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Abstract

Modern day mass higher education presents challenges for both learners and teachers. Whilst digital resources, Web 2.0 technologies and online connectivity can add significantly to the learning opportunities of 21st century students, many cross programme Virtual Learning Environment (VLE) provisions remain collections of somewhat disconnected and basic materials.

In its early development, organised e-learning has generally been the province of specialist programmes and individuals championing the new technologies. However along with the adoption of technology enhanced learning, there is a growing need to develop, design and embed more fundamental and far reaching strategic approaches that embrace the core of traditional university learning and teaching programmes.

This paper focuses upon a large undergraduate core module and discusses the implications of a practice based case study which explored how traditional campus based undergraduate learning and teaching could be redesigned and enhanced by the addition of online technology and e-pedagogy. It considers aspects of both pedagogical and technological design and examines how a VLE can support learners and teaching teams. Findings showed that students were extremely positive about the mix of onsite and online learning. They saw anytime, anywhere access as fundamental, and valued the flexible access and collaborative opportunities offered by Web 2.0 and mobile resources. Considerable operational benefits arose in supporting teaching teams and student marks increased. Drawing upon lessons learned from practice, and feedback gained from students and teachers, the paper examines how the approach may inform future curriculum delivery and programme specification. It considers the contribution that blended learning may make in addressing the needs of 21st century learners in mass higher education, and reflects on the implications of the case study in terms of aspects of design, practice and strategy.

0031 Technology enhanced learning in 21st century mass higher education. Aspects of design, practice and strategy for a necessary step change

Introduction

Taking a case study approach, this paper looks to explore the contribution that blended learning can make to 21st century mass higher education. It uses the findings of a practice based case study to examine how traditional on-campus learning and teaching might be redesigned to embrace online technologies and e-pedagogy. It sets out to identify good practice that may enhance the learning and teaching experience of both students and teachers, and inform future programme and organisational development.

The case study focused on a large, business school based, undergraduate core module, and the adaptation of its traditional learning and teaching design to incorporate a mixture of online and onsite resources and activities. Module pedagogy was underpinned by the principles of constructive alignment (Biggs 2003), and used a framework consistent with Mayes Conceptualisation Cycle (Mayes & Fowler 1999) to integrate on-site and on-line elements across lectures, seminars, directed study, assessment and feedback.

The work was evaluated by collecting data using online questionnaires, focus groups, programme committee and module team meetings. The paper will provide an account of the methods and e-pedagogy employed in the case study module and then discuss and evaluate the blended practice in terms of its impact on learning and teaching. Within the analysis and conclusions will be a consideration of the contribution blended design and delivery might make towards addressing some of the current issues that studies have identified within modern day mass higher education.

Background

Higher education has been in a period of considerable change since the early 1990's. There has been a transformation in the way universities are financed and organisational objectives have shifted to focus on the generation of new income streams and increasing accessibility and participation. The resulting growth in mass education and international markets has generated the need to review the infrastructures and methods that support teaching and learning. Modern day mass education presents challenges for both learners and teachers. "The coming of mass higher education has brought larger classes, more diverse students and leaner unit costs, but keener interest in teaching quality and graduate attributes" (Entwistle, Hounsell et al. 2007, 1).

In parallel to such change we have seen the unprecedented growth in information technologies and the development of a whole new communication media and culture. Web 2.0 technologies have impacted fundamentally on the way we communicate and are changing the expectations of learners. Whilst universities have invested heavily in technology, there remains the need to adapt pedagogical approaches to

make the best use of this new infrastructure. Despite the opportunities and expectations it can remain difficult to change well established traditional methods. Laurillard (2002, 3) states “Higher Education cannot change easily. Traditions, values, infrastructure all create the conditions for a natural inertia.” The recent Benchmarking and Pathfinder Programme has provided a valuable opportunity for institutions to take stock of their own e-learning provisions and practices. However it is necessary that they now translate this into further action for self-improvement and evaluation (JISC Benchmarking and Pathfinder Programme 2008).

