Embedding blended learning in a university's teaching culture: Experiences and reflections

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Abstract

Blended learning, the combination of traditional face-to-face teaching methods with authentic online learning activities, has the potential to transform student-learning experiences and outcomes. In spite of this advantage, university teachers often find it difficult to adopt new online techniques, in part because institutional practices are still geared to support more traditional approaches. This paper describes how a project, funded to support international collaboration to enhance learning and teaching in Geography, has allowed a university to explore models for change. It briefly examines the associated issues of sharing and repurposing resources; it reflects on the impact of the project on local strategy, and the importance of sustaining the collaborations and approaches to learning and teaching after the funding is completed.

Introduction

The DialogPLUS project was a collaboration between Pennsylvania State University, the University of Leeds, University of California Santa Barbara (UCSB) and the University of Southampton. It began in February 2003 to investigate 'Digital Libraries in Support of Innovative Approaches to Teaching and Learning in Geography'. The project was funded for three years by the Joint Information Systems Committee (JISC) in the UK and the National Science Foundation (NSF) in the USA under the Digital Libraries in the Classroom Programme. According to JISC,

This programme aims to examine how integrating recent technical developments with digital content will improve the learning experience of students and provide new models for the classroom including the impact of integration on student achievement, retention, recruitment and on institutional structures and practices.

Specific objectives are to:

- Bring emerging technologies and available digital content into core teaching and learning
- Develop and use innovative approaches in integrating technologies for the benefit of under-graduate teaching
- Demonstrate how the pedagogical process needs to be adapted or developed to support the learning process when using technology
- Examine the human and organisational issues associated with implementing new modes of teaching. (JISC, 2007)

Martin and Treves (2007) and Durham and Arrell (2007) described aspects of the DialogPlus project from the standpoint of the geographers, addressing the first three previously quoted bullet points in some detail. We, the authors of the current paper, were involved in managerial, technical, educational and evaluative support roles at the University of Southampton and for the project as a whole. We became increasingly aware of the effect the project had on our own institution, particularly with respect to its influence on e-learning strategy and policy making.

A primary objective of the DialogPLUS project was to investigate the practicalities of the joint design and sharing of learning activities, based upon existing digital resources. JISC and the NSF have already funded the production and licensing of many digital resources for use in education and research, and this programme was particularly concerned with deploying such resources in blended learning, exploring the associated technical, educational and organisational issues, and evaluating the impact on students and staff.

Developing the project

Scoping the project

An important starting point for DialogPLUS was an early agreement by all concerned that the project should be pedagogically, rather than technically, led, and that the teachers should have ownership of the way it developed.

To this end, although the overall project managers were computer scientists, the first task was to put the geographers in charge and to give them the independence to work in a way that suited them. At both Leeds and Southampton we were able to use the funding to employ young geography lecturers who could work on the curriculum changes directly, or relieve existing teachers from some of their load in order that they could spend time redesigning their courses. In both schools we were also able to employ some learning technologist time—at Southampton a full time appointment was made and the member of staff had an office in the School of Geography.

The next task was to identify where in the curriculum to make interventions. In many e-learning projects the initiative for the undertaking has arisen from teaching staff keen to innovate and improve their teaching. While this is laudable, it is difficult for such staff to make an impression on the curriculum as a whole—typically their efforts will affect only the course or module in which they teach, and when they stop teaching, the module innovations will often be lost. It is our contention that changes are more likely to become

embedded when they are planned as an integral part of the curriculum, and this can usually only be achieved with the active encouragement of senior management.

In DialogPLUS, both at Leeds and at Southampton, the head of the schools of Geography were active project team member. These two professors had the influence and enthusiasm to enable their schools to take a curriculum-wide view of where the e-learning innovations would be best made, as well as the authority to alter the teaching loads of members of their staff in order to allow them to participate in this project and to develop e-learning activities. Many e-learning innovations are situated within the faculty or school that receives project funding. An advantage of DialogPlus was that there were four universities involved, and an interesting dimension was added because two were in the UK and two were in the USA. At our early meetings the geographers compared syllabuses and identified areas of overlap where collaboration would have most potential benefit for project members. This process was not straightforward as Geography is actually a composite of many subjects and different geographers have quite different views of the discipline. These differences were most apparent when comparing universities either side of the Atlantic; for example the US partners attached greater importance to physical geography and less to human geography. However, it was possible to reach some level of agreement, and a partition of effort was established and recorded on a spreadsheet that became an important working document for the project (see Figure 1).

