Using e-Learning to extend access to new populations of students and reduce cost of   programme delivery

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Abstract

This paper evaluates the Global Campus e-learning programmes offered by the School of Computing. The programmes are delivered to students at seven collaborative partner institutions located in China, Cyprus, Egypt, Hong Kong and Singapore. The same programmes are also delivered to students at our London campus. All programmes employ the same course management, assessment and quality-control procedures so that all students have an equivalent learning experience. These procedures comply with the standards laid down by the Quality Assurance Agency (QAA) of the Higher Education Funding Council of England (HEFCE). Recently a sustainability analysis was completed correlating programme income with staff salary costs for all programmes offered by the University. Using these figures we have been able to estimate the benefits of delivering the programmes with Global Campus e-learning materials in terms both of learning enhancement and cost reduction.

Introduction

The Global Campus project originated from the strategic decision of the University to expand its provision to meet the vast demand for British higher education abroad by offering e-learning supported programmes. These provide access to students who would otherwise be unable to benefit due to the prohibitive costs of studying in the UK. Existing programmes were converted for distant delivery by redesigning the instructional format to take advantage of information technology and by extending the learning materials to improve their quality. The important characteristics were that the development

- embraced entire programmes – so that students could complete their courses without having to change their learning style or location.
- was learner-centred – so that the impact of the physical absence of a human teacher was minimised.
- utilised a Virtual Learning Environment (VLE) – making students even more independent of location.
- provided scheduled synchronisation points – so that tuition and assessment requirements could depend upon occasional organised and supervised group activities.

The first programme was delivered in 2000 – an MSc in Business Information Technology (BIT), followed by an MSc in Electronic Commerce the following year. The BSc in Business Information Systems (BIS) followed in 2003 and a Foundation Certificate in Computing with Business in 2004. Currently approximately one third of the curriculum of the School of Computing Science has been developed in this format and within the Business Information Systems Group 22 out of 25 modules have been deployed for Global Campus delivery. Thus most of the faculty from the BIS group are engaged in the support of the distance learning delivery overseas.

Design and Development

Middlesex University measures programmes in *credit points* – a Bachelor's degree is worth 360 credits and a Master's is worth 120. Programmes are subdivided into topical *modules* worth 10, 20 or 60 credits. A credit represents about eight hours of learning time, and so Global Campus adopted the credit as our **unit**

of learning. The learning materials for each unit are organised into sections according to the SCATE pedagogical model [Figure 1.]. SCATE is an abbreviation of Scope, Content, Activity, Think and Extra – the headings of the different sections.

Figure 1: The Global Campus Learning Materials using the SCATE model

The *Scope* section provides the context and learning outcomes for the unit and lists the estimated time students are expected to spend on each type of learning activity. The *Content* section delivers the primary content together with a narrative pathway through the rest of the learning materials – directing students (via hyperlinks) to secondary content sources and specific learning activities in subsequent sections. The *Activity* section is the most significant for student learning. It contains activities which help students to reinforce the facts, concepts and techniques presented in the Content section. Feedback for each activity is incorporated into the material. Activities may be offline (i.e. paper-based) or online. Software for online activities is provided within the browser, the VLE or on a separate CD-ROM. The *Think* section allows the student to reflect, to share experiences with peers via a discussion forum, to make entries in a learning journal and to tackle review questions which serve to strengthen knowledge and understanding and to prepare for subsequent examinations. *Extra* is used for supplemental, remedial or advanced materials.

After appropriate training, the faculty responsible for each module (the *module leaders*) were required to break down the module syllabus into an appropriate collection of units and were invited to author all or a selection of the unit learning materials. Alternative authors were found for any units not chosen by the module leader. Every unit was reviewed by an independent faculty member (or occasionally an external specialist). For the initial Masters programme, every module was trialled with a pilot group before the module materials were deployed in earnest. In addition, each module is reviewed annually for updating, taking account of feedback from the module leader, the student questionnaires, the tutors, examiners and student progression data.

