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ARTICLE

Integrating technology into a traditional learning environment

Reasons for and risks of success

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ABSTRACT This article reports on an evaluation of student views and reactions to a changed approach to teaching and learning that was enabled by the extensive use of information and communication technology (ICT). Evaluation was carried out over two academic years and involved the use of questionnaires, one-to-one interviews with students and student-led discussions. In general, students were appreciative of the approach, welcoming classroom sessions that focused on real problem-solving rather than one-to-many discourse. The students perceived the module to be harder than other modules although overall student performance was actually better when compared with previous years. It was clear, however, that during the semester most students used the electronic materials provided only when they needed them to support coursework assignments. As a consequence one major aim of the approach, to increase the degree of student-led learning in class, was not achieved consistently.

KEYWORDS: *biology learning, ICT in the classroom, ICT, integrating technology, student views on ICT, World Wide Web*

Introduction

In recent years, increases in class size, the diversity of student populations and changes in the expectations of students have all acted as stimuli for an examination of approaches to teaching and learning (Saunders, 2000). Coupled to developments in information and communication technology (ICT), these stimuli have generally led to different and more flexible

approaches to learning, often involving the increased use of ICT in the classroom (for examples see Collis and Moonen 2001; Hudson et al., 1997; Saunders et al., 1999). There is a great dichotomy of opinion as to the value of ICT to learning. Proponents can cite a considerable body of research evidence as to its effectiveness. For example, a recent study of the use of ICT to underpin the teaching of mathematics (Wenglinsky, 1998) concludes that ICT does promote academic achievement and that the impact depends on how ICT is used. Other studies have reached similar conclusions (e.g. Salpeter, 1998). Critics of ICT use are, however, quick to point out that most studies are related to a very specific teaching context or scenario and cannot therefore necessarily be considered generic (Healey, 1998). In addition, there is understandable concern that rapid and widespread adoption of technological approaches could fail as a consequence of the inability of many teaching staff to adapt their teaching to suit a technological environment. The middle ground of this debate is one that involves accepting that ICT can, when used in an appropriate way and in the right circumstances, have a positive effect on learning.

At the University of Westminster the delivery of an undergraduate year 3 module in the School of Biosciences has, in response to the pressures referred to above, been changed from a mainly lecturing approach to a more flexible delivery form. The shift actually began four years ago with the production of a range of printed materials designed to support a style of self-directed learning. At the same time, the amount of lecturing was reduced from around 24 hours to 12 hours. In the academic year 1998/99 paper materials were for the first time replaced with electronic materials and then in 1999/2000 these materials were supplemented by the use of additional Web-based learning tools. In these last two years lecturing on the module has been reduced to nil and classroom sessions have been used mainly for problem-solving activities related to the subject matter. In both years total classroom contact time was maintained at the same level as that of previous years (i.e. in years prior to 1998/99). What follows is a report of the reaction of students to this change in module delivery. The report is based on an evaluation of questionnaire data, interviews with individual students and student-led group discussions, carried out over the two academic years concerned. In addition, the view of the tutor is presented. All other modules taken by the students at the same time as this one were delivered using a more traditional approach.

Evaluation of student reactions and views

At the end of each year of this study, a questionnaire was completed by 26 (1998/99) and 35 (1999/2000) students. In addition, a total of 14

students (8 in 1998/99, 6 in 1999/2000) were interviewed on a one-to-one basis. In both cases the interviewer was an academic who had not taught or met the students before. An aim of the interviews was to elicit views on the module content and information on how individuals had made use of the electronic material. For the 1998/99 academic year delivery of the module was for the first time based around electronic materials which at that time comprised 12 sets of World Wide Web (www) pages, containing text- and image-based information. Each set was supplemented with tutorial exercises/assessments requiring the use of pen and paper. In addition, details of the course syllabus, the module learning outcomes, coursework, past exam papers and some model answers were also available to students as were a range of Internet links to relevant resources.