Engaging with the technology
Although the curriculum-mapping exercise moved the project forward with respect to understanding what teaching and learning resources might be shared, there was still the issue of four different e-learning platforms. One of the important technical objectives of this project was to identify solutions to the problem of interoperability of online learning activities. The authors have long experience of working with and supporting academics in producing learning materials (eg, see Davis & White, 2001; McDowell, White & Davis, 2004) and have found that a good approach has been to allow the academics to specify their needs, then to show them technological solutions that might meet those requirements, rather than start with the technology. Thus, when the idea of a 'nugget' emerged from the early meetings that sought to establish common ground, the learning technologists did not initially rush to replace it with the term 'learning object', nor to expose the academics to emerging interoperability standards and metadata theories.

A DialogPLUS 'nugget' was defined as containing all that was needed to delineate a discrete learning activity. It should consist of

• At least one learning objective;
• Instructions to students on how to carry out the activity;
• The resources (or links to the resources) necessary to support students in carrying out the activity;
• Optionally, some assessment of the activity. (Successful completion of the activity itself was seen to be sufficient in some cases).

		LEEDS MODULES	SOUTHAMPTON MODULES	PENN STATE COURSES
	HUMAN GEOGRAPHY	GEOG 5100M (F2F), 5105 (ODL), 5101(UKeU) (Masters in GIS programmes): Census Analysis and GIS (Rees, Durham)	GEOG 3025 Census and Neighbourhood Analysis (Martin)	
	PHYSICAL GEOGRAPHY			EARTH 002: Gaia-The Earth System (Crane, Weaver)
			GEOG 2001: Physical Geography in Environmental Management (Clark, Priest)	
			GEOG 2016: Drainage Basin Geomorphology (Darby, Priest, Leung)	GEOG 115: Landforms of the World (Shue)
		GEOG 3870 Upland Catchment Management (BSc) (Hardy)	GEOG 3015: River Channel Dynamics (Darby, Priest)	
		GEOG 5410M Water Resource Management (McDonald)	GEOG 3023: River Basin Management (Sear, Priest, Leung)	
	GIS	GEOG 3010 Advanced Retail Planning (Clarke)	GEOG 1005 Quantitative Methods for Geographers (TBC)	
		GEOG 5010M Principles of GIS (MSc, F2F)(Hogg) (TBC)	GEOG 2010 Introductory GIS (Wu)(TBC)	
		GEOG 5011M Principles of GIS (MSc, UKeU)(Arrell)	GEOG 3006 Advanced GIS (Wright)	GEOG 482: The Nature of Geographic Information (DiBiase, Weaver)
		GEOG 5015 M Principles of GIS (MSc, ODL) (See) (TBC)		
		GEOG 5891M (MSc, UKEU) GIS and Spatial Analysis and GIS (Arrell)		
			GEOG 5811M GIS for Analysis of Health (Wright, Treves)	GIS for Analysis of Health
	EARTH OBSERVATION	GEOG 2750: Earth Observation and GIS of the Physical Environment (Mackay, Barr, Carver)	GEOG 3008: Remote Sensing of the Terrestrial Environment (Milton, Leung)	GEOG 352: Image Analysis (Gahegan, Weaver)

Figure 1: Cross-curricular comparison

An example of a simple, generic nugget is the academic integrity learning activity (Fill, Leung, DiBiase & Nelson, 2006), which requires students to access various institutional and other resources to enhance their understanding of antiplagiarism and similar policies, and then to take a short quiz.

The 10 academics, involved in those early meetings, were encouraged to go ahead and create their nuggets, and the learning technologists would take care of packaging them for sharing. The results of this approach are discussed further in the next section.

In order to support the academics with the process of designing online learning activities, the learning technologists developed the DialogPLUS Toolkit (Conole & Fill, 2005) which provides a step-by-step guide to help them make theoretically informed decisions and to choose appropriate tools and resources. It also maintains a database of existing learning activities and examples of good practice which can then be adapted and reused

for different purposes. As part of the technical development of the toolkit, we compared our schema and metadata with those in the emerging IMS learning design (Bailey, Zalfan, Davies, Fill & Conole, 2006).

