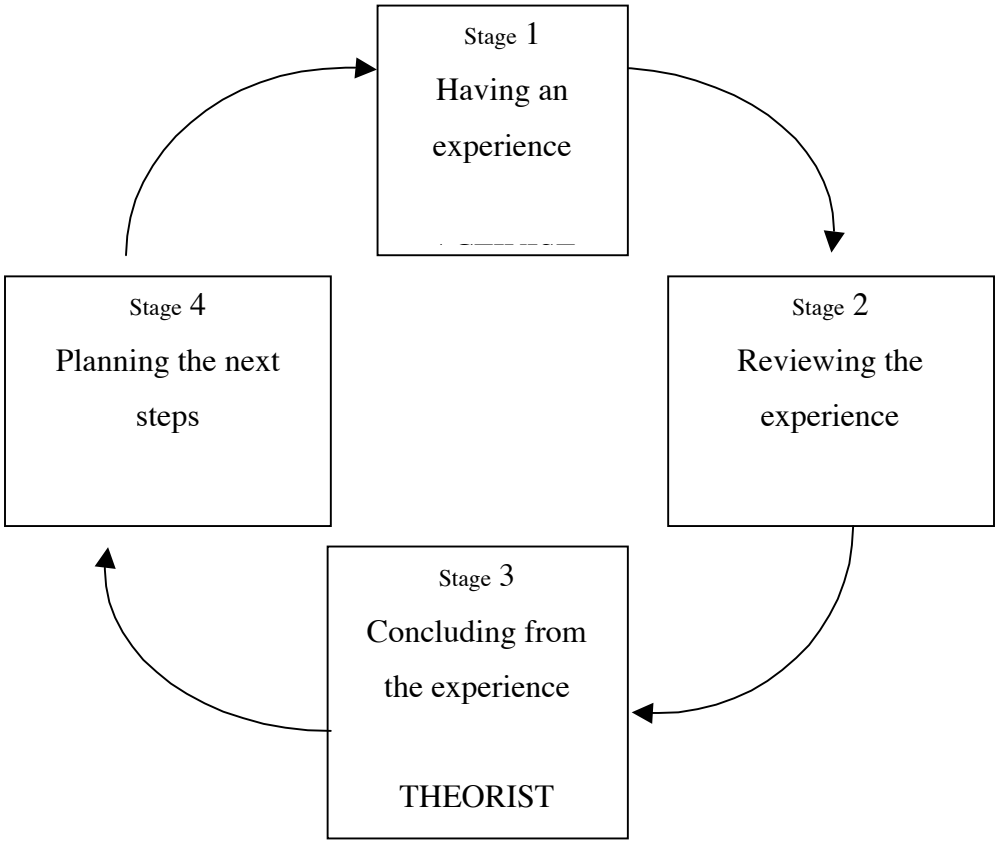

Figure 2 The Honey and Mumford circle of learning styles

Bloom (1956) in his seminal work identified this taxonomy of learning objectives as having six specific classes in what he described as the cognitive domain. These classes are as follows: -

1. Knowledge
2. Comprehension
3. Application
4. Analysis,
5. Synthesis
6. Evaluation

This hierarchy is I believe one with which we may all feel comfortable. It certainly is the starting point for much subsequent work in this field. Whilst simple to understand and model, it was ground breaking in its time and is still as valid today as it was in 1956.

We can link the six elements of Bloom's Taxonomy to the Honey and Mumford circular model and jointly model these two theories as shown below.

Honey and Mumford style of Learning	Gains, demonstrates or practices	Blooms Classification of Learning Objectives
Activist	→	Knowledge
Reflector	→	Knowledge Comprehension Evaluation
Theorist	→	Knowledge Comprehension Analysis Evaluation Synthesis
Pragmatist	→	Knowledge Comprehension Analysis Evaluation Synthesis Application

Table 3 Honey & Mumford and Bloom (Hart 2001)

The importance of such a model is that we can usefully inform the planning of the design of a module or course so that each of Blooms elements is present at each stage. This will ensure the learning styles of every student will be accommodated to a greater or lesser extent and also may help to construct teaching that will facilitate deep learning. Almost certainly, even the simplest acquirer of knowledge will apply that

knowledge and become a pragmatist, at some stage or other. It is of course entirely possible to pass through the reflector and theorist stages quite sub-consciously. The difficulty with Blooms Taxonomy is that it will only work, in the above context, if we ensure that the comprehension (perception by the student) is correct, or at least adequate for the level and in the context of the application of the learning. This suggests we should incorporate some measurement process (even if only inferred) in the assessment exercise.

McVay (1998) says: -

> " Learning is a collaborative experience where understandings are developed. Constructing knowledge is not a one-way transmission of information from the instructor to the learner. Constructing knowledge involves the opportunity to critically analyse information, dialogue with others about its meaning, reflect upon how the information fits with personal beliefs and value structure and arrive at a meaningful understanding of that information. …Think about how rich the discussion in your course can be if everyone is involved in shaping the experience. Every student has something to offer."

Though written about the design of courses for delivery over the Internet, this appears to express in full measure what we, as teachers should be seeking to do. Besides balancing the elements of learning with ideas on learning styles we need also to consider the learning process itself. Two important models of the learning process are those identified as "Behaviourist" and "Cognitive.

Skinner (1954.1960) was an early proponent of the "Behaviourist" model, often known as "Connectivist". Learning is seen as taking place when a particular behaviour or "response" is observed in connection with a specific stimulus. This is seen to be brought about by a staged or linear process of stimulus leading to response that is then rewarded. This reward may be a positive re-enforcer (equivalent to a fanfare for a correct response) or the removal of a " negative". This model clearly ignores any consideration of the actual process going on in the students' mind. However it has held much sway, since the simplicity of the model makes it possible to

make quite precise measurements of the factors, which influence learning (in the context of the model). Crowder has developed the model to include paths branching in response to alternative answers to multiple-choice questions.

Others, Bruner (1966) and Mandler (1985), reject the theory in total and espouse cognitive models, that is those that are concerned with student's understanding rather than their behaviour. Piaget quoted by Anderson (1984): -

> "suggests that a student naturally wishes to explore and learn … but after some experience finds that they are in a situation that they do not understand".

Anderson (1984) suggests that the student wishes to restore a position of equilibrium (understanding) and does this by re-interpreting the experience to fit their existing internal structure, or if this fails, the student modifies the internal structure. When this happens, learning may be said to have occurred. This becomes the starting point for "Constructivist" models, in which the view is that students themselves are active in the construction of understanding and knowledge.

Proposers of the cognitive models also suggest the need to modify the teaching approach dependent on the context and content of the subject matter. They also suggest the cognitive models recognise that surface and deep learning take place and this recognition must inform the structure of lecture/teaching sessions.

Also noted, as a process of learning, but which seems to be a logical mirror image of a structure of teaching is the "Developmental" process. This holds that learning is paced and sequenced to suit a student's stage of development. It surely becomes a teaching model when the pace is specifically designed to encourage that development. A further model of the teaching process which surfaces as a learning process is the "Humanist" model which makes the process significantly centred on the individual student. This can be to the detriment of the group as a whole for the benefit of the individual. It is very much a model applicable to the construction of an individually negotiated pathway of instruction or learning.

Recent experiences with a small group of post-graduate students working remotely and taking their learning from materials posted on the internet suggests and confirms the author's view that a more holistic view of the teaching/learning process obtains. Some students were adamant that they required all the learning support (teaching) materials to be available at one time and to be left to access the materials and work at the assessment tasks un-aided. Others expressed clear preference for the more traditional structure of distinct sessions. All preferred the use of an holistic or topic based topic approach to the module rather than the traditional approach where the topic is artificially subdivided into time based slots that fit into the familiar timetabling approach to module delivery. Again some were very active in the on-line discussion areas linked to the modules. Others took little if any part in such debate.

Those who were active in the topic-based discussions undoubtedly exhibited the first three stages of Honey and Mumford's circle of learning styles. That is they had had some experience(s) (H&M Activist) on which they had reflected (H&M Reflector) and from which they subsequently had drawn conclusions (H&M Theorist). Some showed evidence of planning to make changes (H&M Pragmatist). The very fact that all one way or the other had had their perceptions changed accords well with such activity undoubtedly makes a clear connection with "the changes in perception" that Ramsden (1992) suggests is learning. This experience, whilst coming from a small group, nevertheless reinforces the view that any group of students will exhibit a wide mix of learning styles, need to utilise both shallow and deep processes of learning and to individually be cognitive in the processes that they utilise.

If then we take a pragmatic approach to learning and teaching and its facilitation, we are recognising the validity of the phenomenological model. That is, we are looking at all the variables that impinge on the process, those of homogeneity or disparity in the levels of knowledge in the student body, the learning needs, either individually or group defined or negotiated, the place and time, location, the teaching environment, the available facilities (e.g. whiteboard, ohp etc.) and the context in which the learning need(s) have been defined.

3.2 Teaching styles

Historically teaching, through virtually every level from kindergarten to masters level, has been based on the principle of the expert transferring (or attempting to transfer) his or her accumulated knowledge to the student. The efficiency, of that transfer process, is then assessed by testing the recall process of the student. More recently there has been a significant move toward guiding the student body in examining or exploring a body of knowledge. The learning and students' understanding of the knowledge is then tested by asking them to apply it in the context of their own life and/or work environment. This has lead to a much more dynamic knowledge environment, with the knowledge base being widened by the student investigations.

