

**Integrating e-learning into full-time undergraduate teaching – some
reflections on the choices made**

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Abstract

This paper reports on the experiences of two early adopters of WebCT at MMU Cheshire who combine elements of e-learning with more traditional face-to-face undergraduate teaching. It explains firstly, the authors' views of their own role in the learning situation. It then explores how this was translated into practice given the authors' understanding of the capabilities of the software. The elements explored include delivery of learning material in place of lectures, delivery of lecture session support materials, use of the sites as 'universal unit information sources', use of the bulletin board facility for discussions, on-line formative assessment, on-line summative assessment and e-mail support. For each unit the advantages and disadvantages of WebCT are identified, and it is suggested that the old adage of pleasing some of the people some of the time appears to apply. The paper briefly examines student performance in relation to their use of the WebCT resources provided and concludes that, like any of the other support mechanisms offered to students, it appears to be the most motivated who make the best use of the facilities. The paper concludes that the authors now see that their expectations of their own role and that of the students in the learning situation was, perhaps, a little optimistic.

1. Introduction

One of the key challenges facing higher education teachers in the new university sector is coping with the diversity of their students' learning needs. This diversity is multifaceted and can include intellectual development, skills development, socio-economic situation, motivation, length of time since last involved in formal study and so on (Lie & Cano 2001). In coping with this sort of diversity a traditional response might have been to create smaller groupings of students with similar needs. However, in the current economic climate UK universities are unable to sustain small group teaching unless tutors are willing to work beyond their contractual hours. Within MMU there are many who might be willing to do this but, with the pressures of the Research Assessment Exercise and other initiatives, the personal cost of being too 'student friendly' can be high.

So what can be done to address this problem? There is probably a range of solutions that might be considered, but this paper focuses specifically on the use of e-learning. In particular, the issue is the attempt to better support the needs of full-time undergraduate students. This segment of the student body is not one for whom e-learning would, at first sight, appear to offer great benefits.

2. Some Relevant Literature

As will be explained in Section 3 below, both the authors have Computing Science backgrounds. Thus it is possible that the charge of championing e-learning technology on 'interest' grounds, rather than on educational grounds, could be leveled. In order to address that issue, it seems appropriate to begin with a brief outline of the 'Scholarship of Teaching' that forms the context for this discussion.

Trigwell & Shale (2004) subscribe to the view of Boyer that the principal activity of higher education tutors is 'scholarship'. This comprises knowledge related work involving the four components of discovery, integration, application and teaching. Trigwell & Shale suggest that the scholarship of teaching has been perceived in the past as including the publication of research into discipline teaching, excellence in the practice of discipline teaching, use of the literature to inform the practice of teaching and reflection on the practice of teaching. However, they propose that this is inadequate in that it appears to ignore both the student and the outcome.

They propose that the scholarship of teaching involves three principal components; knowledge, practice and outcome. Knowledge relates to discipline knowledge, learning and teaching knowledge, conceptions of the role of the teacher and knowledge of the learning and teaching context. Practice comprises the actions of teaching including the selection and delivery of material for students, communication to students and others of how the process of learning is to be facilitated, investigation and evaluation of the process, reflection on the experience and, finally learning from the experience. Outcome comprises student learning, documentation of various types including course plans, learning materials, evaluation reports, etc. along with the important components of teacher learning and satisfaction. The final link in the chain is that the outcomes are made available for scrutiny by students, peers and other interested parties through publication. (See Figure 1) In outlining the ideas expressed in this paper, the intention is to use this model to demonstrate Scholarship in Teaching, and to offer our experiences for scrutiny.

An important influence informing the application of Information and Communication Technologies (ICT) into the classroom is the conception of teaching held by the tutor concerned. Teachers' views of their role in the teaching situation have been investigated by various authors over the years (e.g. Samuelowicz & Bain 1992, Gow & Kember 1993, Trigwell & Prosser 1994, Trigwell, Prosser & Waterhouse 1999). It is suggested that teachers' conceptions of their role can range from being 'the Oracle' at one extreme to 'the team manager' at the other, with views ranging from teaching as transmission to teaching as facilitating learning.

