

E-learning in initial teacher education: A solution looking for a problem?

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ABSTRACT

This article describes the development of e-learning as an integral element of a course of initial teacher training.

In seeking to embed the use of e-learning tools within an existing course structure and to accommodate a range of external and contextual constraints the study uncovers a number of tensions which must be addressed if the use of such tools is to meet the needs of a range of stakeholders. It is suggested that this theme of conflicting stakeholder needs and the broader context within which course development must take place is often relatively neglected in favour of a focus on the technology and techniques of e-learning.

This article focuses on the factors which promote and inhibit the successful embedding of e-learning as a tool for meeting various stakeholder needs and suggests that planning to deploy e-learning can frequently consist of looking for a "problem to fit a technological solution". In contrast the article takes a critical, non-techno-advocate stance and suggests that the uncritical deployment of e-learning has the potential to diminish quality, efficiency and effectiveness unless planning is informed by clear guidelines focussing on and balancing the needs of course stakeholders. It is further suggested that the range of e-learning tools made available to those designing and delivering courses is frequently provider rather than client led.

Finally the article suggests that the effective articulation of e-learning research and course development would benefit from adopting more a commercial research and development model in which identification of a need to improve or develop a new product precedes and triggers research activity rather than a model which seeks to find applications for research which has been undertaken for other purposes.

INTRODUCTION

The project reported in this article involved the development of e-learning to support teaching and learning on a course of initial teacher training (ITT). The course is focussed on training teachers of secondary school ICT and consists of 22 trainees all of whom are graduates in a computing related subject and who have demonstrated relatively high levels of familiarity with technology before embarking on the course. The course involves two main elements, the first is a university based face to face teaching element and the second a school practice based element where trainees spend a total of 120 days spread equally between two schools. As such the course requires staff and students to engage with a combination of face to face and distance supported learning.

The distance element of the course has led to the gradual and often ad hoc development of e-learning and e-communication elements as a means of providing support whilst trainees

are on practical teaching experience. The adoption of email, web-groups and eventually mobile telephone, text messaging and SMS as a means of sharing resources, information dissemination and as a channel for mutual moral support between trainees has been gradual and largely unplanned with technologies being employed as they become available and in response to clear and identified needs. Whilst the use of such technologies has not benefitted from any process of strategic planning, feedback from students and external evaluations of the course have judged the use of technology in course support to be effective, well used and appreciated by the trainees. A more detailed description of technology use by trainees is discussed below and shown in Figure 1.

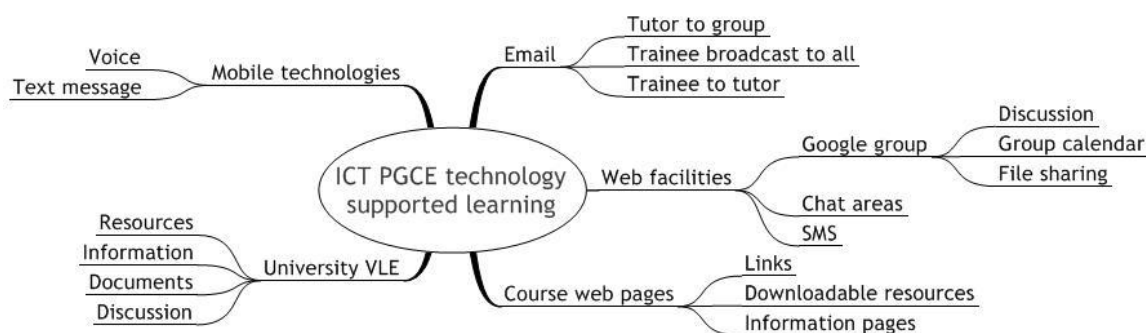


Figure 1: Technology use on ICT PGCE before the redesign project.

The map shows that the use of technology within the learning experience varies from core elements established as permanent formal tools to support the course which are ‘owned’ by the university to ad hoc and temporary arrangements making use of commercially available web based facilities set up on demand by either trainees or their tutor. The course is also supported by informal networks set up by students themselves sometimes excluding their tutor. These networks tend to make use of synchronous web based chat, SMS and mobile telephones. It is further worthy of note that routine gathering of feedback from trainee evaluations showed that whilst they very much appreciated the e-learning support elements of the course many expressed concerns that any development should not be at the expense of opportunities to meet their fellow trainees and tutor face to face on a regular basis. In course evaluation workshops trainees had previously expressed appreciation of the flexibility of face to face sessions where the focus and content of the day could be adjusted quickly to meet their needs as they arose. Some felt that the face to face elements of the course constituted personalization as all were invited to request the inclusion of particular topics into the day’s agenda during the planning and during the teaching day trainees were able to ask for clarification or to offer particular cases or problems currently being encountered for discussion.