In his report *The Future of Higher Education Teaching and the Student Experience*, Ramsden (2008) identifies ICT as a key contributor to evolving expectations. However whilst digital resources, Web 2.0 technologies and online connectivity can add significantly to the learning opportunities of 21st century students, key messages about e-learning from the sector indicate many cross programme VLE provisions remain collections of somewhat disconnected and basic materials (Adamson and Plenderleith 2008). In her interview at the JISC Innovation Forum 2008, Sarah Porter endorsed the view of HEFCE Director John Selby, that the most important challenge now facing higher education was getting the work of experts and developers to the sector as a whole (Porter 2008). Whilst many institutions can point to examples of excellent practice, the quality of cross programme e-learning is often very inconsistent. More generally there is a need for the development of programme wide e-learning specifications designed to assist in the alignment of programme learning objectives and the student journey.

Whilst there are many theoretical models, those offering ‘learning as guided construction’ probably best fit with current scientific ideas about learning. Guided construction gives the student an active part in their learning. It also gives an important role to external guidance, whether from a teacher, online resources or other learners. (EDNER Project Paper 1 2002)

Within the field of e-learning we can identify three significant models of learning. These are ‘Mayes Conceptualisation Cycle’, ‘Laurillard’s Conversational Model’ and ‘Salmon’s Five Stage Model’. These models all put high value on active student learning and are in the ‘constructivist’ mode. The concept of constructive alignment has been one of the most influential in recent higher education learning and teaching theory and practice.

It is important when developing e-pedagogy to focus not only on developing materials but also on the learning activities that will assist students’ learning and meeting the learning outcomes of the course. This is particularly the case when supporting student centred directed learning. “Learning and teaching in higher education is shifting towards a more student-centred model, in which the learner’s cognitive activity is acknowledged to be much more important than teachers’ historic pre-occupations about syllabus coverage. Educational technology development projects need to take this into account.” (EDNER Project Paper 3 2002, 1).

Mayes Conceptualisation Cycle (Mayes and Fowler 1999) stated that learning with technology involved a three stage cycle of; conceptualisation, where students are exposed to other people’s ideas or concepts; construction, where students apply these new concepts in the performance of meaningful tasks; and dialogue, where new concepts are tested during conversation with tutors and peers. Mayes stresses that focusing too much on primary stage ‘courseware’ will not provide sufficient support for learning. In order to ensure that learners are supported at all three levels of the conceptualisation cycle, a variety of teaching methods need to be within the course design. High level learning will not take place until there is two-way dialogue. This can only take place at the tertiary level—either using courseware or face-to-face methods of learning which are integrated with technology enhanced teaching.

The ESRC funded Enhancing Teaching and Learning (ETL) Project has enabled research into contemporary teaching and learning environments. The project aims were to investigate what makes for effective teaching and learning in contemporary higher education and to use the findings to help bring about improvements in students' learning (Hounsell et al 2005). The challenge was to respond to the impact of such issues as larger classes, increasing student diversity and learner unit costs, whilst recognizing the need for greater teaching-learning quality and accountability. One element within this mix was the impact of information and communication technologies on the learning and teaching process, supporting both the provision of learning resources and communication between university teachers and their students. The project employed a set of key concepts which included the learning and teaching environment, constructive alignment, subject based thinking and practice and threshold concepts.

Alignment is seen as a cornerstone within the design of effective learning and teaching systems. In his model of constructive alignment Biggs (2003) applies a systems approach to learning and teaching, with the elements of the system all working towards the achievement of clearly defined objectives through the construction of learning. In this view the effectiveness of the system in achieving the learning outcomes will depend upon the alignment, or goodness of fit, of both the teaching and learning activities and the assessment methods. The implication is that such systems need to be deliberately planned and designed around these elements.