3.2.1 College Instructional paradigm

This paradigm (Barr 1994) is that traditionally offered by FE colleges and many institutions in the HE sector. It primarily consists of closely defined areas of knowledge usually with set texts and substantial bodies of notes and handouts. The teaching style tends to be quite didactic. Assessments of the students will often be by way of formal examination of the body of knowledge, being more concerned with information recall rather than application. This may suit some with good recall but does little to bring about the changes in perception that Ramsden (1992) suggests is learning. Further it does little to engage the higher orders of Blooms Taxonomy. There have of course always been tutors who taught in exciting and innovative ways, requiring the students to apply their knowledge to solve problems and demonstrate understanding of the subject matter.

As greater attention has been paid to the need to fit graduates for industry and employment, institutions have started to look at generic and transferable skills as an underpinning of all the learning that takes place under their auspices. This has lead to a gradual but accelerating move to the learning paradigm (Barr 1994) as the institutional style. This move is slow since most modules have a life of several years

between revalidation and usually it is only at re-validation that the module structure can be radically altered to reflect the new paradigm.

3.2.2 Learning paradigm

The literature review (chapter 3) identified that there is a significant move from didactic teaching to exploratory learning. With this move has come a significant move to the use of computers and computer based technology. Adoptions of computer managed learning environments continue to increase, both inside the formal educational domain and in the commercial training environment. The perceived business case and its seductive message of greater efficiency are persuading senior figures in educational establishments to adopt the web as a delivery mechanism. The essentially hierarchical nature of educational management means that key decisions, which have major implications for student and academic staff alike, are imposed often without adequate stakeholder representation. The literature review identified that there has been a rapid advance of educational theory from a College Instructional paradigm (Barr, 1994) to the Learning Paradigm.

Ramsden (1992) previously quoted suggests that: -

> "Learning is fundamentally about changes in the understanding of reality, and that teaching should be directed towards helping students understand phenomena in the way that subject experts do."

Rodenburg (1998) declared that there has been

> "a shift in pedagogical perspectives from a 'transmission' model to a more 'constructivist' model," and goes on to say "…this means fostering chances for the articulation of, and reflection on, their [students'] own conceptual models."

Robert Barr (1994) has suggested: -

> "The current college paradigm is that the purposes of colleges is to provide instruction."

The move to a paradigm that produces learning changes everything and the common student and staff purpose becomes the achievement of learning and success of the student.

The new learning paradigm moves the key activity from teaching to the facilitation of learning. In parallel there is a move from courses defining the input objectives to articulating achievable and assessable outcomes, within the context of the learner. Tutors will have to revisit theories on learning styles and take note of these in course design and embrace new forms of assessment. Above all, on-going staff development will need to take place as the form and style of writing learning outcomes develop.

The assessments will be couched in language synonymous to the learning outcomes and will seek to involve the majority, if not all, of the classes in Bloom's Taxonomy (Bloom, 1956). The tutoring process focuses on facilitating the learning process and necessarily becomes much more student centred. Exploration of source material (key texts, professional journals, newspaper articles and Internet sources, etc.) becomes a major part of student activity. Using different student groups, from within the same class, to explore and research differing topics, can encourage these activities. Findings may then be summarised and presented to their peers. These presentations come to be part of the formative learning process when they are assessed and commented on by the tutor/facilitator. This process of group/peer interaction is a key part of the learning process, for as Reed Doob (1995) previously quoted suggests: - "…research shows that students achieve more by participating in study groups out of class."

ICT lets us exploit this paradigm shift to the benefit of student and facilitator (teacher) alike. Using the new and emergent technologies may enfranchise many learners and liberate some students from the constraints of time and place. Others may feel excluded. This is neither an argument for or against employment of the new technologies, simply a note of caution. The employment, of the new technologies, requires a careful and pedagogically sound approach to the design of the facilitation and learning activities that will employ the chosen technology.

Hart (2000) has derived a model to give facilitators a simple tool to guide them through the stages involved in designing the facilitation and learning activities for a

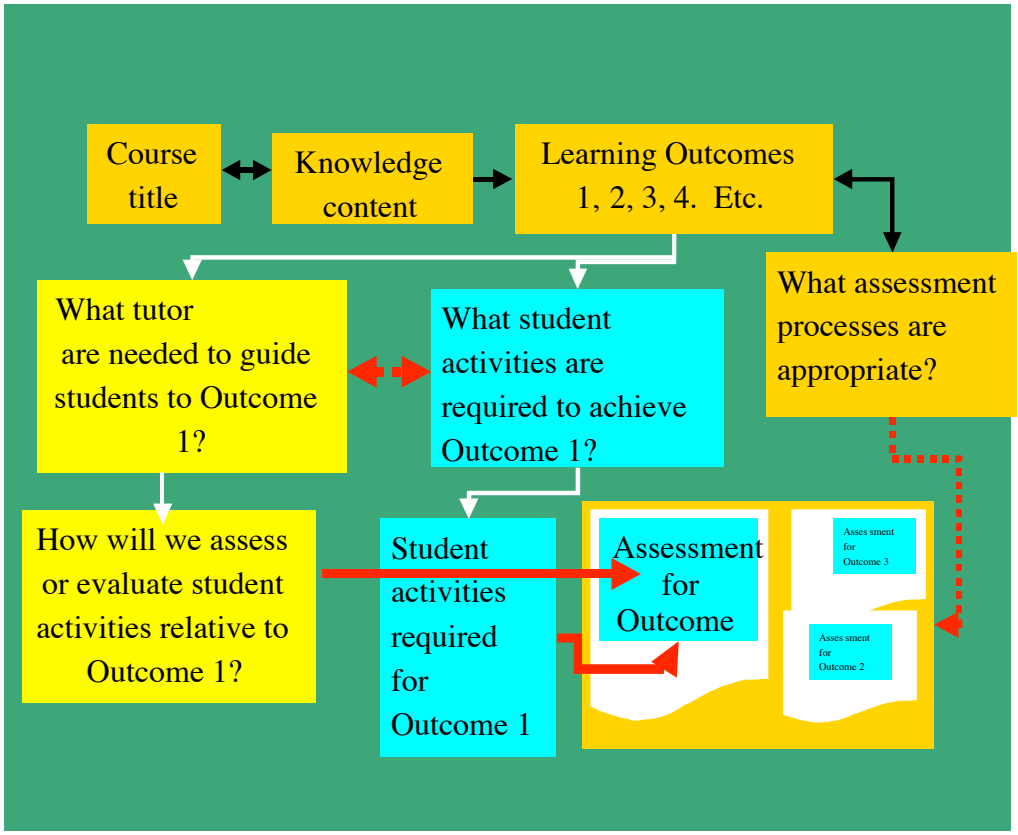

Figure 3 Hart's model of course design

module in the environment of the Learning Paradigm.

As this new paradigm is demanded by more students and thus has to be embraced by more institutions there is a need staff development. This development will need to embrace the move from course learning objectives to measurable learning outcomes and the design of suitable and appropriate methods of assessment processes contextualised to embrace the students' learning environment. It is suggested that adoption of this model assists the design of the facilitation processes and learning activities and is particularly appropriate to use in a web-enabled environment. It is neither designed nor does it seek to inform the practices to be adopted within those processes.

The move to a learning paradigm means facilitators will need to take responsibility for the design of adequate structures that will assist students in the learning process. As Laurillard (1993) states:

> It means that in setting work for students…the teacher has a great responsibility to require the sort of thing that will help them learn. This does nothing to diminish the importance of students taking responsibility for their own learning…inevitably they (students) will respond to the demands of the context, so the teacher must be sure that the demands of the context are pedagogically sound.

As we increasingly move to online learning there will emerge a new style of tutor facilitator, who is skilled at facilitating online discussions and moderating learning communities. Successful moderating needs a light touch and an understanding of

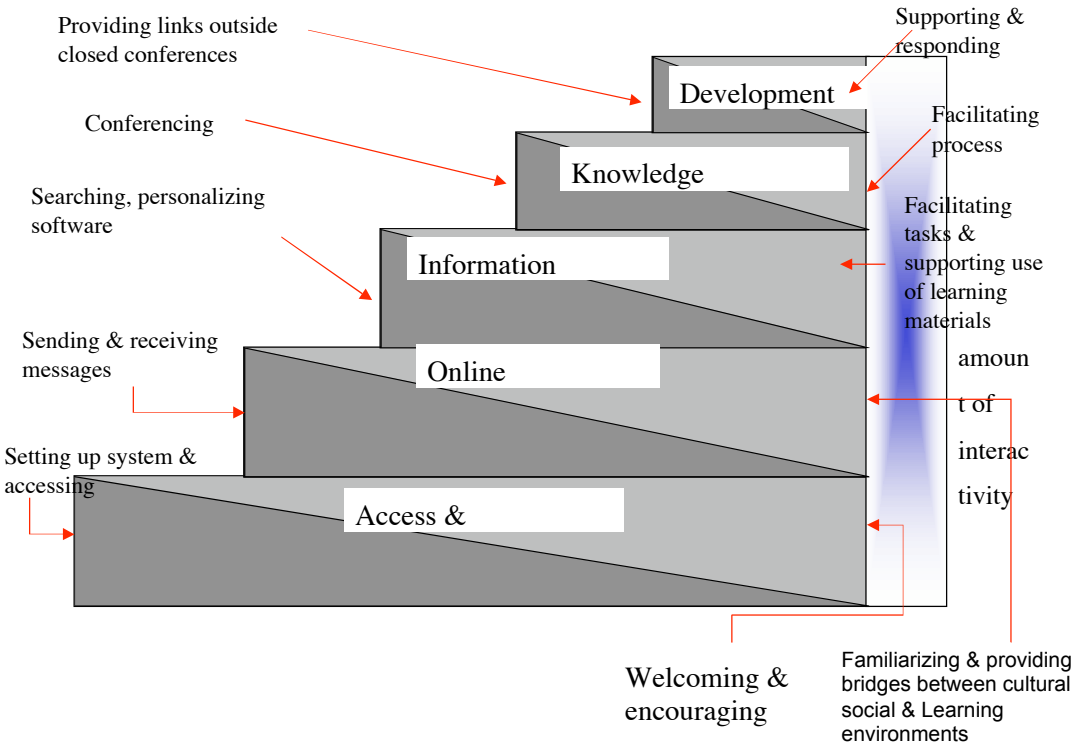

Figure 4 Salmons five stage model

when to act and equally when to do nothing. Salmon (2000) has evolved a particularly useful five-stage model that can inform the work of moderators.