Following the initial discovery stage of the project, the team moved into development mode; nuggets were developed in a range of topics, they were deployed for use by students, they were evaluated, they were improved, and work on new nuggets began. In the course of these developmental iterations it became clear that extensive sharing of resources, in the sense of each partner using the same nuggets in different courses, was not really possible or desirable. It is very difficult to build learning activities of any size and complexity that are independent of the context in which they will be used, and cultural, curricular and cohort differences tend to dictate the shape of delivery.

However, generic learning activities, such as one to encourage academic integrity (Fill *et al*, 2006), and tools like Penn State's concept-mapping application were taken up enthusiastically by other partners. Towards the end of the development phase, some of the geographers began to explore ways to share students on blended learning Masters courses, so that they could benefit from specialist teaching in any of the participating institutions. There was a growing confidence that well-designed online learning activities enhanced their courses and student outcomes.

Embedding blended learning

At Southampton, by the end of the second year of the project, the School of Geography was perceived by other staff, both in academic and in support roles, as a university leader in the blended-learning domain and as a pocket of e-learning that could serve as a positive exemplar of how such work could develop. However, the team also wondered to what extent the continuity of this, and indeed any such, pocket would be dependent on the stability of personnel, technology and course content.

Sustainability and the associated issue of reuse of learning resources are now considered and illustrated with anonymous quotations from interviews with the geographers at the University of Southampton.

Sustainability
When the enthusiasm for, and recognition of the benefits of blended learning are shared in a department or teaching team, innovations are likely to become embedded.

I think it's hard to tell how long it lasts but it's raised the temperature of teaching and learning practice here in geography and ... because for the most part the academics round here are committed to the quality of their teaching, they will continue to take some of those things forward. (G1)[1]

[1]G1 is Geographer 1, G2 is a second geographer and so on.

However, as we have already seen in a small way at Southampton, when the champions retire or move on they may sometimes be replaced by staff who are not as enthused. Faced with many demands on their time and not fully briefed about why and how blended approaches have been developed, incoming teachers may drop or reduce the online components. They may feel unable to defend the approach when questioned by colleagues or students.

Even for staff who continue to teach on the same modules and wish to carry on with blended learning, there are issues to do with updating the digital resources they have created, especially if the information technology infrastructure changes and/or they no longer have local, timely technical support. A senior lecturer voiced these concerns:

The currency of these materials, it seems to me, diminishes quickly. They need updating frequently to keep them fresh and working properly. So it will be very, very interesting to see how that works, whether people will be able to maintain their resources at the current high level of standard. (G2)

While academic staff in the project have developed their skills in that kind of curriculum planning, syllabus content planning, matching assessments to learning outcomes and really thinking about how e-learning and digital libraries can help, particularly in this subject, what we haven't done of course is developed any skills whatever in the Web authoring of that kind of approach. I think we'd feel quite challenged to do that ourselves; we wouldn't want to do that ourselves because it's time consuming. (G2)

Those who endorse the benefits of the 'learning object economy', a term coined by Duncan (2004), would probably respond to such concerns by advocating the reuse and repurposing of digital learning resources created by others and made available via repositories managed on behalf of the education community. However, this aspect of e-learning is still far from mature in UK higher education and, in our experience, it does not address the real needs of front-line teachers. They need a simple way to change some aspects of resources created by others, without the support of computing specialists. Tools such as the MURLLO toolkit (Wang, Davis, Dickens & Will, 2007) may offer a solution here, but only if usage becomes ubiquitous. It will need the economies of scale of Word or PowerPoint to be really powerful.

The UK funders (JISC) of the Digital Libraries in the Classroom (DLIC) programme were keen to ensure that the changes made as the result of this project were embedded in the teaching culture of the participant universities. To this end they required that the UK projects continued for 2 years after the 3 funded years; we are in that phase now. Although there is no doubt that most of the blended courses will continue for at least that period, and that the schools will continue to develop new blended resources, we also have examples where staff have moved on, and the new teacher has not reused the resources. Further investigation is needed to determine whether this is due to the new teachers being uncomfortable with the teaching method, or simply the timely and appropriate evolution of taught content in a research-led teaching department.

Reuse of learning resources

As discussed elsewhere (Fill *et al*, 2006), while academics involved in the DialogPLUS project have been enthusiastic about the possibilities of adopting generic resources created by others, there are cultural, contextual and curricular barriers that appear to prevent any substantial sharing of subject-specific resources. Such barriers have also been reported by (Christiansen & Anderson, 2004; Malcolm, 2005). However, at issue in those articles was the reuse or repurposing of materials created by 'distant others', that is, commercial content providers, or academic and related staff in other institutions. Whereas, our geographers are much more concerned about the lifespan of their own resources, what can be reused, what will need to be updated year on year, and the support needed to do that for some of the technically complex online objects and activities.