Samuelowicz & Bain (1992) came up with five conceptions of teaching and five dimensions that relate to each of the conceptions. Their model identified two principal orientations that were hypothesized for each dimension

comprising the tutor centred view and student centred view. A similar view was taken by Gow and Kember (1993) who developed a model of two principal conceptions of teaching, knowledge transmission and learning facilitation, and nine sub-dimensions. Their constructs are shown in Table 1 below.

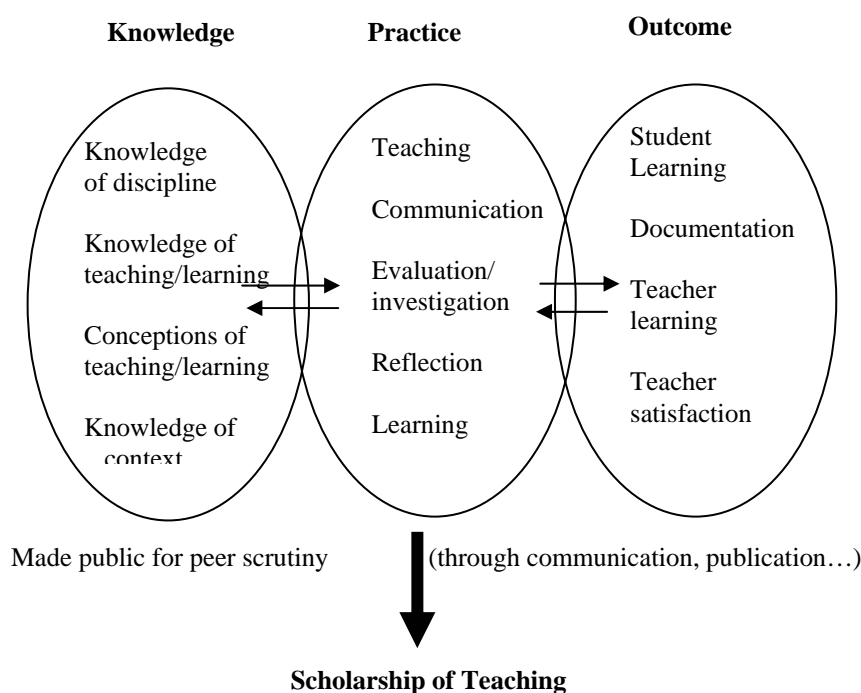


Figure 1 - The Scholarship of Teaching (After Trigwell & Shale 2004)

Table 1 - Gow & Kember's (1993) Conceptions of Teaching (from p. 27)

Learning Facilitation	Typical item
Problem solving	After completing a course students should be able to analyse a situation and display logical and rational thinking.
More interactive teaching	In my teaching I have tried to develop participation from the students to make it more lively.
Facilitative teaching	I guide students in learning rather than force things down their throats.
Pastoral interest	A good tertiary lecturer is someone who cares for the students and is in-tune with their problems.
Motivator of students	A successful lecturer is able to enthuse students.
Knowledge Transmission	Typical item
Training for specific jobs	A most important function of higher education is to produce graduates for certain professions within the community.
Greater use of media	Information can only be properly presented if audio-visual materials are used.
Imparting information	A lecturer imparts information to the student.
Knowledge of subject	A sound knowledge of their discipline is vital for all academics.

The importance of the teacher's perception of his/her role lies in the teaching strategies and approaches that s/he will adopt. Teachers who take the knowledge transmission view will tend to act in a manner that supports a surface approach to learning by the student. By comparison the teachers who take the learning facilitation view are more likely to act in a manner that will support the students adopting a deep approach to learning (Cope & Ward 2002). However, as the work of Ely (1992) showed many years ago, the reaction to the learning context is only one element of the puzzle that comprises the actual learning strategy adopted by any particular student.