A majority of the students interviewed (11/14) had used the materials as a supplement to attendance at timetabled classes. The other three were all mature students with significant external commitments, which included either the need to work to earn and/or significant responsibility for a young family. These students had used the materials essentially as an alternative to timetabled classes, attending only when specifically asked to do so. In academic year 1999/2000 the evaluation also included student-led discussions with two separate groups of students (ten students per group) all of whom had completed the module. In all cases, feedback from students was obtained after the final exam but before they knew their final mark. In 1999/2000 the electronic materials referred to above were supplemented with new tools that comprised around 18 multimedia tutorials (see below) and a set of computer-based interactive tests.

Student access to the World Wide Web and email

Part of the questionnaire sought purely statistical information (e.g. how many students had PCs at home?) and was designed simply to assess the capability of the cohorts as a whole to cope with the technology-based approach in terms of availability of hardware. This was particularly important in the 1998/99 academic year when it was only possible to hold two of the classroom sessions in computer laboratories. The www material was also provided to the students as a set of HTML files together with the tutorials on a floppy disk, to enhance access. In 1999/2000 the introduction of multimedia into the tutorials meant that it was necessary to distribute the materials on a CD, rather than a floppy disk.

In 1998/99, 65 per cent of the students had access to a PC outside the university and 57 per cent stated that they regularly accessed the www from somewhere other than the University of Westminster. Only 50 per cent said that they used email on a regular basis. Table 1 compares some of the figures

Table 1 **Comparison of student access to hardware and student experience of email and the www in academic years 1998/99 and 1999/2000**

	Academic year 1998/99	*Academic year 1999/2000*
Students with regular access to the www from a location outside the university	57%	67%
Students with regular access to a PC outside the university	75%	96%
Percentage of PCs of Pentium grade	66%	100%
Students making regular use of the www in their studies	46%	95%
Students using email on a regular basis	50%	95%

quoted above (together with some others) with those obtained a year later (1999/2000). The conclusion to be drawn from the data in Table 1 is that 'off campus' access to and use of basic hardware and software is increasing among the students taking this module. If repeated across subject disciplines this may go some way to alleviating the concerns of some that the use of, for example, the Internet, may disadvantage a majority of students.

Accessibility of module content: the overall view of the students

In both years a clear majority (75–80%) of respondents to the questionnaire agreed that it was useful to have had access to the entire module content at the start of the semester. Most made the point that it was very helpful to have as much of the materials on either a floppy disk or a CD as this enabled working without a network connection possible. Provision of the electronic material on floppy disk or CD is important, given the fact that around one-third of students did not have regular access to a networked PC off-campus.

Students were asked whether they thought that access to the on-line material prior to the start of the module would have been advantageous. A minority held the view that such access would have given scope for prior background reading and preparation for the module. Some students believed that prior access would give an opportunity to decide whether the module was really for them. However, a majority stated that they saw little

point in having the module resource materials available in advance, mainly citing lack of time to do any work prior to the start of the semester. The interviews and discussions revealed that, although students very much appreciated the resources the majority did not see their availability as a reason not to attend classes. It was, however, noticeable that attendance as a whole was higher (typically 80–90% at peak) in 1999/2000 than in 1998/99 (typically 60–70%). Some of the reasons cited for non-attendance by those who did not attend regularly are listed in Table 2.

The reasons cited for non-attendance warrant further work. It would, for example, be interesting in the future to attempt to determine the relationship between non-attendance and performance on the module.

How students used the module materials and tools

Students were encouraged to work through the Web-based materials before classes and to use email to ask specific questions that might help form the basis for the next timetabled classroom session. In the 1999/2000 session classroom activities were more focused around the interactive tutorials run either from the CD or directly via the network. Evidence obtained via the student-led discussions indicated that few students used the electronic materials significantly prior to classes. This was supported through the student-led discussion in which only five students (of a total of 20 participating) had regularly read or used the material before a timetabled class. Some described using the learning materials in advance of timetabled sessions to 'prepare', until coursework on other modules intervened. Collectively, the students interviewed felt that availability of the on-line materials helped with developing an overview of the timetabled classes and that this tended to increase their chances of understanding a topic in class.