Salmon's model is particularly important in helping to inform the stages through which the facilitator needs to guide the student at least once in a course or programme. However facilitators must remember that in the emergent climate where students design their own programmes, it may be desirable to embed this process in the opening stages of every module that is to be delivered by web-enabled technology. Certainly it is a route that will need to be travelled be every at least once in a programme.

The following model is a re-draft of Salmon's model by Hart 2000, which is perhaps simpler to understand. The model illustrates, in flow form, the 5 stages the on-line learner passes through in the learning process. It identifies the changing nature of both the technical support and the role of the moderator in the student's progress.

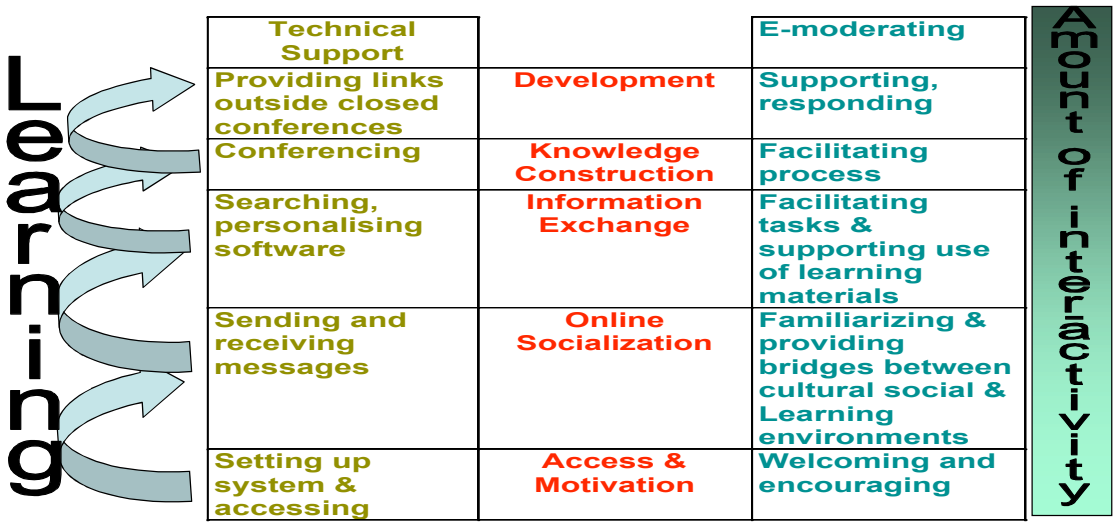

Figure 5 Salmon's model redrafted by Hart

Reporting in "Online Learning: Implications for the University for Industry," Heppell & Ramondt (1998) state the importance of the role of the coordinator in keeping the project alive. They quote Berge (1996) as saying that one person rarely fills all facilitator functions, as the required skills are very diverse. Heppell & Ramondt (1998) additionally identify high-level technical skills and pro-active drive as necessary to sustain project participation. They also reported that some participants found difficulty in actively meeting their own learning needs and looked for structure while others enjoyed the freedom of the project. Heppell & Ramondt (1998) are clear that

> "a better sense of audience and flagging more clearly a set of clues and cues for active participation"

would resolve some of those conflicts. This points to the need for a mix of learning strategies in the formal environment of a module or course.

The online learning environment is exposing and unforgiving. Within the online environment, the dissemination model is not effective and the role of the tutor has rapidly become that of coach or facilitator. The National Professional Qualification for Headship (NPQH), mandatory in the UK for those wishing to be head teachers, is being delivered online to 3,016 senior teachers (January 2001), with a further 2000 due to commence in September. Until recently, in similar online learning communities the model was of small groups of students with a single facilitator, typically around twelve candidates to a single tutor/facilitator. Chapman (personal communication, 2001) says: -

> "Using our expertise in online learning communities, gained from a range of projects since the late 1980's, we were aware that this was much too small a group to sustain effective vibrant online communities."

The model adopted for NPQH is one that combines four traditional tutor groups into a group of at least 48 candidates and 4 tutors. Most importantly perhaps, the communities achieve critical mass, since as some group members move out of active

participation; others move in and sustain the community, widening the peer learning experience. Chapman (2001) who leads two major on-line learning communities says: -

> "The group size enables tutors to share concerns, disappointments, achievements and tasks and ensures that candidates have a lively and stimulating range of discussions"

The work of one of these major on-line communities is discussed in more detail in the next section.

3.3 A Major on-line learning community: Talking Heads

The Talking Heads online community began in January 2000, as a 12-month pilot project that brought together 1,200 newly appointed English head teachers from all educational sectors and regions. The success of the pilot ensured that in 2001 the project was made available to all heads of English schools under the auspices of the National College of School Leadership.

Stephen Powell, (2001) Senior Researcher and a project manager reports that: -

> "The Talking Heads online community model is that of a high level conference with sub-conferences. A typical head-teacher is a member of a range of communities that they either opted into on the grounds of their personal interests or core communities they were automatically placed in. Each community has a different purpose and different membership profiles. Some communities are relatively large cutting across school phase, others are made up of schools with particular common features such as small rural schools, whilst others are 'communities of practice' addressing particular topics within a tightly defined domain".

Powell goes on to say: -

> "Talking Heads has created an engaging online community that makes teachers want to return. The three key elements are the community's relevance, the creation of a safe environment where teachers feel at ease in conversations about any subject matter, and the sense of empowerment that teachers come away with. Creating a vibrant community requires a skilled facilitation team. The facilitators work is often invisible and involves bring head-teachers together, linking individuals with conversations and finding resources, and 'scaffolding' head-teachers to a point where they can manage their own communities."

It is interesting that the findings of Powell and Chapman while observing different environments, are not dissimilar to those of Kim (2000), who suggests three underlying principles for building online communities: design for growth and change, the creation and maintenance of feedback loops, and the empowerment of members over time.

4 Pedagogy

It rapidly becomes clear from the reading, that on-line learning requires different approaches to the preparation of content material and a different pedagogical paradigm. This chapter describes the underpinning theoretical context to this changed pedagogy and the Learning paradigm.

It is very clear from the writings of Vygotsky and later Ramsden that: -

> " learning requires an involved teacher who is an active participant, and guide".

Much of the teaching that the author has in the past experienced has been a part of the didactic or College Instructional paradigm (Barr 1994). As before discussed on-line learning is quite unsuited to didactic teaching and requires a paradigm shift to facilitated exploratory learning. It often proves difficult to persuade some colleagues of the validity of this view. It is clear that significant staff development is required if the experience of students undertaking on-line course is to be optimised. Shona

Butterfield (2002) delivering her report to the New Zealand Government refers to her team's convictions (amongst others) that: -

> " e-learning must be learner centred.", "e-learning must be quality-based and informed by excellent pedagogy" and "e-teaching must be supported by capability development in institutions"

These convictions represent exactly the views that the author has developed through experiences in setting up on-line courses and the difficulties experienced in persuading colleagues to embrace newer teaching and learning philosophies and paradigms. It is vital that these changes are embraced by all involved in facilitating on-line learning since the characteristics of on-line delivery are completely different to those of face-to-face learning. The key differences are shown in the following table, which was devised by the author in 1998, as an aid to advise some colleagues to whom he was giving a presentation.

Face-to-Face Delivery	**Internet Delivery**
Fixed time and Place	Any place any time
Tutor driven pace	Learner driven pace
Face to face contact	Indirect tutor - student contact
Immediate feedback	Asynchronous feedback
Difficult to repeat	Repetition possible
Ability to change pace of delivery to suit response of audience	Pace of progression through content is in control of the audience

Table 4 Face-to-Face v Internet Delivery Hart (1998)

Embracing these differences requires tutors to adopt a significantly altered approach to the teaching and facilitating the learning on such courses. It is essential that tutors concentrate on the course pedagogy and the identified differences in the delivery mode and work out how better to structure their course material to take advantage of these differences.

5 Institutional perspectives

5.1 Introduction

It is clear that as the Internet becomes increasingly widely used and socially accepted as a form of communication it will have a parallel effect on how we deliver and access education.