The other thing is when we developed some of the nuggets we forgot the technical barriers. For example, the three ePracticals for (a specific course). I can never actually manage to see how they are working and to repurpose it. I can't see how, it's too complex. (G3)

The concern always was that when the support staff disappear the project falls off the precipice. I don't think that's happening. The teaching that's been developed and other elements are slowly beginning to be rolled out. That's continuing, but it would be a lot easier to do that if there was that kind of resource available for people to buy into, perhaps competitively. However it was arranged, it would be hugely helpful. (G2)

Depending on how technology moves, it's possible that in a few years you could have some major technological change or cultural change in the sector that overtakes the whole project, through no fault of the project at all but it's a leading edge thing and the leading edge can change shape and change direction. Pace of change could wash away some of the long term impact I suppose. (G4)

These reservations appear to us to beg the question of whether an approach to learning and teaching partly based on current computer technology will ever be mature. Early adopters of new technologies may forever lead the way, with the majority stuck in the comfort zone of the previous 'know-how'. It is possible that institutional strategies, underpinning the planning and implementation of what might be termed the 'efra-structure' and the provision of timely and effective staff training, could mitigate some of the uncertainties. However, there is a cycle of innovation that results in the strategy sometimes lagging behind the work at the coal face. In the next section we discuss how the DialogPLUS project has contributed to the e-learning strategy at the University of Southampton.

Contribution to institutional strategy

The distributed approach to financial management at the University of makes it difficult to introduce top-down change as there is no single point of decision making. Rather, any decision must be taken at school level, and there is no guarantee that what is agreed upon by one will also be agreed upon by another (White, 2007). Each School decides its own curriculum and is largely responsible for financing its delivery. However, by the time the university teaching budget has been divided between all the schools, any

surplus with which to fund change and innovation is usually very small, and typically the centrally retained funds are spent on e-learning software and online resources rather than on developing learning materials and activities.

Our problem, in this environment, has been how to assist schools with making change, getting beyond the 'PowerPoints online' instantiation of e-learning to adopting a small, but appropriate amount of blended learning. The DialogPLUS project has provided us with a good model for bringing about such changes. In the School of Geography we observed that change was successful, and more embedded than we have seen in previous projects, because the school leadership took a proactive approach in facilitating curriculum change, enabling appropriate staffing of curriculum-development teams. This change was aided by the project funding which, once divided between partners, was relatively modest. The University of Southampton is a research-led institution and its academics are often motivated by bidding for grants and carrying out projects; we suggest that this model of local leaders introducing change is much more effective in this type of culture than exhortations from the centre to change.

We have recently established a strategic fund within the university which enables schools to bid for assistance in introducing blended learning in a curriculum-wide approach. The assistance generally comes in the form of teaching staff and learning technologists (based in their schools), and bidders are very much encouraged to work with other partners or consortia. The first round of bids for this funding produced bids from the majority of school in the university demonstrating the effectiveness of this approach.

Conclusions: critical success factors—and failures
The DialogPLUS project has had a number of useful outcomes. We have produced some excellent learning activity nuggets, which are now being loaded into JORUM. We have produced the toolkit, a kind of pedagogical planner, and we gained useful understanding of the problems of sharing and reuse through our work on the generic academic integrity nugget (Fill *et al*, 2006) and on cooperative design through our work on the GPS activities (Durham & Arrell, 2007).

However, most importantly the experiences of carrying out the DialogPLUS project have enabled us to identify a number of critical factors which we believe have been important in ensuring success in embedding the changes that the project funded.

Active involvement of senior management.
Many readers will be familiar with the letters of support that funding bodies require senior management to produce to indicate institutional commitment to some particular project. Often this institutional commitment is, in reality, little more than agreeing to allow the project to go ahead without overheads.

In the DialogPLUS project, at the UK end, we had the head of the schools of Geography (at Southampton and Leeds), the head of the Learning Technology Research Group and

the professor of Educational Innovation in Post-Compulsory Education at Southampton as active managers in the project (indeed the latter two became responsible for e-learning strategy across the university during the course of the project). It would be difficult to overestimate the influence these four people were able to have on their colleagues, the school curriculum and the university strategy.