The issue of the individual differences in tutors was explored by Fuller et. al. (2000). They used the well known Myers-Briggs Type Indicator (MBTI) along with the Gregorc Transaction Ability Inventory to explore how tutors reacted to having to teach a course on-line. On the basis of the styles that the research instrument could reveal they proposed that, for the successful on-line tutor:

*“More on-line instructors would be E (Extravert) rather than I (Introvert)
More on-line instructors would be N (Intuitive) rather than S (Sensing)
More on-line instructors would be F (Feeling) rather than T (Thinking)
More on-line instructors would be P (Perceiving) rather than J (Judging)*

Using the Gregorc Transactional Ability Inventory, we would anticipate that most instructors would be either Concrete-Random or Abstract Random. (p. 73)”

The respondents in their study did not match with this hypothesized profile, leading Fuller et. al. to propose that staff development for e-learning needs to include more than just attention to the demands and limitations of the software. Tutors need to be sensitized to how their personal preferences can impinge upon their course design and thus affect the acceptability of the course to the students.

Another issue that needs to be considered is the nature of the pedagogical model underlying e-learning courses. Smith and Hardaker (2000) argued that the key issues are the tutor's conception of what knowledge is, how it may best be transmitted and people's motivations for learning. They suggested that:

“The behaviourist/empiricist model emphasises individualised environments in which information is presented in a clearly sequenced series of explicit instructions with feedback, reinforcement, and statistically valid and reliable tests

The cognitive/rationalist model emphasises interactivity as a way of developing a general and unified understanding of a domain and favours organising information to match the developmental stages of the learning process... Assessment involves

performance and is relative to the background and developmental stage of the learner.

The situative/pragmatist model emphasises environments of participation, in which the learner practices the patterns of enquiry and learning and the use of resources, as part of the preparation for membership in a particular community. As part of the development of the learner's identity, this area involves not only the assessment of the learner's ability to participate in social practice, but also to participate in the assessment itself.

On the basis of these three perspectives they suggest that the particular software environment used may force the teacher towards particular approaches to their on-line course. For example, the behaviourist/empiricist model is encouraged by software that places emphasis on test based assessments, skills teaching and content delivery. In contrast, the cognitive/rationalist model is better supported by software that facilitates interactivity and student use of authoring tools. Finally the situative/pragmatist model is best supported if the software can facilitate a 'scaffolded approach' that has both teacher led and independent 'mining' of the resource, along with teacher assessed and self-assessed evaluation allowing the student acts as a 'probationary' professional.

This would seem to suggest that potential e-learning tutors need to reflect very much upon their own practice and understanding of their role. Whilst the 'bells and whistles' of the technology can appear enticing, effective use of such systems requires tutors to apply the traditional 'craft' skills of teaching that they normally use when placed in any different learning/teaching encounter.

3. Our Perspectives on Learning & Teaching

Given the issues raised in the brief review of the literature above, it might be expected that this section would attempt to argue that both authors naturally subscribe to the 'knowledge facilitation' approach to teaching. However, just as students have been found to adopt different approaches to their learning in different contexts, we would argue that tutors adopt different strategies in different contexts. To attempt to clearly identify our thinking about the units that form the basis of this paper, we both completed the Teaching Goals Inventory (Angelo & Cross 1993) for our units.

3.1 The Units

The two units under consideration are undergraduate level one core units. Financial Analysis is a core in the Business HND and degree programmes, as well as being a core in the business related joint honours subjects. As a result

the enrolment is high at around 300 students, who are split into two groups for lectures. Similarly, Power Applications is a core unit, but in this case for the Information and Communication Technology Applications (ICTAPS) joint honours subject. This is a new subject and, apart from being offered as an option to the business programmes, is not part of other modular programmes. Thus the recruitment is relatively low at around 25 students.

The unit specifications for the two units show an interesting contrast. Financial Analysis is limited to listing eleven discipline specific topics that the student is intended to master. Power Applications, on the other hand, outlines objectives for the student that are clearly personal development oriented, although clearly rooted in the ICT discipline. Similarly the teaching and learning strategies of the two units differ in their focus. Financial analysis place great emphasis on the use of lectures and exercise workshops while Power Applications is concerned with tutor facilitation of student personal development through the medium of learning contracts. Of the two units, only Power Applications makes specific mention of the use of WebCT for student support.

3.2 Our Pedagogic Perspectives

In order to understand the pedagogic perspectives of the tutors it is, perhaps, relevant to briefly outline our backgrounds in the context of e-learning.