Whilst this representation of Biggs' model provides a solid conceptual framework, it may be argued that it is an oversimplification, and that the greater complexities embodied in the wider teaching and learning environment cannot be ignored. Hounsell & Hounsell (2007, 94) observe "what is also evident from surveying the burgeoning literature on teaching-learning environments is the sheer breadth of potentially relevant contextual factors, embracing not only departmental, subject and institutional influences but also wider social, cultural and political ones". McCune & Hounsell (2005) extended the scope of their study beyond teaching, learning and assessment activities to include the variety of resource with which teaching staff may interact. These encompassed curriculum aims, scope and structure; teaching-learning activities and learning support; assessment, guidance and feedback; course organisation and management; and students' backgrounds, knowledge and aspirations. Given this much wider scope they used the term 'congruence' rather than alignment to explain the degree of harmony achieved between high quality learning outcomes and the elements and strategies employed.

Hounsell et al (2005) found there were issues in the level of engagement with undergraduate students. They also identified differences between teaching and learning environments across first and final years of study. Final year modules tended to offer more student choice and have more varied approaches to teaching and assessment. They also had smaller class sizes and 'better' resources. Perhaps this is not altogether surprising given the extra demands put on first year modules in terms of scale, student diversity and unit costs.

Deep and surface learning approaches are often seen as ways of measuring student engagement and the quality of learning. The ETL Project identified 'organised effort', how students organise their study and whether they use their time effectively, as important in enabling students to achieve deeper learning. Scores for deep approach and organised effort were higher, and scores for surface approach lower, in final year courses. Another factor influencing this was the compulsory nature of core modules and the diversity of the student body. Issues such as perceived subject relevance and prior knowledge can effect student motivation and engagement.

In general the dynamics of learning and teaching will vary across different disciplines and settings. Hounsell et al (2005) found that the learning approaches supporting deep learning were markedly different across the four subject areas studied. The study by Reimann (2004) of economics learning and teaching environments found a number of issues. These included tensions between, students with and without prior subject knowledge; students intending to major in economics and students taking it only as a compulsory foundation module; and gearing the curriculum to the majority leaving minority groups overstretched or under-challenged. There were also concerns around disciplinary norms and student diversity, and difficulties interpreting assessment tasks such as exams and assignments. Many of these concerns can also be identified in finance and accounting learning environments.

As evidenced by the National Student Survey assessment and feedback is a common area of concern for students. The ETL Project found in terms of feedback there was variability in students' experiences across the subjects and course settings. A wide range of concerns expressed uncertainty about expectations for set work, dissatisfaction with the variable quantity and helpfulness of feedback comments from staff, and frustration with delays in receiving feedback. (Entwistle, Hounsell et al. 2007).

This research will explore further the issues of organisational change, pedagogical practice and contemporary learning and teaching environments.

Method

The work examined in this paper was undertaken within the author's own institution and as part of his own practice. The development of the blended e-learning pedagogy involved an ongoing process of diagnosis, planning, action and evaluation. This took place over a three year period with the broad objective of identifying effective learning and teaching strategies through the use of technology. The strategy adopted had similarities to action based research and was underpinned by a philosophy embracing a mixture of pragmatism and interpretivism. Given the practitioner based method within an academic setting, the approach may also be seen as falling within the realm of applied practice-based educational research as defined by Furlong and Oancea (2005).

The practice based nature of the work lent itself to a case study strategy which was at the centre of the research method. Data was collected using a mixed method, making use of a questionnaire to gather quantitative data, and focus groups to gather qualitative data. Whilst the main time horizon of the questionnaire was cross-sectional, the focus group feedback was received at various stages over the three year period of developing practice. The data collected was subjective in so far as it focused on the values and opinions of students and teachers. This led to an interpretative and inductive approach in the analysis and evaluation of the findings.

Whilst there are limitations associated with a single case study strategy it was justifiable in this instance because it provided an opportunity to investigate new and developing practice. It was also typical, in the sense that the case study exhibited many of the more general issues found in contemporary large module teaching and learning in mass education.