Those who had previously encountered ‘on-line’ courses felt that in contrast to the above these course structures were frequently rigid and based around content and activities which remained constant and gave little opportunity for students to address their own needs or interests. This is at odds with claims suggesting that e-learning supports personalization and flexibility.

As such the framework for development was centred on technological enhancement of the existing mixed mode method of working rather than the development of an entirely on-line course.

In summary the course is rich in the use of technology supported learning and the development process was largely driven by the desire to formalise some elements of the process and make the systems in use more easily manageable and efficient.

In drawing conclusions from the following article the reader will appreciate that the relatively high level of technological skills and very high levels of routine use of web based technologies characteristic of this particular group of students would suggest caution when extrapolating the conclusions to courses where students are less familiar with such technologies.

THE DEVELOPMENT CONTEXT – DRIVERS AND CONSTRAINTS

As stated above the focus for redesign included a need to rationalise the overall use of technologies used to support the course in order to make the management more efficient and to avoid duplication. Also the intended outcomes included the use of newly available technologies such as blogs and wikis within the university VLE to support more efficient and controlled collaborative working.

A further driver promoting course redesign was a major programme wide reorganisation which involved the modularisation of the whole ITE programme necessitating the development of a new course structure and methods of assessment.

The opportunity of redesign and the rationalisation of the use of e-learning within the course took place within a framework of more general change and mapping the elements of this broader change context was the first stage of the redesign process. The objective of this stage consisted of two complementary elements. The first mapping elements both internal and external to the course itself which would act as driving and containing factors which would jointly provide insight to the broad possibilities for redevelopment and secondly consultation with the trainees themselves to ascertain what they considered priorities for development and just as importantly those elements which it would be counter productive to change.

The primary mapping of the issues impinging on course redesign can be seen in Figure 2.

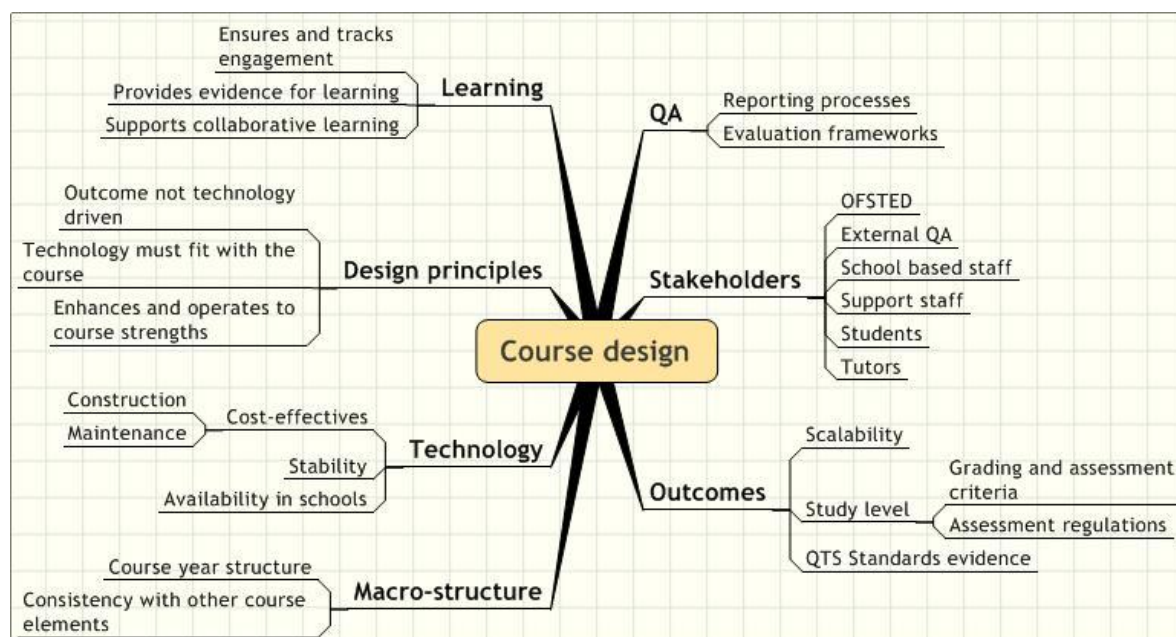


Figure 2: External and internal factors impacting on course redesign.