The majority of students were clear that Web-based resources and tools should be used to supplement and not replace face-to-face activities (75% stated this on the questionnaire). Most of the students interviewed referred

Table 2 **Cited reasons for non-attendance**

Reasons cited by students for non-attendance at timetabled classes
Significant external commitments (e.g. young family or prolonged illness)
'I prefer private study – more beneficial to me'
'I had already covered the notes – gave me time to study for other modules'
'I attended when I needed to'
'The disk is the only thing needed'
'Most of the material on the Web – nothing new to learn in class'

at some point to listening more during class, whereas markedly fewer referred to a need or desire to contribute actively to face-to-face discussions that involved the tutor. Several of the students who placed importance on listening made the point that the availability of the module Web resources had an impact on their experience during classroom sessions. As one student put it, 'I didn't have to panic about writing it all down and was therefore able to listen more'. Another felt that using the Web resources aided understanding during timetabled classes, whereas another stated that 'the Web resources helped fill in the gaps when I switched off in a class'. All of the students interviewed felt that Web-based resources should be used more widely on the degree course.

In both years almost all respondents to the questionnaire stated that they had printed the electronic material, hardly ever reading 'on screen'. In the 1999/2000 session the multimedia tutorials could not easily be printed and this was highlighted as a major concern by many completing the questionnaire and reinforced by comments made at the interviews. Four students who were interviewed had printed off as much of the material as they could right at the start of the module. Others stated that they printed the material gradually, having decided by viewing on screen what they thought they needed. Two students interviewed had noted that reading on screen was uncomfortable and limiting as 'one could not annotate and individualize what was there', and one dyslexic student noted difficulty in concentrating on the computer for long periods (which induced queasiness). However, the majority of students who contributed via the interviews or the discussions were not unduly concerned by spending periods of up to 45 minutes at a time in front of a computer screen. This suggested that a failure to use the materials significantly prior to classes was not due to reasons associated with either ease of access or on-screen use of the materials. This is further supported by the positive comments about the visual appeal and impact of the materials, made by the majority of students via the questionnaire. However, although students appreciated the use of colour, especially within diagrams, several observed that this tended to make the printing of some of the course notes difficult due to the lack of availability of colour printers.

Regardless of the way in which the materials and tools were used, the majority of students interviewed stated that they attended classroom sessions as often as they could. In previous years (prior to 1998/99) the module had typically comprised 12 timetabled sessions of 3–4 hours duration. Normally, this has been broken down to around 24 hours of lecturing (reduced to 12 hours in 1997/98), 6 hours of group tutorial work and two 4-hour laboratory sessions. Classroom contact (excluding laboratory classes) time with the students taking the module was not significantly

reduced but, apart from laboratory class contact (a total of 8 hours), was used solely for tutorial/summary type sessions around a particular topic. In 1998/99 the classroom sessions comprised a brief introduction to the topic of the week by the tutor followed by small group work on problems/scenarios related to the topic of the week. A similar approach was taken to classroom sessions in 1999/2000 with the major difference being the availability in that year of the multimedia tutorials to support student work on the problems/scenarios presented. While students worked in groups the tutor spent as much time as possible providing feedback to small groups or individuals on previously submitted coursework.

A small minority of those interviewed only attended classroom sessions when told that they must do by the module leader (4 of 12 sessions). All of them believed that they learned most effectively by reading, tending to use books and articles to make sense of notes and fill in gaps. All made reference to the fact that they found note-taking during classes difficult (either because it becomes tiring after prolonged periods or because of the difficulty in absorbing ideas at the same time). Overall these students all felt that they were better prepared for the exam in this module compared with other modules.

Learning style and approach

The questionnaire gave respondents the opportunity to describe their learning approach to the module. However, most responses were very brief and the bulk of information on learning approach came from the interviews with individual students and particularly the student-led group discussions. The latter provided an insight into the general learning approach taken by students on the courses in biosciences and how the approach differed for the Web-based module. There was no doubt that the majority of students on the courses spent most of their time compiling as many learning resources (notes from lectures, copies of articles and book chapters) as they could, supplementing these with information gathered in 'hand-outs' given during classes. In general, students stated that compiled learning resources were not used significantly during the semester except in circumstances in which their use was required for an assessed piece of coursework. If not needed to help with coursework, compiled learning resources would probably not be looked at after a classroom session until 1–2 weeks before the final examination. The major difference in approach with the Web-based module was that few notes were taken during timetabled classes and as a consequence many students agreed that they were able to listen more effectively during classes. The Web-based material was used in a similar way as conventionally obtained course material for revision prior to the examination.