The Global Campus technical team is responsible for uploading and maintaining the learning materials on the VLE. Figure 2 shows the home-page of a typical Global Campus module on our WebCT VLE – named OAS!S. The module leaders use the *Lecturers Resources* for uploading information such as past exam papers, additional exercises, examples etc. *Additional Information* is a place where module feedback analysis, examiners' reports and module information handbooks are placed. *Communication and Study Tools* contains the discussion board, an on-line quiz for each unit, the course calendar and various facilities for on-line submission of coursework.
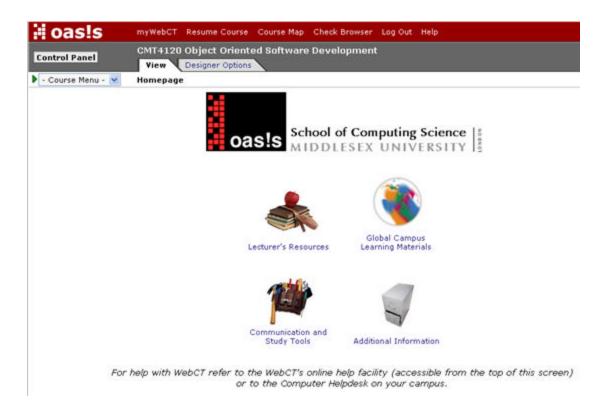
Figure 2: e-learning material on OAS!S – the University VLE

The Masters programmes we re, roughly speaking, developed in 'real-time' in the sense that, during one particular semester, the materials for the subsequent semester were under development. The timescale for the Bachelor's programme was more piecemeal. Broadly, however, the whole development could be considered to cover a five-year time -frame. During this time some 205 Masters units and 216 Bachelors units were produced at mean unit costs of approximately $2200 and $1800 respectively. This compares well with reported figures [5] and amounts to a total production and deployment cost of $834000 to which should be added management and administration costs over the five years amounting to about $992000.

Delivery Overseas

The programmes are delivered in blended learning mode at our collaborative partner institutions overseas. Students have access to the Global Campus materials on OASIS, access to the University student record system and to on-line digital library facilities just like their counterparts in the UK. In addition, the Global Campus students receive in hard-copy, a generic study guide to familiarise them with the SCATE pedagogy; a subject handbook which covers their programme of study; and one or two core textbooks pertinent to the modules being studied. The students receive frequent face to face tuition at the collaborative partner institutions. These are typically short weekly sessions, are mostly student led and so generally have a tutorial rather than a formal lecture flavour. The coursework assignments and time-limited unseen examinations are set by Middlesex University module leaders and provide the synchronisation points for the modules. Assignments are marked locally and moderated by UK staff while the examinations are marked by Middlesex University. The Examination, Progression and Award Boards for all students on the programme are held at Middlesex University. Partner institution staff 'attend' these electronically via our video-conferencing systems.

Figure 3 Locations where Global Campus distance learning programmes are delivered

The MSc BIT is currently running at Intercollege in Nicosia, the Regional IT Institution in Cairo, the Singapore Polytechnic Graduate Guild in Singapore, the University of Hong Kong – School of Professional and Continuing Education in Hong Kong, and at Ningbo University and the Research Institute of Tsinghua University in Zhuhai in China. The BSc BIS is currently running at Hong Kong University of Science and Technology, Ningbo University and the Research Institute of Tsinghua University in Zhuhai.
Both programmes will be offered in Vietnam in the near future. Although the programmes have been designed to be offered as a whole at one place, one of the great benefits of running the same programmes everywhere lies in the flexibility this affords. Thus the Chinese students from Ningbo and Zhuhai, in accordance with the Chinese Education Ministry requirements, study half of their Masters or two thirds of their Bachelors by distance-learning, and complete their courses face-to face in London. By contrast, Hong Kong students holding two-year Higher Diplomas are admitted to the final year of our BSc BIS course offered at Hong Kong University of Science and Technology for a single 'top-up' year.

It has not been a simple task to offer franchised programmes in this way and to endeavour to ensure the equivalence of the learning experience universally. We had the task of introducing not only the academic programmes themselves, but also the method of delivery and the ethos under which UK higher education is managed and organised. We were able to call on over twenty years of experience of successful collaborative partnerships both in the UK and overseas at Middlesex University. This has resulted in a procedures handbook developed by the University's Quality Assurance Unit which proved an exceptionally useful guide for staff in the UK and at our collaborative partner institutions to follow [2]. In 2005 the University was subjected to a Quality Assurance Agency (QAA) audit of its collaborative provision, and achieved an excellent outcome [1] – namely "broad confidence" – in the maintenance of both academic standards and the effective management of the collaborative arrangements. In 2006 the QAA returned specifically to review the China links across the sector and the provisional outcome reflects similar confidence.