Peter became involved through one of the first MMU On-Line Learning Fellowship awards. At the time of the interview for this Fellowship, the University espoused the view that WebCT could be used to replace teaching staff, and the applicants were expected to focus on a particular course that could be delivered using the medium. Thus the initial learning context was clearly within the Behaviourist/empiricist school, and emphasis was on designing content for electronic delivery.

A further 'prop' for this position was that Peter has been re-deployed from his native discipline into the teaching of accounting. As a 'probationary' accountant, the need for building personal subject knowledge has led to the use of carefully planned lectures supported by PowerPoint slides. It has not been his practice to walk into a class and 'spout' for an hour without notes. This has led to the accumulation of a good store of resource material.

Susan, in contrast has been operating within her natural discipline of ICT. She has been a self-taught WebCT enthusiast whose interest was aroused through seeing what Peter was attempting to do with the software. Her main motivation in learning was to find out what the software was capable of doing, and hence be in a position to decide how it might be best applied in her work. However, it is fair to say that she was already committed to the idea of e-learning and had developed a range of self-teach materials for student use via browser software. Given this background, Susan's initial standpoint was clearly within the Situative/pragmatist school.

The results of the Teaching Goals Inventory (Angelo & Cross 1993) clearly show how the different objectives of the units and the pedagogic perspectives of the tutors combine.

	<i>Cluster Number and Name</i>	<i>Clusters Ranked from by Number of "Essential" Goals Susan</i>	<i>Clusters Ranked from by Number of "Essential" Goals Peter</i>
I	Higher-Order Thinking Skills	1	4=
II	Basic Academic Success Skills	6	3
III	Discipline-Specific Knowledge & Skills	3	1=
IV	Liberal Arts and Academic Values	4=	4=
V	Work and Career Preparation	2	1=
VI	Personal Development	4=	4=

Table 2 - Ranking of Essential Goals for Power Applications and Financial Analysis

It can be seen that the Financial Analysis Goals (Peter) are very much focused upon the acquisition of discipline specific knowledge in the context of work and career. Higher order thinking skills, personal development, etc. are relegated to low priorities. By comparison Power Applications (Susan) is clearly seen as focusing on higher order thinking skills, although still in the context of work and career. The use of the discipline skills to achieve this end is shown by the third place awarded to Discipline-Specific Knowledge. As this unit revolves around the use of software to solve particular problems, there is little emphasis on ‘traditional’ academic skills such as essay writing.

4. Approach to Integrating E-Learning

A key part of the process of integrating e-learning into any unit is to define the role that the student is expected to play.

4.1 Views of the Students’ Role

For Financial Analysis the students were assumed to be attending the ‘traditional’ lectures and exercise classes every week. The learning model was one in which the students were directed by the tutor in terms of content and learning material use. The WebCT support system was intended to allow them flexibility and improved study support but it was not seen as allowing them to ‘give up’ lectures. For example it was expected that some students would access the lecture material in advance and thus raise any problems in the lecture. It was also assumed that the students would use the exercise solution postings to check the answers to those exercises that were not completed in class. It was also felt that students would use the self-assessment quizzes to complement their learning, and similarly make use of the various web links as and when appropriate. In addition it was felt that students who were unable to attend class for whatever reason could keep up to date through use of the web site resources.

It was also felt that the availability of the three resources of the lecture programme, the set text books and the WebCT resources would allow students to follow the course in a manner that better matched their personal learning style.

Similarly, for Power Application it was assumed that the student would choose between using the class in a traditional manner, use just WebCT or a mixture of the two. However, unlike Financial Analysis WebCT was used as the primary means of delivery so physical location was not deemed an issue. Students were expected to 'attend' WebCT regularly so that the register could be completed, but personal attendance on campus was not seen as important. Naturally students wishing to see a tutor in person needed to attend physically. Power Applications students were expected to be pro-active, driving their own learning rather than being passive recipients of lectures. They were expected to assess their own capabilities, derive their learning contracts, seek out suitable learning materials to study whilst managing their study time effectively. The students were expected to treat the tutor as a resource or mentor, rather than a traditional directive teacher.

4.2 The Application of WebCT

For Financial Analysis WebCT was used to make the lecture PowerPoint slides available on a weekly, cumulative, basis, with each week being released prior to the lecture. Similarly the weekly exercise tasks were made available prior to the lecture, with the solution sheets being released after the workshop session.