OUTCOMES

The course assessment is primarily driven by the need of trainees to provide evidence of a range of 'Standards' set by central government. Any changes needed to ensure that the course provided opportunities for trainees to engage with activities which provided opportunities to meet these standards and, more importantly, that the evidence for the achievement of these standards was kept in a secure environment. As this assessment element is 'mission critical' some concern arose about the security of evidence stored on-line and the legal implications if a technological failure should result in such data being lost. In the current system trainees are responsible for maintaining the evidence required to pass the course until it is finally submitted. Where the university provides an e-portfolio for the storage of such data it accepts responsibility for its safe storage. It was felt that the risks accruing to such a system outweighed the advantages of using e-portfolios. A suggestion that trainees should be responsible for maintaining copies of such data was rejected as further complication the assessment process and involving duplication of systems.

A further issue which arose with respect to course outcomes was that any developments being piloted by trainees on the ICT course should be scalable to other PGCE subjects. Earlier work on the use of e-portfolios had indicated that technical difficulties associated with building and managing portfolios potentially imposed a further burden on trainees.

In summary the design process involves a number of judgments relating to an equation where technical reliability coupled with the severity of consequences of system failure have to be balanced with potential gains. Where the stored assessment data is critical and an existing system of proven reliability exists a rational judgement favours the retention of the existing system.

STAKEHOLDERS

The second issue which arose from the mapping exercise was the need to balance the requirements of a range of stakeholders. Whilst ‘user centred design’ is seen as a primary design criteria the reality of the design process in practice has to accommodate needs of stakeholders who’s importance sometimes transcends that of the learners themselves. As stated above any system implemented must meet the expectations of a range of agencies which comprise the accountability structure associated with some courses. Management frameworks and organisational cultures can present major challenges for those engaged in change (Hazemi, 1996).

Additionally school based staff are significant contributors to the training process and any systems implemented needed to accommodate their working context. Likewise, systems must be designed which are within the capacity of technical support staff to maintain.

Clearly the concept of user centred design focussing on students seems logical and supportable but the realities of delivering education within a highly regulated and bureaucratic framework requires consensus and agreement which will impact on the degree of uptake of opportunities for innovation.

QUALITY ASSURANCE

The impact of growing accountability structures both in terms of government level regulation and at institutional level can act as a brake on innovation (Mills, 1996)

Internal QA procedures establish a framework which sets boundaries on the way the course may be delivered, participation and most importantly the methods of assessment used. This means that any e-learning development must be both technically feasible and operate in a manner which does not transcend the guidelines established to regulate course delivery and programme delivery at a variety of levels and the means of assessment. Whilst innovation is encouraged, quality frameworks and the associated risk evaluations can militate against risk taking and lead to a culture of risk aversion (Aldbury, 2003).

LEARNING

Design criteria in relation to learning included the need for any system implemented to enable ongoing tracking of trainees engagement with learning over the duration of the course and most importantly during the times when away from the university, working in schools. Also any work undertaken needed to result in an outcome which could be retained for assessment purposes providing evidence of meeting competency standards. This need to acquire and store evidence was felt to preclude the use of a number of asynchronous communication tools where records of interaction could not be attributed or retained.

Finally it was felt that the development of collaborative working was important as student feedback had already showed that working in virtual teams supported a sense of community which promoted both learning and a feeling of mutual support.

DESIGN PRINCIPLES

The need to define fundamental criteria against which possible options could be judged produced three main principles.

Firstly it was established that any developments would be output led rather than technology led and focussed on students needs. It has been suggested that the relationship between student research and course development can be neglected (Lockwood, 1995). Whilst such a principle might seem on the surface to be obvious, tensions in the design process between technological/systems issues and pedagogical priorities are frequent (Richards, 2006).

In a workshop where trainees were invited to contribute to the redesign process a number of comments were made suggesting the use of various technologies but as these technologies were discussed it became clear that few of those making the suggestions had developed a clear idea about how such technologies could be usefully applied, to what ends and with what added value. Such technologies as Web 2.0 and video conferencing were discussed but as technologies which were new and available and as such deserved to be found a place in the course rather than offering a solution to an existing problem.

Secondly, any technology used should fit with the character of the course. This meant that any technology used would need to allow trainees a significant level of control and facilitate their participation in the management of any e-learning system used.

Thirdly, technology solutions would be selected for their capacity to enhance established strengths and careful consideration given to the potential negative impact of inappropriate systems.

TECHNOLOGY

Consideration of technology and the issues of cost effectiveness were considered and it was decided that any solutions should be carefully costed with time costs associated with both development and maintenance balanced against potential benefits. A further issue arising under this heading was the potential stability of any technology used. As any investment in e-learning development would need to be reclaimed over several years it was decided that only technologies which were likely to remain in-place should be considered.

The final point for considered was the issue of access to any e-learning facility when trainees were on school placement. Past experience has shown that many web based resources are not available in schools due to security measures in place to protect pupils.