5.2 Demand for flexible modes of programme delivery.

What is certain is that the student base of the future will not be the same as that of today. The population as a whole is becoming increasingly computer literate and conversant with the new technologies and this certainly includes the next generation of undergraduates, whether from the traditional late-teen age or the increasingly important mature age group.
Such students are increasingly looking for flexibility in their study patterns, many come with different skill sets to those with which academics and institutions are familiar, computer skills being but one. Those in employment or attending as mature students are becoming accustomed to working from home and increasingly using tele-working as an everyday tool. As this trend continues, it is certain that they will demand education free from constraints of time and place.

The OU has proven the demand for such flexible learning environments and the new paradigm will extend such freedoms to traditional courses. Initially, it is likely that in many conservative institutions, this demand will go unremarked by administrators and others, or at least that they will not give adequate strategic thought to the changes such changes will bring. The majority of those institutions will need to embrace rapidly the new paradigm, if they are to remain competitive with those more flexible and student centred institutions that already are offering traditional courses facilitated by the new technologies.

Operationally, the most convenient way to deliver such flexibility is likely to be by way of ICT based material.

5.3 ICT and models of programme delivery.

There is a current emphasis on the application of the Internet enabled technologies to spatially and/or temporally distance the learner from the organisation and/or the teacher. There are however two other models of course delivery, the hybrid model of a mixture of distance learning with defined, but perhaps optional, periods of attendance and the traditional face-to-face classroom delivery. The latter two are likely to remain in use for the foreseeable future. What will continue is the increasing use of ICT based materials and Internet technologies in all modes of delivery. This may involve the development of totally new or the re-working of existing materials; it will certainly change the way the learning takes place. Whether by default of programme design or student practice, ICT materials are frequently used in a stand-alone mode, thus if the development of the new course materials does not take place in an holistic and appropriate environment the student experience is likely to be adverse.

So as to ensure that such newly developed materials are of adequate standard, current institutional quality assurance (QA) practices will need to change to embrace this developing involvement of ICT. These changes will apply equally, to ICT materials for current validated programmes, whether used in face-to-face or paper based distance learning or to new programmes to be delivered remotely without any face - to-face contact. ICT based materials may range from the most simple, say perhaps a simple spreadsheet, to a fully interactive CD-ROM or to a sophisticated web based course. What is critical from an educational perspective is not the level of sophistication of the presentation of the material; rather it is that the material content should be appropriate to the course or lesson plan. The technologies employed must always be secondary to and informed by the pedagogical demands of the course. If the pedagogical perspective of ICT enabled course material meets the demands of

distance learning, it will form excellent material for supporting traditional face-to-face delivery, the contrary is not necessarily the case. Good face-to-face material almost inevitably requires significant reworking to suit distance learning.

5.4 Experience of new technology application in education.

Experience on a world scale suggests that teachers embrace new technology, without being clear why they are changing from the existing. Jon Baggaley, (1999), Professor of Educational Technology at Athabasca University comments on the apparent rush to new technologies: -

'In the more affluent nations, teachers are apt to move on from one promising medium to the next after their first failures to use it properly, a tendency, which leads them to overlook the possible reasons for the failure of their applications:

- The fact that they did not create adequate resources to keep the medium supplied with effective content;
- The fact that they did not take account of the classroom processes which should have accompanied this content so that it could be efficiently interpreted by students.'

The increasingly rapid move to ICT based materials and use of Internet technologies appears to mirror such activity. Discussions with colleagues interested in the use of ICT based teaching, particularly utilising web technologies at international conferences, (International Society for Exploring Teaching Alternatives 30th conference, Los Angeles October 2000 (ISETA, 2000). Teaching for a Change, Steamboat Springs June 2001, and WebCT users conference Vancouver June 2001), suggest that much of the staff activity in this area is exploratory and is pioneering in nature and undertaken without adequate institutional support. Certainly there is a lack of order and direction at institutional level. Pioneers are exploring the technologies because they are there, and producing learning support materials for courses or

modules, often by-passing current Institutional validation and quality control processes in their desire to publish these new materials.

Teaching and Learning theory is moving rapidly to embrace a 'learning' rather than an 'instructional' paradigm. Learning Outcomes rather than Teaching Objectives are becoming the drivers of programme design and pioneering teachers are exploring the possibilities of these moves. Yet in many instances, the institutional processes are firmly rooted in the past with little understanding of how the new technologies can change the student experience and enfranchise new cohorts of students. Many Institutions are passive spectators of the technological advances that are announced with increasing frequency. Certainly few have an institutional policy to embrace these technologies and actively support their use in teaching practice. Thus the change in student experience may be for the better or the worse. Without adoption of institutional policies supported by implementation strategies and plans backed by resources the changes will certainly be fragmented and are likely to lead to unsatisfactory student experience.

5.5 The need for Quality processes

In the late 80s and 90s the public was increasingly voicing concern about its perception of the failure of the education system to deliver perceived value for money. At the same time structural changes and increased funding for HE in took place in a general climate of Central Government demanding measurable improvement in educational performance. The era of league and performance tables was thrust on all sectors of education from primary schools through to Universities. Various agencies and quangos appeared to measure, monitor, control and offer advice. Whilst some staff derides these changes as interference in areas of academic freedom, it cannot be denied that many of the laissez-faire and conservative attitudes prevalent in education cannot continue unchanged. One of the products, of this change in ethos, is a guideline document on distance learning, issued in an attempt to ensure that the student experience changes for the better. The guidelines will come to be seen as best practice to be observed rather than over restrictive.

5.6 UK Quality Guidelines

These comprehensive guidelines for the quality assurance of distance learning have been issued by the Quality Assurance Agency for Higher Education QAA. The QAA describes 'distance learning' as: -

> "… a way of providing higher education that involves the transfer to the student's location of the materials that form the main basis of study, rather than the student moving to the location of the resource provider."

Any ICT based materials have the potential to be used in such a way, even though they may not originally have been authored for such use. Thus such materials would fall within the scope of the guidelines, which apply to materials designed for distance learning. The challenge will be for institutions to recognise this, identify the materials and apply the appropriate quality assurance processes. There are six guidelines (QAA 1999, still current 2002) that are well and clearly set out. They are very specific and quite demanding. The guidelines are supported by twenty-three precepts that are in turn associated with one hundred and sixteen guideline statements. Thus the QAA may be seen as posting clear markers against which the institutions' strategies could be benchmarked. Whilst some precepts may not apply to every module or course the spirit and ethos of ensuring excellent student experience certainly does.

5.6.1 General implications of The QAA guidelines

The six guidelines cover the following

1. System design - the development of an integrated approach
2. The establishment of academic standards and quality in programme design, approval and review procedures
3. The assurance of quality and standards in the management of programme delivery
4. Student development and support
5. Student communication and representation
6. Student assessment

These guidelines taken together with the requirement to elicit a Teaching and Learning strategy are seen by many academics as being bureaucratic in concept and diminishing traditional academic freedom. Closer examination shows perhaps, that they establish a useful template to be used to design both the teaching and learning activities and the processes involved in the delivery and administration of courses. What is already emerging is the reality that these guidelines cannot be ignored. The word "explicit" is used no less than seven times in the guidelines and their accompanying precepts. The repeated use of this word cannot be accidental; it is clearly designed to ensure that institutions critically examine existing attitudes and processes and make the changes necessary to accommodate the accelerating move to distance learning. Adherence to the guidelines and the emphasis of the precepts should prevent institutional drift from traditional methods of delivery into computer facilitated distance learning, without there being adequate processes in place. Attention is drawn to some of the guidelines and their precepts, which may well impose new duties on institutions. Certainly some of these precepts will challenge cherished and traditional academic and administrative attitudes. Examination of some of the guidelines and precepts, in detail, may help to expose some of the prevalent attitudes and processes and areas that will need change.

The choice of the words 'development of an integrated approach', in guideline one, covering ' System design - the development of an integrated approach', is interesting and cannot be accidental. It recognises the reality of what many institutions would rather not admit, that they have systems and processes that in isolation may be excellent but which together often have significant broken links. Most institutions would argue that they have clear vision statements and policies for realising those visions, yet their publication alone does not ensure either downward communication of those policies to staff or their adoption by the staff. This is particularly the case where management strategies and processes appear to derive little from the high level statements.

Experience in the UK, corroborated by conversation with other practitioners at ISETA, October 2000 in Los Angeles, suggests that a frequently encountered model is one of pioneers developing their own on-line activities, in isolation and unsupported by policy or allocation of either resources or finance. Such activity is frequently concentrated on the technology that is perceived as new and exiting and a better way of doing things. This activity may be unguided by any appropriate pedagogical approach and at the same time totally divorced from the existing institutional processes of quality assessment. This happens not through a wish to circumvent the processes, rather because the pioneer slowly develops the material and then makes it available to students in parallel with his or her traditional teaching materials. Thus drift occurs.

Institutions must establish policies in this area together with appropriate processes of management and quality assurance. Directorates need to recognise that such activity is a healthy and logical consequence of developing educational theory. There should be a warm welcome for such activity and an understanding of need to facilitate change in the processes to embrace and foster the new paradigm. This is best done by developing the current processes to keep the best features and at the same time incorporate flexibility that will allow exploitation of the new methods of delivery and assessment encourage pioneers in this area. Where institutional response to awareness of such activity is conditioned by a corporate culture based on rigidly applying current control processes, irrespective of their appropriateness, it is unlikely that the work of the pioneers will cease. They will continue and migrate to more congenial surroundings.