The Bulletin Board facility was used in lieu of a physical unit notice board. Notices, information, reminders, etc. were posted as appropriate. A second board labelled Discussions was created to provide a forum for debate and the posting of questions by students or staff.

The self-test quiz facility was used to provide a formative assessment facility that could be used as the students thought fit. The quizzes were topic related, so that a new one did not need to be added every week.

Links were utilised to provide access to the set text book website, the library, the University's skills website and other websites related to accounting. Additional links of a topical nature were added to encourage students to look beyond the narrow confines of the unit.

E-mail support was also provided, but outside the WebCT framework. Additionally, electronic delivery and posting of assignments was introduced for re-sit work to complement the paper delivery of the CAF1 system.

Power Applications is a development of previous Information Technology units. The most successful way of delivering content was found to be through

the creation of self-learning materials, allowing students to work independently. Resource materials had, over a number of years, been produced in an HTML format enabling their posting on the University student shared drive and making them easily updateable (as new versions of MS Office appear). This format was ideal for generating WebCT content and, as well as making resources available to students off-campus, WebCT was used to give the unit a 'cyber-identity' bringing together resource delivery, assessment and communication aspects.

For assessment the unit took a flexible approach in which one element required students to construct a learning contract related to their planned ICT skills development. They were required to define an individual portfolio of work that they would submit for assessment at the end of the year. Students were expected to draw upon the broad range of resource materials that were available. Delivery of these materials in an e-learning environment facilitated their availability and diversity. The provision of self-learning materials frees the tutor allowing him/her to spend more time in one-to-one tutorials with individual students.

Content modules were used for each major Office Application. In each content module the student was presented with a list of exercises, listed roughly in order of difficulty, from which they could select. There was no particular need to follow the exercises sequentially and students were free to choose exercises that would introduce a new aspect of the software application to them.

In addition to the learning contracts, a number of regularly spaced small summative on-line quizzes provided the rest of the assessment. These quizzes addressed the basic skills of the four major Office applications Word, Excel, PowerPoint and Access as well as file management. In some aspects they adopted the format used in the ECDL examinations but were less formal and restrictive. Each quiz was made available for one week and students were allowed two attempts of which the higher score was counted. Each attempt had a set time limit.

A bulletin board communication tool was added to allow students to pose questions and discussion points. Students were also able to e-mail tutors through the University e-mail. Links to Information Technology Web Sites were also available. One aspect of WebCT that was not used was the calendar tool which could be useful to remind students of course events or deadlines. Time for setting this up and managing it was not available.

5. The New Panacea?

E-learning should, perhaps, be seen as just a facet of the 21st century communication driven society. With the spread of domestic access to the internet most young people, if they want to know something, find it natural to 'Google' (Dolezalek, 2004) to search for an answer. Similarly, with the increase of technology in the classroom and of the provision of PC

workstations, it is more common for resources produced by tutors to be in an electronic format. Increasingly students expect to be able to access an electronic copy of lecture notes and other materials used by their teachers. It is, therefore, more appropriate to think of e-learning less in terms of being a panacea for teachers, but simply just another pedagogic tool. With this perspective, the next question to ask is whether the WebCT applications outlined above have proved fit for their intended purpose as teaching tools.

The WebCT software has a number of good points. Resources are available from anywhere that has internet access. It has proved to be very stable and neither of us know of any instances in which it has crashed in normal use. As far as we can tell, availability has been 24/7, interrupted only for brief maintenance periods. Document downloads were reported to be very reliable. The system forces tutors to use a 'common' basic environment whilst allowing a fair degree of customisation. This appears to make life easier for students as different WebCT sites are not significantly different in their user interfaces.

The problems with WebCT that we experienced included:

- ❑ students who did not do a formative assessment quiz in the given time window, for whatever reason, required 'special treatment' by the tutor.
- ❑ the quiz technology within WebCT operates as 'pop up' windows. However, many off campus students' browsers have this function disabled to avoid pop up adverts when surfing the net.
- ❑ maintaining the WebCT site is an additional task over above those of the 'traditional' lecture programme. It can feel like doing the job twice.
- ❑ regular postings become a treadmill. Students get to rely on the system and rightly grumble if one slips up.
- ❑ some difficulties were experienced by students accessing the site from off-campus due to the way their employer's system were set up.