MACRO-STRUCTURE

In addition to QA and regulatory frameworks the redesign was required to fit in with the macrostructures of the course within which it was embedded.

The first key element of this structure is the pattern of the teaching year with its immovable milestones which, to some degree, undermine potential advantages of e-learning flexibility.

Secondly, whilst the modular nature of the course allows some degree of flexibility in terms of content and delivery methods the articulation of module elements and a number of other course elements is a constraint on the way in which e-learning is applied. Elements of the course still consists of more traditional components such as lectures and presentations and it was felt that effective e-learning would require more than simply moving these elements on-line (Garrison, 2003).

DEVELOPING A CONCEPTUAL DESIGN – THE FUZZY FRONT END.

Having outlined the constraints and opportunities through the mind mapping exercise and student workshops the second stage was focussed on the generation of possible course development scenarios. This process equates with the creation of a ‘fuzzy front end’ as applied in the field of ‘new product development’. This phase consists of generating solutions and options which can be evaluated in terms of the degree to which each matches with the design constraints above.

As is typical this phase generated a number of false starts and through a number of iterations the solution finally chosen emerged as a workable model.

The ‘fuzzy front end’ model based on the development and early stage testing of multiple solutions is often at odds with a linear project management philosophy such as Prince 2 which rests largely on a clear linear path between problem and solution. As the project was being managed under tight time constraints those involved in the development were faced with the resolution of the tension between:

- A strong solution stemming from an exhaustive examination of possibilities but potentially, with the chosen solution remaining unfinished within the available time span.
- A solution which was achievable but sub-optimal within the time scale.

CONSULTING THE EXISTING KNOWLEDGE BASE

Projects were well provided with a review of e-learning research undertaken in the institution where the course was to be developed. The assembled research, whilst being of high quality and wide ranging largely failed to support the design process for several reasons:

Firstly the requirement of academic research to produce results which are generalisable in this case fell short of effectively informing the redesign as the knowledge created was not sufficiently explicit in addressing the highly specific and realistic constraints in which the course design was to take place.

Secondly much of the research was focussed purely on the application of technology to learning and largely neglected the wider organisational context in which “real world” development takes place.

Thirdly, a significant proportion of research and course planning tools are focussed on a linear and sequential set of discrete “sessions”. Whilst this does support effective planning where courses are of this nature it does not meet the needs of complex courses where students are involved in a mix of practical workplace based learning and scheduled sessions which have to be frequently adjusted as learning needs emerge.

CREATING THE COURSE

Given the limited timescale for the development of the course and the need to undertake a constraint/opportunities mapping, undertake stakeholder consultations and generate the ‘fuzzy front end’ relatively little time was available to build the course.

It was decided that the diversity of experience stemming from work based learning where trainees encounter different problems in different contexts at different times generated an opportunity to use e-learning tools to support trainees in working collaboratively to create a shared knowledge base where trainees were both information users and information providers.

The organisation of the solution was based around wikis embedded within the group’s existing virtual learning environment and offering two opportunities:

- Team produced wikis based on the key topics of the course. These themes included such themes as Special Educational Needs (SEN), differentiation, classroom management. In the production of these wikis all 20 trainees were to work collaboratively to define the key content which should be included in the wiki, to divide up topics between the group and to undertake research on an element of the theme, to agree a structure which made the information accessible and usable and to edit and publish the content.
- Individual student wikis aimed at collecting and presenting a variety of evidence to support the achievement of the list of competencies required to gain Qualified Teacher Status (QTS). This was to replace the current ‘assessment file’ containing paper based evidence presented at the end of the course. The use of the wiki facility rather than a file repository style e-portfolio was intended to allow trainees flexibility over not only content but also the structure and presentation of evidence. These rapidly took on the name “wiki-folio”.

This approach was designed to support emerging professionals as collaborators in the construction of usable and relevant professional knowledge rather than being provided with a body of ‘content’ to be ‘delivered’ at a particular time in a given sequence.

The learning gains which it was hoped would accrue from this approach were:

- Trainees would come to appreciate that professional learning both in initial training and their subsequent development is an active process involving a collegiate responsibility to be a knowledge creator and sharer rather than a simple receiver of a body of centrally disseminated ‘good practice’.
- Trainees would engage with each element of learning as a practical need for knowledge arose.
- Trainees would understand that the value of knowledge when applied is highly context dependent.
- Trainees would develop a habit of collaboration and professional discourse as a model for life-long professional learning.

INTERIM EVALUATION

Six months after launching the new e-learning elements of the course an interim evaluation was undertaken with the following outcomes:

Collaborative theme wikis.