5.6.2 A review of some key guidelines and precepts

Guideline 1, Precept 3

> "Prior to offering programmes of study by distance learning, an institution should explicitly design and test its system for administering and teaching students at a

> distance and plan for contingencies in order to meet its stated aims in terms of academic quality and standards."

In some institutions this precept will require a fundamental rethinking of the current inwardly focussed administrations processes that are hierarchically driven. Alien words like service and customers will have to become part of the institutional vocabulary. Management will have to engineer profound changes throughout their institutions so that processes can become more inter-active and service centred. Whilst module content will continue to be the preserve of academics, increasingly there will have to be rigour of processes of both delivery and administration, solely so that the quality of student experience is enhanced at best and maintained at worst. This will inevitably lead to tensions, as academics feel threatened by the loss of some perceived academic freedoms. Perceived, because they were never real: rather the freedoms that many enjoy are the product of poor management over time. Increasingly, to meet the QAA guidelines, management will have to develop and change processes so as to achieve consistency across programmes and schools and/or departments. Consistency becomes the watchword; Quality of student experiences the yardstick of measurement.

Whilst the overall precept specifically refers to distance learning it is not logical to believe that this excludes ICT materials used as part of a traditionally delivered course. Processes '…in order to meet its (the institution's) stated aims in terms of academic quality and standards' are surely not the exclusive prerogative of the distance programmes.

Guideline 2, Precept 7

> "In designing distance learning programmes of study, and any component modules, a providing institution should ensure explicit and reasoned coherence between, on the one hand, the aims and intended learning outcomes, and, on the other, the strategies for teaching at a distance, the scope of the learning materials and the modes and criteria of assessment"

This precept recognises the shift from an Instructional Teaching paradigm (Barr 1994) to a learning paradigm and the parallel move to a significantly student centred culture. Such a change will be painful and threatening to many academics, others will welcome it. Adoption of this paradigm shift will require careful change management, a skill not notably present in conservative organisations, and a process that is rarely well handled even by progressive organisations. Incorporation of ICT based materials into traditional programmes may be the first steps in move to a learning paradigm. Module design for student centred learning is an alien process to those used to teaching to module objectives. Distance learning is a different paradigm to standard face-to-face delivery and requires different approaches to student engagement. Designing integrated formative and summative assessments is significantly different to setting a traditional module end assessment. Computer-based programmes may significantly aid the formative assessment process, within a traditionally delivered programme. This assessment process may be used within the class environment or at a distance. Either way it must be integrated into the course design. Overall Management will need to take positive and affirmative action to ensure that appropriate staff development takes place in support of the move to a learning paradigm and the likely parallel move to ICT materials.

Guideline 2, Precept 9

> "A providing institution should have processes for approving distance learning programmes of study which, while underpinned by principles relevant to all educational programmes, take specific account of the requirements of the system of distance learning adopted and of the opportunities provided for scrutiny."

This precept recognises the obvious; that distance learning is different to classroom-based learning. It also requires that institutions acknowledge this and act accordingly by moderating existing, or adopting, new processes. This may be comparatively simple, if time consuming, with traditional paper based programmes. Such programmes have been in use for decades and various models well proven. The evaluation is perhaps less easy with web enabled distance learning, not least perhaps

because the practitioners are not many in number and the processes of best practice are like the technologies themselves emergent. It is important therefore that those responsible for academic standards rapidly become well informed of the potential of such methods of delivery and the forms of assessment that may be appropriate. This will undoubtedly necessitate staff development for some senior academics, a notion that some may find distasteful. Further it becomes essential that the validation process have a suitable protocol built in whereby the student experience and academic rigour can be tested without imposing unreasonable restrictions on the course design team.

Guideline 3, Precept 14

> "Learning, although at a distance, should be treated as an activity involving all participants in the system, in which monitoring, review and feedback to those who manage the programmes of study are used regularly to enhance all components of teaching, learning and the system of delivery."

This clearly puts an onus on providing institutions and their programme or course directors to establish an effective ongoing process of continuous review and to act on the findings of such reviews to improve the overall delivery, management and administration of the programme. Virtually every institution has in place, on paper, such review mechanisms for traditional learning programmes. Experience suggests that many problems identified, by traditional review processes, are perennial in nature and have practical solutions that are not implemented because frequently the suggested remedies cross boundaries of the internal hierarchies of academia and administration. The clear requirement, to put in place effective mechanisms that will ensure that recommendations are carried forward to successful implementation, can only be met if the current laissez-faire culture is changed.

Guideline 5, Precept 16

> "A providing institution should meet the need of its students who are studying at a distance for information that is particularly full and clear about ... the characteristics of the distance learning system and how students interact with it. ... "

This precept clearly requires some wide-ranging explanations of how the programme will be run, what technology will be used, the methods of contact and support are to be used and what is expected of the students. At the very least this requires a well-documented course handbook, at the best perhaps a major programme of induction. Institutions may perhaps achieve this by incorporating such information into the validation protocols. This should not be onerous but perhaps may be of major cultural significance to those academics that are less than meticulous in their course introductions. Such a protocol will also help ensure that appropriate technology is employed rather than that which is readily available. ICT based materials may be important elements within a course and if they assist ' A providing institution (should) meet the need of its students who are studying…' it should be immaterial whether they are part of a traditional or distance learning programme.

Guideline 5, Precept 17

> "A providing institution should monitor the effectiveness of information provided to students and, in the light of its findings, take steps to enhance its provision. "

This precept will require similar actions to those in **Guideline 3, Precept 14.** This is in reality a requirement to audit and obtain student feedback on the course documentation and to implement change as a result of the audit process. This surely is something that should happen in the management of traditional delivery, but which is often overtaken by lethargy and is therefore ineffective in moving programmes forward. Positive management action will again be necessary to change such attitudes

Guideline 5, Precept 18

> "An institution should determine what means of student representation are appropriate and realistic for students on distance learning programmes of study and should provide these students with accurate information about them. "

It is clear that, without being prescriptive, this precept looks for the establishment of practical and effective rather than complex processes of student representation. This will pose challenges for academics and administrators alike as they endeavour to design robust effective processes where perhaps none exist inn support of current traditional programmes.

Guideline 6, Precept 19, Guideline 6, Precept 22 & Guideline 6, Precept 23

> "A providing institution should be able to demonstrate publicly that summative assessment procedures... are appropriate for the mode of study... for the circumstances in which the programmes are studied... "

and

> "A providing institution should employ formative assessment as part of the design of distance learning programmes of study. "

and

> "A providing institution should monitor systematically the soundness of its assessment procedures and practice and be ready to amend them in the light of feedback. "

These three precepts address the whole question of assessment, and alone should spark off significant debate not only in staff team involved in course design but also among those charged with quality assurance. There will need to be fine judgements as to what constitutes distance learning, in the context of (some) elements of ICT based materials being used in a traditional programme. Will it be necessary to apply these precepts? Who decides what forms of assessment are appropriate in the context of a

module or course? Are the current controls on traditional programmes able to meet such potentially rigorous guidelines? Suffice it to say that this area will cause much friction between those rooted in traditional methods of assessment and those who hold more progressive views. As yet many staff both academic and administrative are unaware of the possibilities of using a combination of formative and summative ssessment. Staff training and development will become a minimum requirement, yet alone this will not be adequate. There is a requirement to gather feedback about the assessment processes. But from whom? Students? External examiners? Academic standards staff? What are sound assessment processes? Who will define soundness? If we bring in new processes for ICT based materials and distance learning should the Institutions adopt such criteria for traditionally deliverd programmes.

Determination of these issues will require establishment of Institutional working parties embracing subject specialists, student administrators and Academic standards specialists and those policy makers responsible for academic matters. Such working groups will need to establish relevant measurement criteria for different programmes; which issues are unique to particular programmes and which common to all. They will need to establish measures to establish whether variatiions in recorded performance over time are measures of student variability, tutor variance, or diminishing relevance to work place practices. These are not simple issues. The requirement to amend assessment processes when necessary means that the monitoring processes must be robust yet trigger change when necessary and then review the changes made.

5.7 The changes required by the guidelines: some of the issues.

To accommodate the changes presaged by the guidelines institutions will need to manage the process of institutional change, both operational and cultural.
Some students will be more comfortable and empowered by the new technologies; others will feel just the opposite. The removal of the need to attend at a fixed time and location will give more flexible use of time, but will require a different sort of motivation. Regular logging on to some form of conference area will become the

norm; written contributions to discussion will be a key part of the learning process and more modules will move to combinations of formative and summative assessment. Reflective writing will perhaps be more encouraged at lower levels than at present. Over time students will become more familiar and comfortable with exploratory learning and didactic teaching will perhaps seem old fashioned. Other students will welcome some chalk and talk, as more familiar.

There will be both losers and gainers; the jury will be out for many years on which group will predominate. The only certainty is that technology will forever change the way in which students learn and the way in which education is delivered and administrated.