The whole curriculum approach

This approach suggests that rather than changing a single module within a programme to include blended learning, it is better to undertake an entire curriculum review, and to identify suitable places to include blended activities. Of course, the selection will not only be dictated by the appropriateness of the learning outcomes, but also by the availability of suitable teaching staff and other constraints such as timetabling and room allocation. In many ways we see this approach to the inclusion of blended learning as being similar to that of generic key skills; it is much improved by a curriculum-wide process, rather than doing it all in a single module, often out of context. Undoubtedly, taking such an approach requires the active participation of senior management.

An interesting observation from our colleagues at Penn State University, who have been involved far longer in e-learning (at a distance), is that it is useful to consider what is the 'right amount' of e-learning to offer in a curriculum; too little and we are not helping student to learn appropriate lifelong learning skills, but too much, and the students will start to complain that they had not signed up for a virtual degree, and that they want more face-to face opportunities. Our evaluation activities also indicate that both staff and students find they spend more time on the e-learning components of blended modules than the traditional elements (Fill, 2006b).

Funding

The DialogPLUS project would not have happened without external funding. Although we had schools of Geography that were ready to change, they simply did not have the funds to take the risky steps required to bring about a transformation. The funding was necessary to employ extra teaching staff, either to produce and tutor blended activities themselves, or better still, to release existing staff from their teaching in order to spend time preparing blended activities. Postfunding, the schools now continue to employ some of the staff hired originally just for the project.

Support at the point of need

Teachers, and their academic schools need support when they want it! In many universities support for e-learning is a central service, and however willing the staff may be, they will have multiple conflicting undertakings. Putting a dedicated learning technologist into the School of Geography at Southampton was highly influential. This member of staff was always available to help when needed, and furthermore was able to sit down with academics and show them individually what was possible. It is well

established that an effective approach to group change is to introduce a change agent (see for example Havelock & Zlotolow, 1995). A communicative learning technologist can be a very good change agent.

Collaborations
In a collaborative project we might have expected to share development effort and to reuse each other's activities. This happened to a certain extent, but the benefit of the collaborations turned out to be more subtle than we had anticipated. When a team is undertaking change, they will experience many moments of self-doubt and loss of confidence. Working with colleagues from other schools and universities that we respected helped the team to achieve coherence and gain self-confidence to cope with and move through the bad spots, and provided a common sense of purpose. The close relationships developed in occasional face-to-face meetings have formed a sound basis of understanding for our monthly virtual meetings using Access Grid and other virtual conferencing tools.

Some of the things that did not work
Not everything in the DialogPLUS project worked perfectly, and it is useful to reflect on our failures as well as our successes.

The project results were more significant for the UK partners than for the US partners. There are probably multiple reasons for this. In the USA the DialogPLUS undertakings were conceived much more as research, rather than development, projects, as in the UK. This had two disadvantages; the first being that the US participants did not have the senior management and curriculum buy-in that we had in the UK, and the second that their funding was subject to overheads, such that they had significantly less funding than the UK partners. Furthermore, the UCSB contribution had been expected to be based around the use of the Alexandria Digital Library (ADL), an NSF funded library of geo-referenced digital images and other resources. During the timescale of this project the NSF funding of this resource diminished, possibly as tools such as Google Earth provided some of their important functionality, and the role that we initially envisaged for ADL never materialised.

Sharing of learning activities was not as widespread as expected. This was in part a result of our failure to agree upon exactly what a nugget was. Learning object specialists would suggest that important features of well-designed learning objects are low coupling and high coherence (Boyle, 2003) in order to provide context-independent units. But some of our learning activities were far too dependent on each other and their context of use to be shareable. We believe this problem was attributable more to the cultural issues than technical issues (Fill, 2006a). We found that sometimes staff would rather encourage their students to take someone else's module rather than try to use someone else's materials in their own module.

Finally, it is interesting to reflect on the extent to which the practices we have developed have become embedded in use. While we are happy that we have more than adequately

met the requirements of the funders to embed the use of the materials we have created, true embedding will only have happened when the introduction or creation of new blended-learning materials is in balance with the wastage of unloved or out-of-date materials, and this must happen within the stable, internally funded economy of the unit of teaching. It will take longer than 2 years to measure this result. So watch this space!

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