The act of constructing, editing and presenting ‘content’ as opposed to accessing on-line ‘lectures’, set readings, written contributions to discussion boards etc. was well received and served to provide the clear shared task which Belbin (1993) suggests is essential to effective team formation. Where students had previously been involved in online discussion in response to a given reading issues of participation and focus had arisen as noted by Renninger (2002).

Where students were working in a face to face workshop session to produce a collective wiki to act as an SEN resource this worked well with trainees working collaboratively to complete the wiki to a set deadline which can be seen in Figure 3. Working in a face to face environment allowed for rapid establishment of groups, delineation of responsibilities, resolution of disputes and mutual encouragement to contribute to the task. Whilst the provision of a clear task and a collaborative environment has the capacity to foster team based learning collaboration is not inherent in the tools provided but in the dynamic of the group (Holmes, 2006) this was evidenced by the difference in response between face to face engagement and when the collaboration was placed entirely on-line. Subsequent collaborative wiki tasks undertaken where students were working remotely were far less successful with confusion over responsibilities and lack of engagement by some. This would seem to suggest that in on-line collaboration it is important to differentiate between the process of team formation and management which benefit from face to face contact and the process of task completion which can be done adequately on line.

Whilst working on the collective task the group benefited from discovering and drawing on a range of existing skills and knowledge within the group. Some trainees had already gained experience of working in specific fields of SEN and this gave an opportunity to recognise prior learning whilst others contributed technical expertise.

Overall the activity showed evidence of the following value added over a traditionally run face to face workshop:

- Trainees act in the role of knowledge creators rather than receivers;
- The usefulness and relevance of content is decided by the trainees informed by the demands of their challenges;
- The resource constructed is designed to be used by trainees whilst in school and as such constitutes an authentic task.

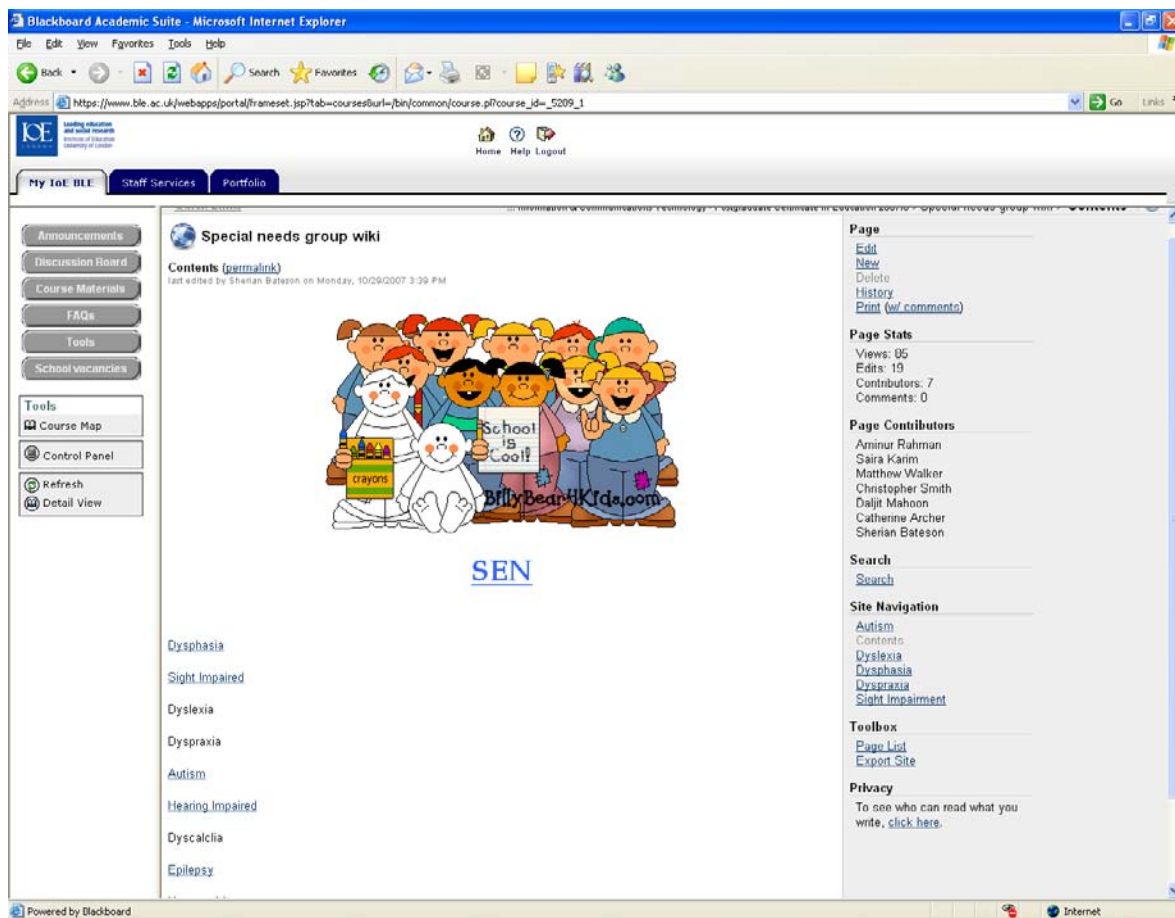


Figure 3: A collaboratively produced SEN wiki.