Just as with other compiled learning resources, the multimedia tutorials and short-answer diagnostic tests were little used during the semester. The interactive tutorials were authored using a multimedia package called Mediator (Matchware Ltd). Typically each tutorial was designed to take between 20 and 30 minutes to work through and comprised a series of screens containing a mix of text, diagrams and areas for direct student input. Movement between screens was in all cases linked to some positive student input (e.g. a mouse click, hovering over a particular part of the screen, entering text or data) thus engendering the tutorials with some user driven interactivity. The Web-based on-line assessment tool used (Question Mark Perception) provided students with a series of formative tests related to the Web-based resources and the tutorial topics. These tests were automatically graded, provided instantaneous feedback, and were taken via a networked computer.

During classes students tended to focus on the www material that essentially mimicked lecture notes, largely ignoring the interactive materials. As one student put it, 'the majority of us went from not using the electronic material at all during the semester to an almost frantic use of the Web-based material for exam revision'. Very few students used the tutorials to help complete correctly the short-answer tests associated with each timetabled session. Students that did try the short-answer tests during the semester tended to try them only once unless they scored a very low mark in which case they tended to repeat them in order to obtain a higher mark. Many students were honest enough to admit that whenever they needed to and could, they would use the timetabled classroom sessions in the computer laboratory to complete coursework for other modules or read their email.

Not surprisingly, the interviews revealed a range of ways in which the students thought they learned best. While there was a unanimously stated need among those interviewed for face-to-face interaction with a tutor, the reasons why this was deemed essential varied (see Table 3).

Table 3 **Examples of the range of student learning approaches and why face-to-face encounters with staff were considered to be important**

Student learning style	*Need for face-to-face learning*
Listening during lectures	The strong learning environment of face-to-face discussion
Listening and talking during discussions	Seeking answers to certain questions
Reading notes and books after lectures	Facilitate a question and answer approach
Reading, hearing and discussing	To hear the 'extras', e.g. examples, anecdotes, current issues

The lecturer's experiences

At the start of the module in 1998/99 the students were clearly wary about the way in which the module was going to be delivered. They seemed particularly worried that there would be little or no lecturing and that the module content (as they saw it) was being handed to them in one instantaneous move. Indeed some students were so worried that the issue was raised at a course committee meeting by a student representative.

In the first few weeks a reasonable number of email messages were received from students, mostly posing questions about the on-line material. Indeed, at the start of the module, timetabled classroom sessions were to some extent informed by such messages. At the end of the module, however, it became clear that only a minority of the cohort (between 15 per cent and 25 per cent over the two years) consistently used email in this way and in fact the majority sent no messages at all. Most of the questions received via email, however, were extremely good ones, indicative perhaps of a greater degree of thought on the part of the students who had taken the trouble to pose them. Replying to the messages did not seem especially time-consuming and the module leader stated that he had derived considerable satisfaction from being able to provide students with answers almost whenever they wanted them. This was also the case at around examination time, when the frequency of email messages increased again.

During timetabled classes it was noticeable that several students were referring to the electronic material (which they had printed off) as discussion around a particular topic progressed. Overall, however, even from the beginning, few students actually helped to set the agenda of a timetabled class by raising issues in class. As the semester progressed, the frequency of email messages decreased to virtually zero. Consequently, as the module went on, the module leader reported that he found himself losing confidence and slipping further and further back into a 'tutor-led' approach to what often became shortened timetabled sessions. Via the questionnaire, students revealed a range of reasons why they had not used email more frequently to contact the module leader (see Table 4) all of which were cited at approximately equal frequency. Five of the fourteen students interviewed had used email regularly to stay in touch, citing this as a useful way to ensure both contact and a response.

The issue of email use by undergraduates is an important one. Most of the students who used email to contact the tutor found it of value in their studies. Given the fact that 95 per cent of students revealed that they used email on a regular basis (see Table 1) it is surprising that more were not moved to make use of this alternative means of support.