Turning to the specific units, the advantages of WebCT for Financial Analysis were:

- ❑ lectures slides always available so some students felt that they did not need to take notes. Instead they listened and even asked questions.
- ❑ students who missed lectures never came looking for missing handouts.
- ❑ some students used the resource to evaluate whether attendance at the lecture was essential in particular weeks (particularly long commute students during inclement weather and those with family responsibilities).

The disadvantages that were identified for Financial Analysis were:

- ❑ the use of WebCT support still did not help with the problem of students who were only attending the lecture for their entry on the attendance register.
- ❑ many students did not bother to use the website.
- ❑ as far as can be ascertained, the formative quizzes were not used at all.
- ❑ the links were apparently not well used either.

- all the work for supporting the site and generating the materials fell onto one member of the teaching team.

For Power Applications the identified advantages of using WebCT were:

- the website was seen as the central core of the unit. Students did not ask questions of the tutor until they had first checked the website.
- no student 'rumours' about assignment dates and other issues as the website is the definitive source of information.
- no problem of attendees simply being there for their attendance mark.
- attending students were always engaged with materials from the site, or other things derived via the site.

The identified disadvantages were:

- the baseline summative tests, that were released for a fixed period only, contrasted sharply with the learning contracts that had very flexible time schedules. Many students appeared to forget that they had to meet these regular deadlines.
- this resource rich site depended upon a good pool of materials already being in existence. A similar approach to the following level 2 unit (not previously taught) will be difficult.

A key question to address is the extent to which the students found the WebCT sites useful for their learning.

For Financial Analysis, the majority of students did not fill in the end of year evaluation questionnaire. However, a small number of students were enthusiastic users and commented that the site was beneficial in the manner that had originally been envisaged. So far, it has not been possible to identify a quantitative change in students' unit results since the WebCT support system has been in operation. However, looking at the 2003/2004 marks and the number of hits on the site it is clear that the top quartile for performance is also the top quartile for usage of the site. However, the difference between the quartile groups is not significant ($df = 3$, $F = 1.062$, $p = 0.366$). The appropriate interpretation of this is probably that the better performing students have recognised the benefits of the site and hence make more use of it. The interesting anomaly for site usage is the number of students who were high users but subsequently dropped out of the course.

For Power Applications the pattern of usage based upon hits and the student performance based upon final marks is similar to Financial Analysis. In particular, the top two quartiles for usage of the site are also the top two quartiles for final marks. An interesting anomaly in these data relates to the student with the highest hit rate for both the site and the associates resource materials. This student only attended via WebCT after the first week, with hits of 237 and 224 for administration/assessment and resource materials respectively, and did not feel it necessary to attend a classroom session. Unfortunately, her Portfolio mark was disappointing, perhaps reflecting the fact that she had not fully understood the requirements of the task.

6. Conclusions

This analysis of the thinking and practice of the application of e-learning to a pair of level one units has shown that the prospective user of such an approach needs to address a range of issues. Firstly, his/her views on the nature of teaching are important, as is the underlying vision of the unit for which this approach is planned. Next the tutor needs to consider her intentions for the unit, perhaps assisted by the Teaching Goals Inventory. The limitations of the software also need to be considered as different software has different strengths. The prospective e-tutor also needs to identify the behaviours and skills that s/he expects of the students. Making these explicit should help to ensure a better match between what students do and what the tutor would wish them to do.

In the case of the two units discussed in this paper, most of these issues were not made explicit before work began. Thus it was expected, for example, that the use of Web based material would attract the attention of the disaffected. However, this did not seem to work. Similarly, there was an expectation that students would be more self-motivated and for example regularly check the site for quiz releases or bulletins. Once again, this did not seem to work except for the odd enthusiast.

Thus we feel that we were rather optimistic, if not idealistic, in adopting e-learning. The practice has shown that e-learning, just like any pedagogic tool will appeal to some students more than others. Just because it involves a computer does not mean that all students' motivation will be improved. However, we feel that we have achieved what we set out to do and, having evaluated the experience, have learned how we might make improvements for the future.

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