The questionnaire was constructed to collect data from students regarding the module pedagogy. It was decided to build the questionnaire in the form of an online survey made available at the year end via the module site on the VLE. The questionnaire was released immediately following the close of teaching in a three week window between completion of semester two delivery and the year end examination. This was a time likely to gather the maximum response as most students would be using the VLE to support their revision. The survey was kept relatively short and it was made clear all responses were anonymous.

In addition to the questionnaire, qualitative feedback was obtained from both students and teachers via programme committee meetings, module team meetings, focus groups and discussion sessions within module delivery.

Contribution

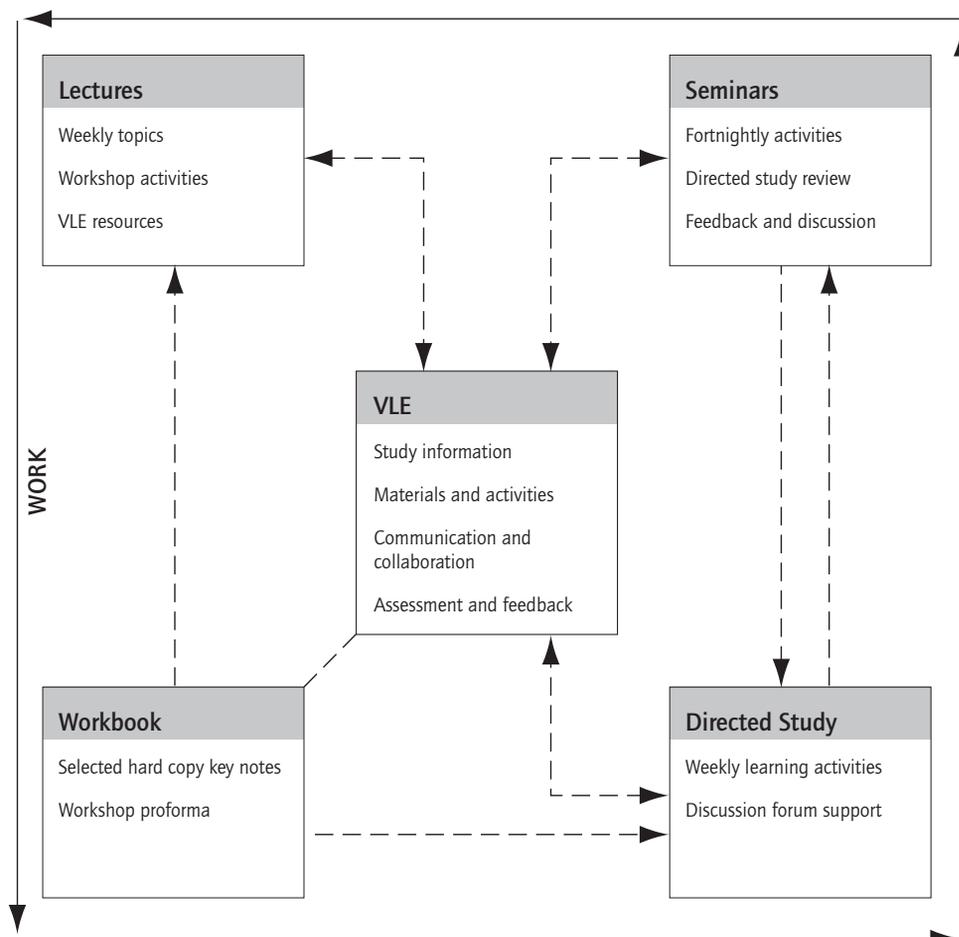
The case study focused on a business school core module that provided common input in financial accounting for 600 first year undergraduate students from a variety of programmes, including business studies, marketing, tourism, strategy and human resource management. It was year long and delivered over 24 weeks. There were three mass lecture cohorts of 200 students each, and approximately 30 seminar groups containing 20 students. Contact time for an individual student was 36 hours a year, made up of a 1 hour weekly lecture and a 1 hour fortnightly seminar.