Institutions will need to initiate major programmes of staff development. Staff will need to become familiar with the current theories on learning and teaching and how the move from objectives to outcomes inevitably moves assessment from measuring inputs to assessing the ability of students to analyse, synthesise and problem solve. Learning, perhaps, will be less about remembering information and more about applying generic tools to specific real situations or case studies. These moves will mean staff rethinking the content of their modules and course directors and others questioning whether the historic approach to a subject or topic is any longer valid. Staff will have to learn the capabilities and limitations of the new technologies. The technologies employed on the Internet are now advancing so rapidly that it is difficult to envisage that academic staff will actually have the time to become technically competent and then keep up to date. There is a case for staff specifying what they want to use in their course material, text, animated slides, audio, Video, webcam, on-line interaction, links to third party sites etc and then leaving the realisation of such specifications to fully trained educational technicians. Thus freeing comparatively highly paid staff to research and develop subject expertise and devise new and interesting strategies for enhancing the student experience. In some institutions there is already wide-ranging discussion of the desirability of every member of staff becoming competent with the new software packages. Will it in fact be feasible, when many are not yet competent on the existing packages, which are continuously being enhanced and at an accelerating rate? Institutions will need to decide whether, in the

short term, academic staff should concentrate on the pedagogy and leave the application of the technology to specialists or whether put in place programmes to train staff in the technologies.

5.8 Summary

Already in the progressive institutions there is significant argument among academics, administrators and senior directing staff about the policies, strategies and timings for embracing the new paradigms that use ICT. Different institutions are piloting different strategies and actively researching this large area of change, in the hope of being informed by best practice It is already clear that there will be no one best method, yet the search or the holy grail goes on. There will a range of options that will emerge. Institutions will have to evaluate and make value judgements dependent on the target market and the subject area,

The Institutional implications are wide spread. Institutions will require to take a managerially focussed and holistic approach, to meeting the requirements of the QAA. Without a pan-institutional approach it will be very difficult to satisfy guideline 1 precept 3: -

> ("… an institution should explicitly design and test its system for administering and teaching students at a distance and plan for contingencies in order to meet its stated aims in terms of academic quality and standards.")

Every course offered that uses ICT based materials will require different technologies and teaching strategies. Each will put different demands on areas like quality assessment committees. Different administrative support and certainly different technical support will be a sine qua non. Staff training and development policy will need to recognise the need for these changed skills.

Decisions will have to be made about how technical support will be delivered and budgeted. Should it be centrally delivered as a top sliced service or provided and budgeted at school level? If centrally delivered, who will ensure that the level of support is adequate to meet the academic requirements?

Will institutions be able to support servers on a 7 by 24 basis including holiday periods based on Christian holy days, recognising the multi-faith nature of society? Traditional hours start to become meaningless. The notion of contact hours needs a complete rethink. Student attendance becomes very problematical. Internet delivered courses are accessed at the convenience of the learner not the institution, but how can these long hours be adequately serviced. If we move to enrolling students from distant time zones the question of 24-hour opening will become more critical.
New technology for home users will put increasing demand on servers. Already we are critical of time taken to down load from servers.
As staff becomes more computer literate institutional policies will need to address issues like staff accessibility to email and university management and information systems from remote locations. Individual web space on University computers will need to be available in support of teaching, research and publication. C&IT services become nervous about such access, they dislike individual members of staff using FTP to and from their workplace computers, yet this will need to be the norm when we move to 24-hour support of distant students. Staff will need to be supported with provision of software, for their use at home, at the same level as the in institution provision. Provision of lap tops or similar would be a way round this, but does not solve the remote access problem.

It is inevitable that institutional policies, strategies and processes will have to change fundamentally to meet current distance learning benchmarks. The process of change will have to be continuous so as to keep pace with the advances in technology and meet current best practice. Start planning to manage that change now.

6 Influences of technology on learning itself

6.1 The computer age

It is instructive to read Marshall McLuhan (1964) in Understanding Media. He was writing at the very start of the computer age and had no direct understanding of capability and versatility of the computer some 40 years on. He makes extensive use of the phrase 'electric age' or variations of that phrase. Yet what he writes holds valuable lessons for us as educators in the way in which we use the power of the computer and the Internet. He identifies that different methods of communication require different responses from the receiver of the communication. He coined the famous phrase the "medium is the message" which is often quoted but little understood. Unfortunately McLuhan' book is poorly referenced, this results in some sources being un-referenced and in some instances an extensive Internet fails to find the source and or a definitive reference.

In the early part of the book (pp28) McLuhan identifies that the basic change of the electric age, in 1964, is the concern has become the effect of the message rather than the intrinsic meaning of the message. This parallels neatly Ramsden's (1992) definition of learning "suggests that "learning is fundamentally about changes in the understanding of reality" quoted above. On pp 64 McLuhan says: -

> " Under electric technology the entire business of man becomes learning and knowing…this means that all forms of employment become "paid learning" and all forms of wealth result from the movement of information."

Equally he suggests that higher education had been a priviliege and now (1964) has become a necessity for production and survival. This is much more so at the start of the 21st Century. He further identifies (p189) that: -

> "a new medium is never an addition to an old one, nor does it leave the old one in peace. It never ceases to oppress the older media until it finds new shapes and positions for them."

It also penetrates the social structures until they are saturated. He goes on to look at the case where a technologies merge to become hybrid, as in the newspaper which he sees as a merger between the electronic form of the telegraph and the technology of

printing. He asserts that the all the purely electronic media introduce a totally new relation of the medium to its users. It becomes a relationship of high participation and involvement.

In a later chapter entitled 'Challenge and Collapse' he compares the changes brought about by new technologies to that of a surgical operation on the way we function.

> "The area of impact and incision is numb. It is the entire system that is changed."

Few in education would argue against that, in the case where computers have been widely introduced into the institutional management and teaching and learning policies and structures. He talks of the need to synthesise the culture of the new technology with the culture and traditions of the previous technology or system. He cites the effect of the explosion of the Gutenberg (printing) technology on the previous oral tradition in education. Later he identifies the need to use the richest medium, or perhaps more than one medium, to transfer the message (effect a change in perception and reality). He further identifies that there comes a transfer of power with the transfer of information and knowledge and that the accelerating increase in the speed of this transfer itself brings about change on a wide scale. It is also clear that as new technologies emerge and become adopted, a freedom of use, that was not previously available, becomes available to the user of the older mediums. An excellent example is radio, that has moved in the main from being a medium devoted to mass audiences to one that delivers specialist content to niche audiences, a freedom yet to be widely available to or exploited in television.

In a later chapters (pp172) McLuhan identifies: -

> "that the basic function of (all) media is to store and expedite information…what is stored is more easily accessible than that which has to be gathered."

He further comments that in the electric age "information is the crucial commodity". Whilst in 1964 he related this to the relationships between advertisements and their

products, there is no doubt that today we increasingly recognise the truth of information being the true commodity. Even in 1964 he had identified the "Age of information and communication" and that the speed of communication and transfer of information had the power to instantly and simultaneously involve many persons. However the information stored needs to be in a usable form and fit for the purpose for that which it was originally intended to be used. Much information has to be stored visually to be effective; typically botanical information needs both text and picture to be complete. Much scientific knowledge may be more readily conveyed to a lay person in pictorial rather than written form, for example the DNA double helix with its code sequences. Music, performed on a manufactured musical instrument, needs to be stored aurally as well as in manuscript terms, since it is a learned skill to read manuscript and play the appropriate instrument(s), for those with aural recall the manuscript form becomes redundant in musical terms since they are able to play by ear. Some music, like nursery rhymes and Jazz, have form that may never be written down, but performed from memory with recognisable form but perhaps not exactly as originally performed or performed by a third party. Equally it is clear then that educators need to consider carefully how they use the new composite medium of the computer and the Internet to store and transfer their information and or knowledge. It becomes equally important for educators to consider the combination of modalities to be used in any particular circumstance to achieve Ramsden's "changes in the understanding of reality".

6.2 Older technologies delivered in new ways.

Increasingly educators at all levels have moved away from plain chalk and talk, didactic teaching toward incorporating additional media into their classroom presentations. The overhead projector has enabled the use of pre-prepared diagrams on separate transparencies, tutors can draw on transparencies and dynamically develop a diagram or sketch a graph, whilst lecturing, thus combining visual and oral delivery. A variation on this theme, similar in effect but using computer power is the use of the computer and PowerPoint or similar software. These in turn can incorporate

photographic images, video, and sound. In the second half of the 20th century educational radio was a favoured medium in primary and secondary education and later educational television was in widespread use. In Higher education the use of video recorders was widespread for the recording of specialist education television in areas like medicine. It also has to be borne in mind that the medium of delivery (of the message or information) can itself alter the receiver's perception of the content and or context of the message. McLuhan pp326 cites the Kennedy Nixon debate, where the perception of the radio audience was of Nixon's superiority in debate, whereas his television image made him appear a phoney.

Later pp338 McLuhan refers in some detail to the effects of restricting the breadth of the medium in delivering information as compared to allowing the information to be presented utilising all the capability of the medium. Suffice it to say that the way the information is presented on a particular medium affects greatly the effect that is achieved in the receiver of that information. He also points to the wider effect of this instant availability of information, in our own recent past we have seen the instant reporting and judgement made about conflicts in Bosnia and the Gulf, whereas the older of us received more reasoned and analysed commentaries on conflicts like the Korean war.

The Open University in partnership with the BBC2 broadcasts much background material for its courses on Saturday mornings. Traditional film is much less used, but transcribed into video format has widespread currency, as have purpose made videos on specialist subjects. In some subjects, typically but not exclusively art, photographic positive slides, are an important medium, since they can faithfully project a static image to form the centre point for a discussion or rapidly convey information that is not readily or easily communicated in a written form.