Individual wiki-folios

These wikis were offered as an alternative to traditional paper based collections of evidence to support the process of assessment. After the introduction of the idea of the wiki-folio

trainees were allowed to choose to continue with this facility or to revert to a paper based model.

Around half of the trainees had abandoned these wiki-folios after the initial introduction whilst the other half chose to proactively develop their collection of evidence, structure it according to their preferences and to add elements of personalisation. A sample of these individual wiki folios can be seen in Figures 4, 5 and 6.

Those who chose to use the wikifolio in preference to the usual paper folder benefited from:

- Ongoing review by their tutor ensuring that the evidence presented was appropriate for assessment.
- Opportunities to see each others folios allowing trainees to compare evidence and share ideas on what should and should not be included.
- An opportunity to develop a sense of ownership of their portfolio by using their own presentation style and graphics to supplement the actual content.

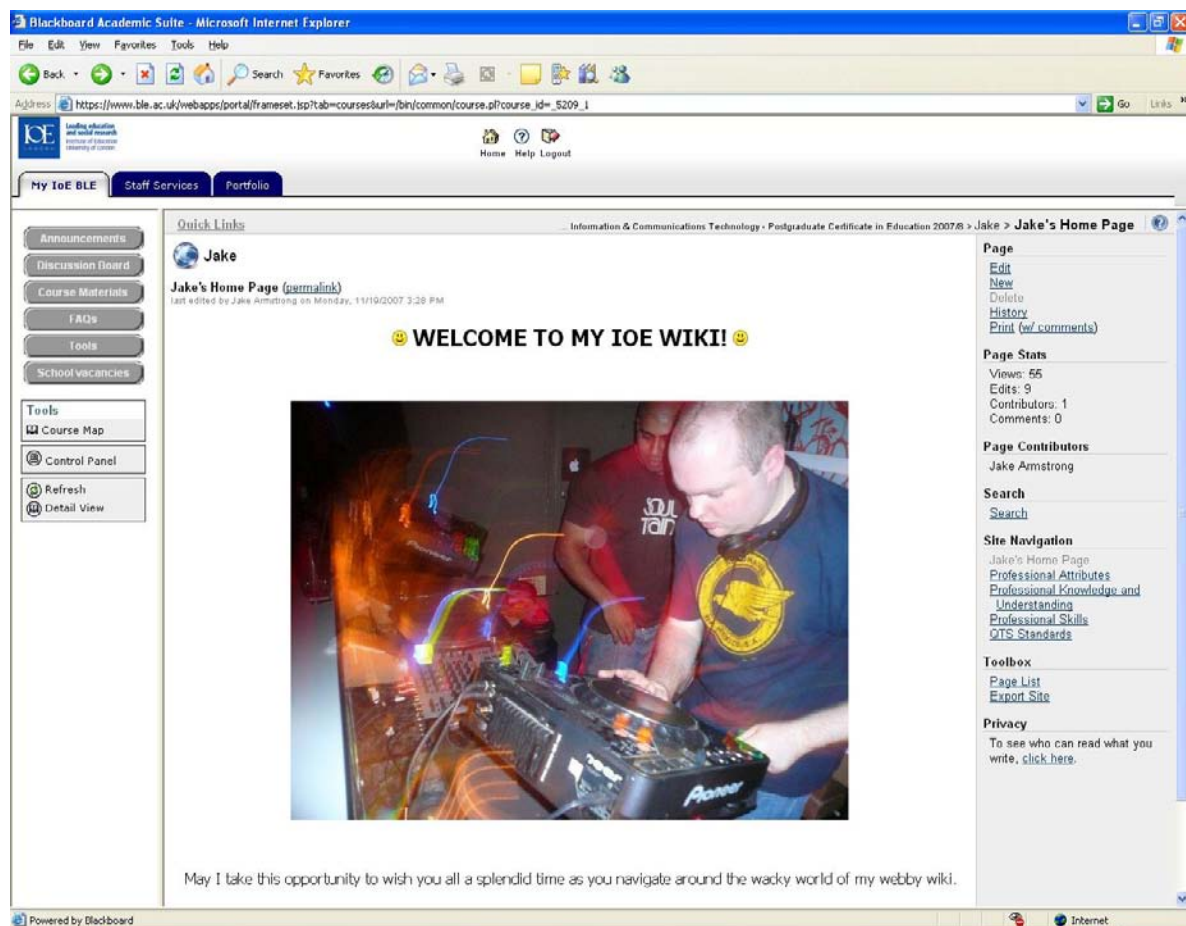


Figure 4: Samples of individual wiki-folios – 1.