The teaching team consisted of eight academic staff from the accounting and finance subject area. In addition to full time, the module was offered part time and franchised overseas. However the study data did not include franchise partners.

The VLE was fully integrated into module learning and teaching. It was presented as one of five key learning resources (Figure 1).

Within the on-site and on-line design a conscious effort was made to align curriculum objectives and intended learning outcomes to learning and teaching activities and assessment tasks. Using a framework consistent with Mayes Conceptualisation Cycle, the learning activities embodied in lectures, directed study, seminars and online learning were brought together into a 'blended learning cycle'. Lectures were followed by active student learning through on-line directed study activities. This directed study was at the heart of the learning process. Teacher student collaboration and

Figure 1: Blended learning pedagogy—onsite and online learning and teaching



feedback was then provided in the follow up seminars over a fortnightly cycle. For diagnostic and formative purposes, suggested answers were also made available online each week and students were expected to assess their progress by comparing and amending their own work. This formative feedback mechanism focused on increasing large group formative assessment within a manageable overall workload.

In addition to directed study activities, students were expected to use the e-materials and media presentations to follow up lecture topics, and reflect upon and consolidate their learning. Students were also required to complete interactive online computer assisted learning modules.

Support was also provided for formative and summative assessment. The mid year assessment was a multiple choice exam and this was aligned to a series of online formative progress tests with feedback during the first semester. Questions in the final exam align to semester two directed study and seminar activities. Preparation for this assessment was supported by guidance sessions and materials that explored previous year questions and marking criteria.

The questionnaire was completed by 201 students. This was approximately 40% of those studying the module in full time mode.

The students were generally supportive of online learning. 77% of students agreed or strongly agreed that the VLE had helped them study the module, whilst only 12% disagreed.

For the blended pedagogy to be effective, students needed to access the VLE regularly and preferably on a weekly basis. Survey findings showed 79% of students visited weekly or more frequently, 16% at least every two to three weeks and only 5% less than that. It was interesting to see that only 2% of students stated that they did not find the VLE easy to use. This did not necessarily mean the student fully understood the best ways to use the VLE to support their study. This was why induction and tutor led example was so important. A clear distinction needed to be made between operating the VLE and managing the module e-pedagogy.

The robustness of the technology was fundamental to the success of online practice. 13% of students reported having experienced technical difficulties. Whilst this was encouraging it should be noted that, from a teaching perspective, a number of staff did feel that the platform was not always reliable.

Students were asked to rank the relative usefulness of lectures, seminars, the VLE and workbook. Whilst all four areas scored 19% or greater, it was apparent that students put the greatest value on seminars (30%) and the workbook (33%). This was encouraging as seminars played a key role in support and feedback for active learning activities. On the first level of ranking the VLE and lectures seemed equal, however third and fourth level rankings showed lectures were the lowest rated elements. Some tutors felt this supported concerns that the blended approach undermined lectures leading to poor attendance.

In terms of student usage of the functional areas of the VLE, the content area was used the most with a score of 88%, followed by information 79% and assessment 71%. The least used area was communication at 45%. This pattern was reinforced by the student's 'usefulness' ratings, where content was a clear winner and discussion/communication the loser. These responses may have reflected the blended design as development had initially focused on content, information and assessment. Directed study was managed through a 'directed study forum' and students were encouraged to use this forum to participate in peer support. However student contributions were minimal and this may be a characteristic of campus based environments. It is recognised that for students who are based on campus, a major part of their learning comes from the everyday face-to-face social interactions (JISC InfoNet 2005).

Students were asked directly if they felt online support affected their attendance. 67% said not, and a further 7.5% stated that their attendance actually improved—possibly through increased involvement and better understanding of the overall pedagogy? Nevertheless 23% did feel they attended less. 10% felt they attended fewer lectures, and more questionably 6% attended fewer seminars. Whilst this aspect can be viewed as disappointing it may underlie enhanced learning opportunities, as students felt that they benefited from having a greater choice as to how and when they studied.