Finally we should recognise that all technologies are merely ways of storing information, some allowing much more rapid retrieval and use of the stored information than others. For educators there is therefore the responsibility of using

these storage media appropriately to the classes of information and use to which that information to be put.

This move from chalk and talk is a continuation of the changes of education that started with the move from an oral tradition to a literate tradition with the invention of the printing press. Flora Thompson (1945) talks of the changes taking place in education in the 1880's and in their own school: -

> "perhaps these upheavals were a necessary part of the transition which was going on" and later "…the children's lives lay in the future and they needed a guide with at least some inkling of the changing spirit of the times."

Surely the lesson to be taken on board by educators is that we now have a very powerful information delivery tool in our command and that we must exploit it both as a powerful retrieval tool for source material produced by others and as a means of presenting information in a wide variety and/or combination of ways. This will enable us to appeal to all shades of learning styles and also to embrace Bloom's learning objectives. Yet most educators are themselves ignorant of the capabilities of the new technologies and have no skills in using them singly, or more importantly, if we take on board the commentary of McLuhan, in combination.

6.3 What delivery software?

The choice of software will inevitably have some effect on the teaching and learning process, if only in terms of access and ease of use. It follows that the choice should ideally be informed by a phenomenological approach, that is considering the needs of all the students, their preferred learning style, the content of knowledge/information to be transferred, the learning objective, the location of the tutor relative to the students, the tutor's own preference for teaching style etc. Unfortunately for ease of management and support, resource managers, who may have little or no understanding of the pedagogical imperatives, frequently dictate the choice of software. In the author's university the choice was made to standardise on software

that met the requirements of one client group, albeit a major revenue source. It subsequently proved to have some deficiencies as far as some other student groups.

6.3.1 Whose choice of software and why?

The choice of software for online delivery of a particular course or programme is inevitably coloured by institutional concerns and becomes perhaps a compromise between what is available and supported locally and that which is the operationally and pedagogically preferable.

The desirable characteristics of any software are that it is simple for the learner to both access and use. This of itself may be a major problem, dependent on the facilities available to the learner at their preferred place of learning. One issue is the limitations of the hardware itself. Domestically this is down to the student but is something to be considered. Work based learning may present a different set of issues. Typically allowing access past firewalls, both inbound and outbound, can be a major issue. Browser compatibility with the delivery software can itself be a problem, and this may be further compounded by restriction imposed by ISPs (Internet Service Providers). These issues were experienced during the first months of the on-line masters course and the responses and support from the University were less than adequate. This was primarily because the University had not thought through the implications of encouraging a piecemeal adoption of their preferred Managed Learning Environment (MLE) and had therefore not anticipated some of the technical questions that arose.

There are many educational software platforms available, Blackboard, WebCT, FirstClass etc. They are all limited in different ways and designed in some ways for different purposes. The first two are managed learning environments with many enablements for facilitating different media like CDs, Video, Audio etc but allowing significant student management facilities. The last is a powerful email based conferencing system but which is highly tuneable and customisable but does not have integrated student management facilities. Ultimately the choice of software will lie

with the management team responsible for the course or programme delivery, after they have considered all the pedagogical, managerial and technical issues.

6.4 Specification to meet user expectations.

The JISC (Joint Information Systems Committee has carried out much developmental work in this area and the briefing paper 5 (JISC, 2002) comments: -

> "Choosing VLE systems is not just about procuring functionality. The functionality supplied in different systems is often a result of different approaches to pedagogy."

The choice should be made, as closely as possible, on phenomenological grounds rather than administrative convenience. To be perceived by the end users as meeting their expectations it is necessary to exceed their actual expectations. This means that modules will become student centred not content centred**.** As the report comments: -

> "Course material in content centred systems is aggregated into 'courses' to which learners are assigned, coupling the learner closely to the content. Learner centred systems organise students into groups (courses or smaller groups)".

This means that content can be stand alone and thus can be made

> "available in a flexible and dynamic way to support individual learners and activities".

An important corollary to this is that staff development and training becomes an imperative for the successful institution wide introduction of an MLE or VLE. In the authors University one member of the Communications & IT Services (C&ITS) staff was selected to become familiar with and responsible for all support for the chosen MLE. It was envisaged that trickle down from this trainer/expert would be adequate to expand the use of the MLE University-wide. This hope has not been realised. It is clear that a much more positive stance is required.

7 Problems of an Institutional Nature: A small case study.

This chapter looks at the position within the author's university

In July 2000, prior to the Vice- Chancellor's keynote conference, the author undertook, for the Vice-Chancellor's office, a survey of the state of on-line courses within the University. He reported as follows: -

> " Hitherto (Internet) related work in Schools has largely been ad hoc, hands-on and practical, driven by interested individuals and has tended not to penetrate into the mainstream delivery. There is currently no platform for co-ordinating and supporting these projects or for collaborative research, and no plan. Indeed the vast majority of teaching staff may be reluctant to get involved in using technology which they don't understand and don't know how to incorporate into their teaching."

Now, in October 2002, the situation is little different.

At the time of the July 2000 conference the University had purchased WebCT to support the School of Health Care Practice in the development of enquiry based learning for the training of nurses. On the back of this purchase, a strategy was articulated for around 1/3 of all modules from all schools to be web-enabled using WebCT. However no major funding was made available to support this initiative, consequently the uptake has been patchy. The major user is the School of Health Care Practice, which has a requirement to deliver much of its nurse teaching supported by such technology. In contrast, Coventry University allocated some £3m to fund staff salaries and establish a cohort of practitioners and pioneers. As a result some 30% of Coventry's modules are web enabled and all modules have allocated space and all students are integrated within the WebCT intranet. In fact Coventry may now be considered a web-centric University that is seeing increasing student demand for more tutors to support their modules with WebCT.

The introduction of web-enabled learning has imposed immense strains on the pedagogical norms of the University. WebCT has designed into it the capability to

post both assignments for marking and the resultant marks for the students to view. This feature in fact goes against the standard university procedure of requiring students to personally hand in and obtain receipts from administrators. Equally few staff understand the pedagogical demands of web-enabled learning, nor is there a directed University wide staff training programme that embraces the pedagogy of the Internet; merely a permissive programme with a technology bias. The strategy adopted was one of trickle-down. In reality, what this means is that those who wish to become expert must find their own mentors, without any certainty that these mentors are themselves adequately trained. This is hardly a positive recognition of the need to manage the change that is being thrust on the University, is far from the views of Hammer and Champy (1994) that: -

> " The reality that organizations have to confront, however, is that the old ways of doing business…simply do not work anymore".

They go on to talk about the three Cs, Customers, Competition and Change. The author's University's customers are their students. They are articulate, know what they want, how they want it delivered and how much they will pay. More and more, our competitors are not just other universities. Major commercial organisations e.g. Pearson, Thomson, Longmans, are providing excellent affordable distance learning packages. Some have invested heavily in MLE software (Thomson has invested $50m in WebCT) and educational materials are seen as a significant growth area for such companies. The rate of change is accelerating. Hammer and Champy (1994) suggest that: -

> "companies think their companies are equipped with effective change-sensing radars, but most of them (radars) aren't. Mostly what they detect are the changes they expect. …The changes that will put a company out of business are those that happen outside the light of its current expectations and that is the source of most change (in today's business environment)."

If that is so for industry, how much more must that be for universities.

Tom Peters (1992) quotes Alvin Tofler: -

> " nations need to embrace a "21st Century economy with an electronic infrastructure".

Surely, the same must be the same all or some of a nation's constituent parts. Universities form one of those constituents.

Whilst writing about the tertiary sector Butterfield's views must be equally as applicable to the university sector. Butterfield (2002) says: -

" All this has major implications for educators. …sees an expanded role for providers to use e-learning to enrich traditional classroom-based… What's called for is a vision of integrated learning".

Equally the "Managed Learning Environments Information Pack" from JISC (2002) expressly addresses the need for cultural change to enable Institutions make the best use of opportunities presented by the new technology. As yet the University shows no signs of this cultural change. It has articulated the idea of embedding the practice of on-line delivery in support of the learner; it has yet to effect planned implementation of such a strategy.

7.1.1 Management Systems

The author's University's management systems, like those of many other institutions, primarily evolved from a paper based learning environment in support of the UCCAS promoted students. The author's perception is that Universities are now moving to a computer-based system and toward full integration of the administration system and the MLE. If satisfactorily accomplished, this will be a major improvement over the current un-integrated systems. It will enable tutors have better access to student management information and could help to improve the student experience by making tutors more informed about their students. However tutors will need specific training on the systems; trickle down will be inadequate. Additionally such changes will do nothing to improve the academic content of modules or courses

Currently the author is a member of one of the several university groups working on a review and complete update of the methodologies for validating both modules and

courses. However the university is in a catch-up situation with some modules, approved under the older processes designed for face-to-face and traditional deliveries, being de facto either on-line or distance learning.

7.1.2 Support for the MLE

Within the university technical support for computing is offered on University installed hardware and on a limited number of supported software packages, primarily Microsoft products. The majority of the work is technical in nature concentrating on infrastructure and hardware capability. They (technical support staff) have no direct interest in or responsibility for the pedagogy attached to particular software. In addition they provide basic training of the 'how to use' variety on the supported package. There is little in the way of formal pedagogical training or advice for WebCT. The WebCT support officer gives advice where he can, however his expertise is limited to solving technical problems.