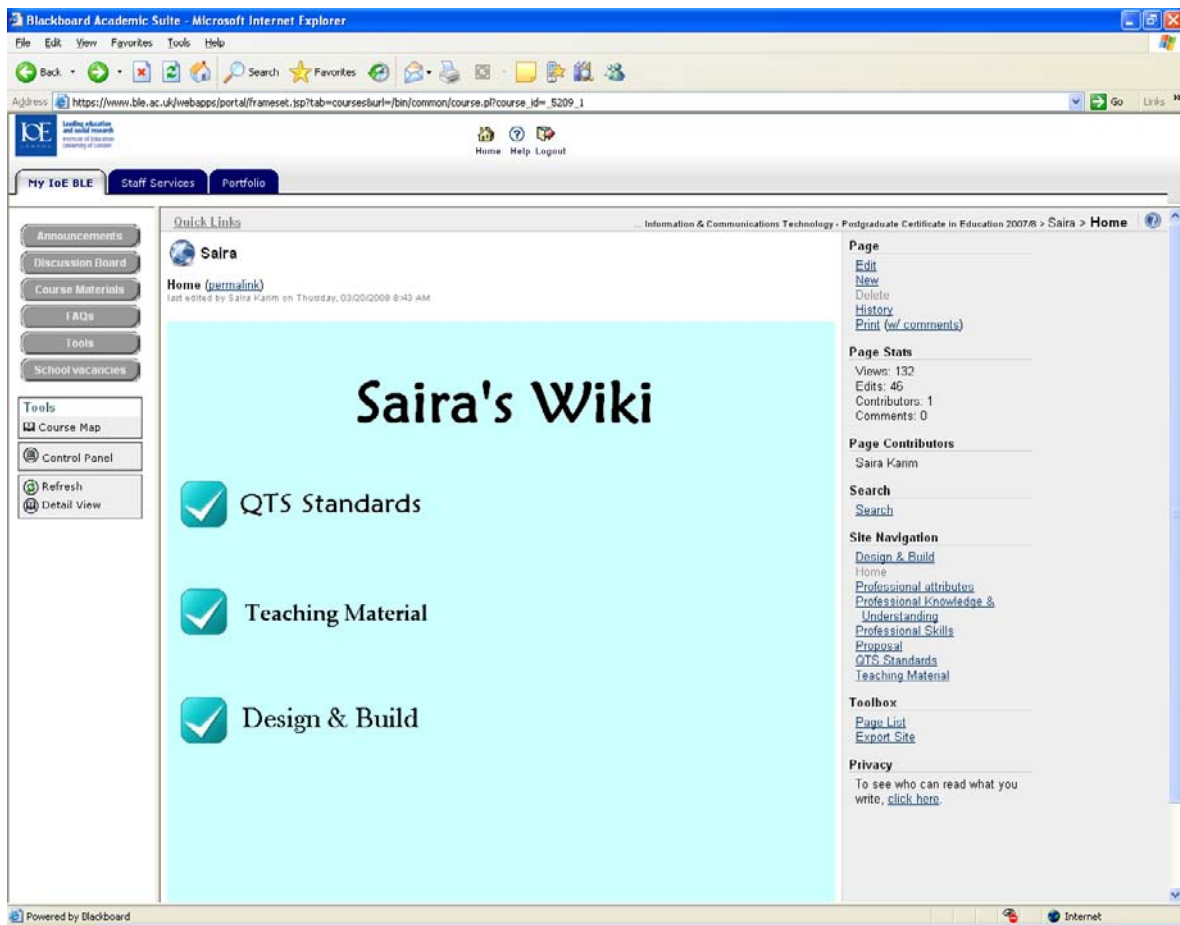


Figure 5: Samples of individual wiki-folios – 2.