Comments received from students during feedback suggest that

Table 4 **Summary of why students did not use email more frequently**

Reasons cited for not using email to communicate with the module leader
Difficulty finding a computer to use outside timetabled classes
No difficulty with understanding the module content
Queries dealt with during classes or by using other literature sources
Too busy with coursework
Dislike of the impersonal nature of email communication

becoming fully involved in the module was made harder by the fact that other modules were being delivered in a more traditional way. Students were simply not used, and therefore not comfortable, with being a partner with the module leader in this 'strange' learning approach. There was also a tendency to skip the Web-based module classes first when coursework deadlines approached. This was because the availability of the electronic materials was perceived by students to be a 'foolproof' back-up for non-attendance. These problems could perhaps be overcome by effectively introducing students into the idea of more independent learning when they first start their course and by encouraging other staff to allow students to exercise their independence. This conclusion was reinforced through the student-led discussions. In these, around half of the students stated that they preferred a standard lecturing approach to module delivery. However, continued discussion revealed that this was mainly because most were not used to working extensively with computers or with computer-based learning materials. However, the majority saw the advantages that use of the electronic materials had to offer, and thought that they would have had a more positive attitude towards this module if similar methods had been introduced gradually during their first year at university.

Effect on performance

Most students interviewed over the two-year period did not think that the electronic materials or approach to module delivery would change their level of performance in comparison with other modules. A few of those interviewed considered that it would be easier to take the exam (in comparison with other modules) as the materials were readily available to read, essentially representing revision notes. Over the two-year period 3 of 67 students failed the module with 5 of 67 scoring less than 40 per cent in the examination. The average examination mark in both years was

around 52 per cent compared with the previous year's (1997/98) 42 per cent.

Discussion and conclusions

In both years of this investigation all forms of feedback used showed that students had valued the availability and accessibility of the electronic materials. Almost all students, however, saw the electronic material as a supplement to classroom events and definitely not as a replacement. Other reports of the introduction of forms of flexible learning approaches have highlighted the apparent comfort that students obtain from the availability of resource materials. For example, after using a required reading approach to reduce the number of lectures Healey and Ilberry (1994) report that 'students like to have a course text that covers the majority of the course material'.

It was clear that the approach taken to module delivery in both years was an unfamiliar one to the students. Their main diet was a mixture of lectures and tutorials with the emphasis firmly on lectures. It was noticeable that the worries (as evidenced by issues raised at course committees) of the 1999/2000 cohort were less than those of the 1998/99 group. This may be due to a generally increasing familiarity among students of the use of computers for learning. Alternatively, the fact that the 1999/2000 classes were all based in a computer laboratory may have been significant. It has been reported elsewhere that the use of computers to deliver courses in a traditional university environment inevitably holds a novelty value that, at least for a while, promotes student interest in the material (Kulik and Kulik, 1991).

The strong support from students in both years for classroom events that focused on activities related to the course material and discussion, rather than lectures, could be related to their general approach to learning. Clearly, their focus was resource collection and storage, unless coursework dictated a need for them to use the resources and seek more complete understanding. Whilst many students said that they valued the lecturer in the classroom, many also indicated that they found classes too full of 'chalk and talk' suggesting that their main interest in seeing the lecturer in the classroom was often simply tied to the model of the collection of resources for storage.

That the students could be persuaded to engage more fully in classroom sessions was quite evident. In 1998/99 the first five weeks of the semester saw no significant reduction in classroom attendance and sessions were typified by a greater degree of student-led discussion and involvement. The quite rapid decrease in student involvement was shown by the evaluation to be due to their need to finish and submit coursework for other modules.

This finding is in line with research that has shown how students will put their main efforts into those parts of a course that are assessed (e.g. Carpenter, 1975; Chansaker and Roundtray, 1980). A similar decrease in attendance occurred in 1999/2000, again as a consequence of coursework demands.