8 Conclusions

Changes in education have been continuous over history. Originally, prior to the invention of papyrus (and then paper) education was an oral tradition. With the invention of paper the oral tradition gradually weakened and education became the preserve of the clergy who could read and write; that near monopoly started to change with the invention of printing. The rate of change increased through the 19th Century and the birth of what McLuhan (1964) called the "age of electric information" further accelerated the rate of change. The invention of the computer gave educationalists a powerful new set of tools to employ in the art teaching and learning. The computer, in the guise of the word processor has found wide adoption in education both academically and administratively.

There is an accelerating recognition that the Internet is changing the way we live and the way business is conducted. Information on a wide range of products and services is readily available to all sections of society by a few clicks of the computer mouse. In

many instances we can buy instantly, by use of e-commerce technology. Equally this change of societal culture is slowly pervading the complete field of education, from primary school to University level. The integration of rapidly emerging technologies into the Learning and Teaching environment is accelerating and changing educational practices and perspectives. Academic staff has become familiar with its power to produce and edit documents and to illustrate their teaching using PowerPoint. More recently the rapid penetration of the world-wide-web into the home and the adoption of its culture of instant on-demand information are generating new expectations among many students. Students increasingly expect to use the Internet technology to access education on demand, in the work place, at home, in fact anywhere and at any time that suits the student and where an Internet connection can be made. Staff development will be key to adoption of the changed pedagogy necessary to optimise the use of the technologies and thus ensure an enhanced learning experience for all students exposed to the new technologies

At an institutional level there is a growing recognition of the need to meet these changed expectations if student numbers are not to decline. Thus institutions are slowly having a culture change thrust on them. Some have adopted a positive position on the adoption of the Internet technologies to facilitate learning and teaching. Fewer have explicit published policies and anecdotally even less have clear implementation strategies and a small minority have clear staff development plans which address the challenges of internet. The result of this that in some instances on-line learning is thrust on students with less than adequate materials, unsound pedagogy, poor support mechanisms and inadequate institutional systems.

This situation can only be remedied if institutions move from a permissive to pro-active adoption of on-line learning. JISC (in the document previously referred to) is clear that: -

> " for all these changes to be achieved a whole college approach is necessary…
> this process will need 'buy-in' from all sections and departments…"

To achieve such buy-in will require re-thinking of policies and strategies and major changes in procedures and processes to embrace the significant differences between traditional face to face delivery and on-line delivery whether of distance learning or in support of traditional courses. Carol Moffat (2002) in conversation asserted her experience is that: -

> "to effect pedagogical shift (in an organization) you have to have Institutional change."

Yet even in strongly managed commercial organisations managing change has always been a different process to manage. It is clear that Universities will have to learn and exhibit expertise in the processes of managing change.
The author's own experience in designing, developing and subsequently launching an on-line masters course convinces me that the 'pioneer' approach of APU to developing such courses is not cost efficient, not effective and may produce some teaching and learning materials which are not pedagogically sound. In addition those responsible for the validation processes had little if any perception of the methodologies and theories of on-line teaching and learning.

These conclusions lead me to the recommendations in the next chapter.

9 The future: drift or directed change

9.1 Introduction

There is a wealth of evidence from the published writings of the pioneer practitioners Laurillard, (1993) Heppell & Ramondt (1998) Salmon (2000) et al that the best practice of on-line learning is significantly different to that of traditional face-to-face teaching. To attain the best practice will require a paradigm shift in learning and teaching and a cultural shift in the management policies and strategies of the providing institutions. Academics should take responsibility for their own career development and recognise the realities of the shift from college instructional to the learning paradigm.

9.2 Recommendations for institutions and staff

These are based on the need to effect institutional change and better manage the continuing professional development of all staff.

1. Institutions establish joint change management task forces of Academics, Administrative staff and Directing staff to effect the introduction of Institution wide on-line learning and teaching.

2. Such institutional change management teams will need to establish clear policies and objectives for the institution wide introduction of on-line teaching and learning.

3. Institutions must properly budget for and finance such activities.

4. Institutions must actively and significantly manage the process of staff CPD and embed specialist training in the facilitation of on-line learning and its processes.

5. Institutions should actively encourage Schools to sponsor 'champions' who are competent and knowledgeable in the area of on-line teaching and learning.

6. Institutions must put in place robust and effective quality processes to monitor both the course design and the on-going delivery of the courses bearing in mind the QAA guideline that "these processes and task are not the same, in important aspects, as those applying in institution-centred teaching."

7. Institutions must put in place adequate programmes of development for all grades of staff irrespective of grade or discipline: that is it should include directing, administration, academic and support staff.

8. Institutions must recognise that the change process is on-going and plan to accommodate such change, because the rate of change in the technologies available to educators is accelerating.

10 Bibliography

Alavi, M, Yoo, Y, and Vogel D.R. (1997) Using information technology to add value to management education, Academy of management Journal Vol40 No 6 pp1328

Barr, Robert B (1994) A Learning paradigm for colleges, Cair 94 proceedings. Downloaded from www.cair.org.conferences/CAIR94?barr.html

Bloom, Benjamin S, (Ed) 1956(reprinted 1972) Taxonomy of educational Objectives, Longman ISBN0582 32386X p.19

Bond S &. Lemasson J.P (Eds.) 1999 Baggaley, Jon, The Impact of Information Technology on National and Transnational Education chapter in A New World of Knowledge: Canadian Universities and Globalisation in Ottawa: International Development Research Centre

Bruner, J.S., (1966), Toward a theory of instruction, Harvard University Press.

Butterfield,S , Chair Highways and Pathways: Exploring New Zealand's e-learning opportunities ISMN: 0-477-04770-X

Chapman, C (2001) personal communication.

Cleborne, Johnson, and Willis (1997) Educational Computing: Learning with Tomorrow's Technologies,

Doob, Penelope Reed (1995) Speaking of teaching, York university Gazette downloaded from www.yorku.ca/admin/cst/sppse23.html

Hammer, M & Champy, J (1994) Reengineering the corporation Nicholas Brealey Publishing ISBN 1-85788-056-0

Hanfmann,E and Vakar, G (1962) Editors and Translators, Thought and language L.S Vygotsky 1934 (posthumous), MIT Press, Cambridge Massachusetts.

Heppell, S., & Ramondt, L. (1998, June). Online learning: implications for the university for industry. Printed online at Ultralab.

Honey, Peter & Mumford, Alan (revised 1986) The manual of learning styles

Hurley, J, Smith,J & Hurley,L (1995) Tutoring for achievement - frameworks, Learning partners/FEDA

Hurley, John (2001) Supporting on-line learning , Learning partners Winchcombe Glos. ISBN1 899692

International Society for Exploring Teaching Alternatives 30th conference October 2000

Kim, A J Community Building on the web : Secret strategies for successful online communities Peach Tree Press□□

Laurillard, D. (1993). Rethinking University Teaching: A framework for the Effective Use of Educational Technology. New York: Routledge.

Mandler, G., (1985), Cognitive Psychology, Lawrence Erlbaum Associates

McLuhan, M, (1964) Understanding Media, reprinted Routledge 2001, ISBN 0-415-25549-X or 0-415-25397-7

McVay, Maggie (1998) Facilitating knowledge construction and communication on the Internet, found at http://horizon.unc.edu/TS/Commentary (December1998)

Moffat, C. (2002)Manager ICT Strategy Eppel Group, New Zealand Ministry of Education.

Open University found at http://www.open.ac.uk/about 20/10/2001

Open University found at http://www.open.ac.uk/factsheets/Background.pdf 20/10/2001

Open University found at http://www.open.ac.uk/factsheets/NewTech.pdf 20/10/2001

Powell.S (2001) personal communication.

QAA Distance Learning guidelines (1999) found at http://www.qaa.ac.uk/public/dlg/contents.htm

Ramsden ,Paul (1992) Learning t o teach in higher education, Routledge, p 30

Rodenburg, Dirk (1998) Shifting perspectives in Educational Technology, downloaded from http://horizon.unc.edu/TS/vision on 8/12/98.

Salmon, G. (2000). E-Moderating: The Key to Teaching and Learning Online. London: Stylus Publishing.

Skinner, B.F., (1954), The Science of Learning and the Art of Teaching, in Lumsdaine, A.A.et al, (1960), Teaching Machines and Programmed Learning - a Source Book, Vol. 1, National Education Association, Dept of Audio-Visual Instruction

Skinner, B.F., (1958), Teaching Machines, in di Cecco, J.P., (1963), Human Learning in the School, Holt Rinehart & Winston.

Stephen Heppell found at http://imics.ultralab.anglia.ac.uk/IT-Freedom-and-Constraint/session1.htm

UFI found at http://www.ufi.com/strategic%20plan/sec1.htm 14/5/2002

Virginia University found at http://jefferson.village.virginia.edu/~meg3c/id/AGB/V1/v1p1.html

Vygotsky, L.S (1935).Mental Development of Children and the Processes of Learning. Translated 1978

---

ii

[6]Hanfmann,E and Vakar, G (1962) Editors and Translators, Thought and language L.S Vygotsky 1934 (posthumous), MIT Press, Cambridge