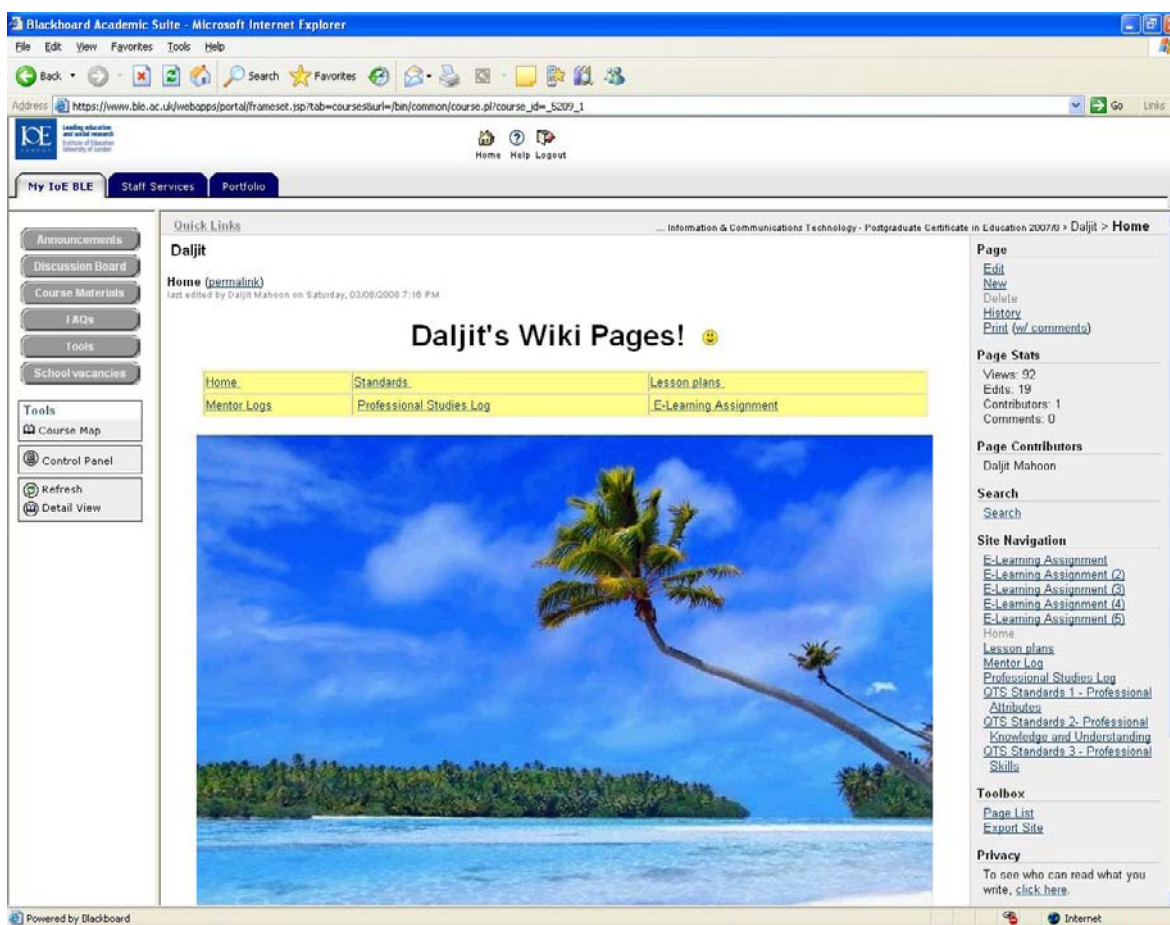


Figure 6: Samples of individual wiki-folios -3.

CONCLUSION

From the outset the project aimed to apply existing research to develop a more integrated approach to the use of e-learning in a course of initial teacher education.

From a practical perspective this has been partially achieved by supporting collaborative learning through the construction of group 'theme wikis' and the use of 'wiki-folios' as a tool for personalisation and the assembly and presentation of assessment focused evidence. These developments have added value to the course.

A second and linked objective was to seek to inform the process of redesign through engagement with an identified body of existing e-learning pedagogical research. This objective was less well met for a range of reasons.

The relationship between research activity, its processes and outcomes and teaching is not well articulated in a mutually beneficial manner. Research and teaching are frequently carried out in the same institution and often by the same staff but the two serve different purposes. Research, often externally funded, is targeted at priorities which are not generated within the institution and is focussed on contributing to a generalisable

knowledge base. 'Deliverables' are often framed in terms of reports, academic papers, seminars etc. rather than specific solutions to specific problems. The research activity described above is clearly an essential and valuable element of the academic enterprise but less well suited to supporting specific developments and solving pressing problems framed within institution specific constraints. Seeking to gather then apply such research juxtaposes the relationship between the problem to be solved and the knowledge needed to support the development of a solution. In short, placing existing research ahead of the identification of development needs leaves us with the task of seeking a problem to fit the solutions on offer.

The argument presented here in no way questions the value of academic research but raises the question of the balance between an institution's needs to contribute to a broader academic knowledge base and to engage with practical issues relating to teaching and learning through operational research undertaken in response to a specific need and having as its outcome a specific solution.

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