Directed study was a vital ingredient in terms of active learning and the module's e-pedagogy. Effective feedback and reinforcement of learning through seminars was dependent upon this. It was encouraging that only 12% of respondents did not feel that the VLE supported their directed study well. This would indicate the blended learning process was successful overall. However of the remaining 88%, 26% were neutral in their response, implying there was still room for improvement in terms of the timely completion of directed study and seminar attendance. Assumptions can be wrongly made that first year students understand how to study and use the available resources. The teaching team believed it important to allocate contact time within the study programme to explain to students how best to use the resources and study routines.

Students were invited to attach up to twenty qualitative attributes to their blended learning experience. None of these questions were mutually exclusive and students were free to pick as many or as few as they chose. Students were most positive about access, independence, time saving and convenience. It is clear students appreciated anytime anywhere accessibility. There was also evidence of pedagogical awareness with students flagging enhanced learning, being in control, motivation, explorative and active learning. Whilst many of the negatives got low responses, they were still chosen by a few students who felt it time consuming or isolating.

Students were asked if they felt the need for online support was greater on large core modules in mass lecture mode. More than half said yes. It may be the case that students engage less through sheer size and anonymity, or lack of identity with subjects outside their main focus.

With regard to the balance of online and traditional teaching elements, 61% felt the balance was about right and 24% wanted more online learning. 14% wanted more contact time with tutors. The initial conclusion seemed to be that the overall balance was about right. However students had limited direct comparisons available and the module was more developed than others in their programme.

Feedback from teaching staff and students recognised the valuable role that the VLE could play in supporting the large teaching team and module delivery. Tutors thought the shared online resources offered significant benefits in co-ordinating and aligning their teaching. They felt the blended provision resulted in better organisation and forward planning. They found it helpful that teaching materials could be shared in advance, and then made available to students as required.

Evaluation

From the case study practice and feedback gained from learners and teachers, it was possible to identify aspects of design and practice that were seen as supporting contemporary learning and teaching environments.

The blended approach required the full integration of on-line and classroom environments. It was important that students understood the role of technology in their learning and the implications for their study strategies

and engagement in learning activities (Sharpe et al 2006). This was explained in the opening lectures. Students that did not understand their role as learners and the interrelationship between lectures, directed study and seminars, were generally more disorganised and ill prepared. Conversely students that followed the study routines were usually well organised, completed directed study work and were prepared for seminars. Ongoing integration was assisted by accessing online materials in class, previewing directed study activities and related online material. Teaching sessions were started with a brief reference to the online study plan to focus the topic objectives and learning resources. These techniques enabled students to remain familiar with the VLE and its functionality.

It was clear that issues of site design were important. Students found many VLE site structures within the wider provision confusing. The same type of materials could be in different places and materials difficult to locate. In response to this, the case study site design kept to a standardised structure with clearly labelled menus to assist navigation. Sections for materials, directed study and assessment were laid out to reflect the study plan, with course links to connect related learning elements. Consistent design was important when building across programme wide provisions and the student journey.

Prior to the blended approach the case study module had demonstrated many of the issues associated with large and diverse student groups that had been identified by the ETL Project. Entwistle et al (2007, 2) had stated, “the issues challenging first year courses included the risks of impersonality in large classes, inconsistencies between tutors where course teams were also large and diverse, and curricula that, while well suited to a majority of students taking a unit, could disadvantage or demote others with different aspirations or depth of background knowledge in the subject”. It was interesting to consider to what extent these issues had been addressed by the technology supported delivery employed in the case study.

It may well be that, under a mass education model, first year modules will be larger and more diverse, and congruence more problematic than in later years. It is also likely that student motivation and engagement will be at its greatest in the final year of study. However it is important to ensure that resources are equally rich at all stages of learning, and technology can offer a wealth of valuable support and opportunity in this direction.