Five years of experience of offering a fairly fixed curriculum to a population of students with mixed expectations at culturally diverse locations has given us a wealth of insights as to how e-learning can be delivered and how it might be received. Perhaps the most important acknowledgement is our absolute reliance on the efficacy and integrity of our partners. A well-founded trust and frequent, frank communication both at the academic and the administrative levels are necessary conditions for a healthy 'link'. We may pride ourselves as being 'virtual' workers, capable of creating and maintaining relationships using telephones and email, but there is nothing like a site visit to bring onboard a reluctant module leader or to get a partner's administrator to appreciate our local constraints. Middlesex University routinely brings

'regional' staff to conferences on home territory and the School of Computing systematically dispatches its lecturers to our overseas links, and this is almost always money well spent.

The measures described above help to build our cultural bridges and grant familiarity by putting faces to names. However, the module leaders may also need to be sensitised to cultural issues especially when creating the learning materials or finding case-studies for assignments or examinations. It might seem very endearing to pose problems around the Metropolitan Police (the London 'bobbies') or a Cricket match, but the amount of explanation required to get overseas students to the same starting point as the 'home' students makes it less than worthwhile. One last issue concerns the calibration of marking standards. In the British system, a percentage greater than about 70% represents an excellent performance whilst a mediocre performance would start at about 50%. In most other educational assessment systems, 70% indicates the high end of a mediocre performance and a percentage of 90% or more indicates an excellent performance. We have to ensure that our moderation recognises these different assessment 'scales' and that our staff-development resolves them over time.

Although there are some variations from one centre to another, a typical fee paid by a Global Campus student works out at about $28.50 per credit which means a Masters student would pay Middlesex around $5000 for the whole course, and a Bachelors student around $10000. [The local partner would also impose additional charges to cover IT and library access, administration and the like .] This compares with $17000 for the Masters and $50000 for the Bachelors student, should they wish to come to London to take the course. Thus the Global Campus provision represents a substantial saving for its students.

Because the Global Campus programmes shadow equivalent taught programmes at the London campus, the coursework assignments and examinations are set by faculty in the normal course of their duties and, usually, the additional marking load can be handled in the same way. Thus the marginal costs of running each individual module are effectively negligible, apart from the need to supply each student with the course textbooks and other learning materials. These account for around 20% of the fee. The balance (some $23) is needed to recover the capital costs and the School also employs dedicated administrative staff to manage the scheme.

Thus, for each unit, we can state

	Masters Unit	Bachelors Unit
Cost of development ($)	2200	1800
Cost of project management amortised over 5 years ($)	471	471
Annual admin. running costs ($)	352	352
Total ($)	3023	2623
Total number of full-time equivalent students needed to break even	132	114
Total number of students enrolled to date	395	242

It has been stated that e-learning costs fall into three categories [5] - development, administration and communication. These calculations show that the Global Campus project has successfully controlled at least the first two of these.

Other Benefits

Students studying the same programmes in face-to-face mode in the UK and also at the University's new Dubai campus, have full access to the learning materials on the VLE. On average, around 80% of the students registered for a particular module will be such 'traditionally taught' students whilst the remaining 20% are the Global Campus distance-learners. Yet the University's analysis of VLE usage of approximately 1700 online modules shows that 16 out of the 20 most intensively utilised modules are Global Campus modules [4]. Hence we deduce that the traditional teaching is being substantially supplemented by the online material. Moreover, there is some evidence [3] that student performance and achievement yields a modest (10%) average improvement when the e-learning materials become accessible.

Another University study analysed sustainability by correlating fee income accruing to each programme against staffing costs. The results showed the School of Computing's costs to be about 75% of the mean

costs across the University. This should not be too surprising since the School has larger-than-average class sizes and probably a greater proportion of its real costs are tied up in laboratories and IT equipment, which were not taken into account in the study. However, when the Business Information Systems group programmes are disaggregated, their costs amount to only about 70% of the School's average, or 53% of the University's. Since the laboratory requirements are broadly the same, this difference comes about primarily through large class sizes (average 201 in 2004-5) and it is arguable [6] that faculty are assisted in sustaining such large classes over entire programmes with the support of the our Global Campus e-learning materials.

Summary

Using IT and redesigning materials so as to enhance the process of teaching and learning made it possible to deliver programmes of the School of Computing at seven collaborative partner institutions overseas and to achieve excellent results. The Global Campus materials, designed for distance learning, have also employed in the delivery of the same programmes at the Middlesex University campuses in the UK and Dubai. Making the Global Campus materials available to students taught in traditional face to face mode has improved the progression results in the UK. Significant institutional savings on delivery costs can be made with e-education.

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