A small percentage of students in both years hardly ever attended classes because they considered that the electronic materials provided them with all that they required to pass. Using interactive text-based materials to promote a flexible delivery mode on an education studies module, Dunning (1997) also reports on the 'opting out' of a proportion of students. In 1998/99 the electronic material provided had no inherent interactive capability. Despite this, 'self-confessed' independent learners in that year found that the materials provided the necessary framework for independent learning and understanding of the subject matter. It was clear, however, that the small minority of very independent learners had tended to approach the use of the materials in a disciplined and structured manner and had not simply used the resource materials when coursework had to be done.

For the 1999/2000 academic year the electronic material was supplemented by an on-line assessment tool and by interactive multimedia tutorials. Coupled to the availability of computer laboratories students now had a more complete range of learning activities which they could undertake using a computer. However, the evidence obtained from the interviews and student-led discussions suggested that most students made little use of either the tutorials or the short tests during the term, coming to classes primarily to hear the short introduction to a topic and to look through and possibly print the electronic materials that most resembled lecture notes.

In summary, there seems little doubt that the mix of electronic materials made available was sufficient to enable students to achieve the learning outcomes of the module. The lack of any lectures appears to have had no negative effect apart from causing a handful of students to express a temporary worry that they were being 'cast adrift'. It also seems clear that students like the provision of Web-based resources as this helps to feed their desire for learning resources that can be stored for later use. That students still largely attended the classroom sessions is also testament to the importance that they place on collecting useful resources (or as one student pointed out 'titbits of information') for the end of module exam. Perhaps as a consequence of their perception of higher education as an information-gathering exercise, students generally did not prepare for or work as hard in classroom sessions as they could have. As a consequence there were too few instances of the independent, problem-solving student group work and discussion from which even greater understanding could have been derived.

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References

CARPENTER, N. (1975) 'Continuous Assessment and Student Motivation in Management Studies', *International Journal of Electrical Engineering Education* 71(2): 205–10.

CHANSAKER, B. A. & RAUTRAY, V. (1980) 'How Relevant is Continuous Assessment? A Business Studies Experience', *Assessment and Evaluation in Higher Education* 6(1): 49–56.

COLLIS, B. & MOONEN, J. (2001) *Flexible Learning in a Digital World: Experiences and Expectations (Open and Distance Learning Series)*. London: Kogan Page.

DUNNING, L. (1997) 'Don't Lecture Me About Flexible Learning! Being Flexible in the Delivery of an Undergraduate Education Studies Module', in R. Hudson, S. Maslin-Prothero and L. Oates (eds) *Flexible Learning in Action, Case Studies in Higher Education*. Birmingham: Staff and Educational Development Association.

HEALY, J. M. (1998) *Failure to Connect*. New York: Simon & Schuster

HEALY, M. & ILBERY, B. (1994) 'Using a Course Textbook and Study Guide to Support Students While Reducing Contact Time', in S. Cox and G. Gibbs (eds) *Course Design for Resource Based Learning – Social Science*. Oxford: Oxford Centre for Staff Development.

HUDSON, R., MASLIN-PROTHERO, S. & OATES, D. L. (1997) *Flexible Learning in Action, Case Studies in Higher Education*. Birmingham: Staff and Educational Development Association.

KULIK, C. L. C. & KULIK, J. A. (1991) 'Effectiveness of Computer Based Instruction: An Updated Analysis', *Computers in Human Behaviour* 7: 75–94.

SALPETER, J. (1998) 'Taking Stock: What's the Research Saying?', *Technology and Learning* 18(9): 24–5, 28–30, 32, 34, 36, 40.

SAUNDERS, G. (2000) *Getting Started with On-line Learning*. Winchcombe: Learning Partners.

SAUNDERS, G., RUMPUS, A. & MCSHANE, D. (1999) 'An Evaluation of the Use of the WWW for Module Delivery', in P. Marquet, S. Mathey, A. Jailet and E. Nissen (eds) *Internet Based Teaching and Learning (IN-TELE) 98*, pp. 545–50. Frankfurt: Peter Lang.

WENGLINSKY, H. (1998) *Does it Compute? The Relationship Between Educational Technology and Student Achievement in Mathematics*. Princeton, NJ: Policy Information Center, Educational Testing Service.

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