It is necessary to understand and respond to the large class numbers that are now a feature of mass education. Trow (1973) recognised that a large scale shift from elite to mass education would have a significant qualitative and well as quantitative impact on university learning and teaching. The blended approach offered a framework of shared learning resources and activities within the VLE which was supported by online guidance. This significantly reduced inconsistencies in delivery across the large course team and improved the student experience. Within the case study module both teachers and students reported operational benefits in terms of coordinating the teaching team and delivery. The communal module site allowed seminar tutors to stay abreast of the lectures and directed study, align seminar delivery and share teaching materials across the team. Answers could be made available for teaching purposes prior to being released automatically to students.

Technology and e-learning helped engagement by involving the students more. The use of collaboration and social networking tools reduced impersonalisation allowing students ready access to tutors and supporting peer group contact and activities. Overall students saw anytime, anywhere access as fundamental, and valued the flexible access and collaborative opportunities offered by Web 2.0 and mobile resources.

One of the most valuable aspects of the blended pedagogy was its contributions towards ‘organised effort’. This supported and developed the

student's ability to manage their studies effectively, and contributed to them achieving deeper learning. The VLE provided an excellent medium in which to present the study programme and learning resources in an organised format. The student journey was supported using teaching and learning plans, study guides and appropriately placed links to the key study support resources such as online databases, library search tools and electronic journals.

Whilst the target was to enable students to be deep learners, a significant proportion of surface learning did take place across the first year case study module. Factors influencing this included the compulsory nature of the core module and the diversity of the student body. This meant that some students had prior subject knowledge, whilst others were studying with low interest as their main business specialism was elsewhere. Electronic resources played a valuable role here offering avenues of additional support for weaker students and further study for stronger students. This was achieved in part by the use of online and mobile media, podcasts, and RSS feeds. These provided targeted talks by tutors and subject experts. Students liked these resources, which they felt helped them engage with topics and reinforce key concepts. When designing the study programme there appeared to be benefits in aligning learning and teaching activities and learning outcomes with the programme outcomes and level, rather than being overly driven by discipline and profession based norms. This helped students understand the wider relevance of the study topics and the related threshold concepts within the subject.

There were many variables and it was difficult to measure in quantitative terms how successful the e-pedagogy was in promoting student learning. However the module mean scores did increase from 52% to 58% during the period the pedagogy was developed between 2004 and 2008. They were no other changes in curriculum and learning outcomes during this period that might have influenced this change.

Conclusion

The second half of the twentieth century has seen a remarkable expansion in student enrolments in higher education. The proportion of 18–21 year old undergraduates has tripled since the 1960s with over two million students studying at UK higher education institutions.

As pedagogy develops and higher education institutions invest in learning technology so expectations increase for traditional learning and teaching systems to adapt and change. Initiatives such as the JISC Benchmarking and Pathfinder Programme have made a valuable contribution to the sector's understanding of the current role and potential of technology in learning. However, many students still experience wide variations and inconsistencies in the way technology is used across their programmes to support their learning. In practice a significant core of university teaching relates to existing programmes, designed for delivery using traditional teaching methods, within environments and communities where students have a physical as well as a virtual presence. Such programmes put different demands on e-learning, and there is a need to establish standards in design and practice which support the growing number of digitally native students.

By examining the blended learning practice within the case study this paper has set out to identify and discuss the contribution that technology enabled online learning and e-pedagogy can make to the enhancement of student learning in contemporary learning and teaching environments in mass education. Whilst the pedagogy described may be limited by the characteristics of the case study group, it was felt that many of the approaches were sufficiently generic as to be of value to wider practice and design. It is believed that there is strong evidence that the approach can provide added value to the learning and teaching experience. Whilst it

is the author's view that blended learning can enhance all types of campus based teaching, it is suggested that such approaches can make a particularly important contribution in meeting the challenges posed by the large scale undergraduate programmes which prevail in mass higher education.

This work is currently contributing to the enhancement of school learning and teaching strategy. It has led to the establishment of school wide minimum standards. Aspects of the design and practice are also informing a blended learning framework addressing programme outcomes, differential study level strategies, group size and the student journey.

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