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Distilling lessons from across different types of e-learning interventions

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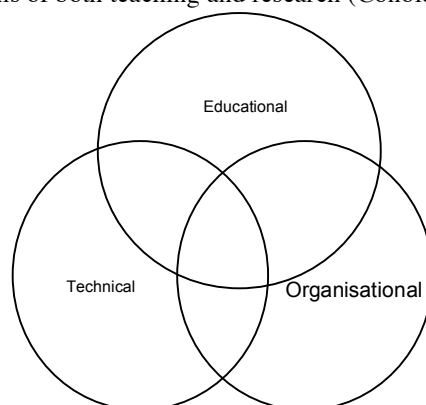
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Abstract. Most Higher Education institutions are now embracing e-learning to some extent. Some have instigated institution-wide e-learning initiatives, whilst others are engaging in the use of e-learning to expand their portfolio of course provision and the development of new niche markets. But the successful deployment of e-learning, whether large-scale or more localised, is complex and multi-faceted. This paper considers these complexities by drawing on the findings across four disparate e-learning evaluations, arguing that these provide a valuable means of extrapolating key lessons to ensure better use of e-learning and avoidance of large-scale, spectacular and public disasters, such as the UK e-University.

Keywords: Evaluation, Learning Technology, UKeUniversity, TOIA, EBank, Neonatal.

1 Introduction

Conole *et al.* (2007) describe e-learning interventions in three main categories: educational, technical and organisational. As the figure illustrates these overlap so that some interventions may cross two or even all three categories. This paper considers the findings from across four major evaluations which span these categories of interventions and attempts to draw out the key issues which arise from the findings. The four case studies discussed illustrate the issues which arise from across different kinds of e-learning interventions. The first focuses on a large-scale organisational intervention – the UK e-University. The evaluation focused on both the organisational structure and processes involved in the initiative as well as the pedagogical model adopted (Conole *et al.*, 2006). The second case study is of a technical intervention, the JISC-funded TOIA project which developed and deployed a free online assessment system for the FE and HE sectors (Conole, 2007a). The third case study is a pedagogical intervention, an international EU-funded development of an online course for Neonatal practitioners (Conole and de Laat, 2006). The final case study provides a cross cutting example, in the form of the eBank project which was innovative in terms of both teaching and research (Conole, 2007b).



McPherson and Baptista Nunes (2007) provide an alternative framework for e-learning which measures the level of academic involvement against organisational focus. They highlight similar categories, with overlapping spheres of organizational, technical and practical knowledge, but provide a more fine grained mapping (of organizational setting, technical infrastructure, curriculum development, instructional design and deliver).

The paper focuses on the experiences and lessons learned from each of these four case studies. The main focus is from an evaluator's perspective – in terms of how an external evaluation can provide a valuable lens on emergent themes through studying the project summatively and from a distance. This perspective enables one to take a meta-view across different types of interventions. A particular interest in this paper is to use this approach to try and describe the various roles and approaches to e-learning; to draw out what worked and what didn't and to identify the factors which contributed to the respective successes and failures in each case. In particular each case study explores the relationship between the documented vision and aspirations of each project and the actual impact on practice. The paper is important in terms of helping to understand the complexity and challenges of different types of e-learning interventions. It offers insights for both policy and practice.

2 Interventions of practice

Before summarising the findings from across the case studies, the three categories of innovative interventions described by Conole et al (2007) are summarised here; each of the four case studies are then described in relation to these categories.

Educational interventions are primarily about the development of innovative approaches to teaching and learning. Many institutions, for example, have set up funds to enable practitioners to experiment with the use of technologies and report back their evaluation findings. Initiatives about staff development for example fall into this category; such as the development of support materials or workshops for effective use of technologies, institutional 'show and tell' conferences or themed learning and teaching seminars to promote dissemination of activities across an institution. One of the most common types of educational intervention involves providing small grants to enable practitioners to explore the use of learning technologies in their teaching.

Technological interventions are those which are primarily driven by either the development or implementation of technologies. Examples include the increased interest across the sector in the past decade on the use of Virtual Learning Environments. Alternatively some institutions focus in on the development and deployment of particular types of technology; for example e-assessment or e-portfolio tools.

Organisational interventions include top-down interventions, either directed through the formulation and implementation of strategies (such e-learning, teaching and learning or information strategies) or in response to external requirements (such as quality assurance). Often strategic interventions follow a top-down/bottom-up mixed-mode approach of the type. Quality assurance is an important example of an externally imposed intervention and has acted as a driver for change by requiring institutions to examine their existing practice and demonstrate the ways in which they support learning and excellence in teaching.

3 Case study one: an ‘organisational intervention’ – The UK e-University

In 2000 the UK Government launched a major new initiative, UK eUniversity (UKeU) to capitalise on the potential of e-learning. With over £60 million of investment the UK eUniversity was created to act as a broker between existing universities in terms of marketing online degrees from British universities. The UKeU represented a major large-scale e-learning initiative, however only five years later it collapsed in a blaze of spectacular publicity. Its early demise sounds a warning note to all of us involved in e-learning. It is important that we learn from this experience so as not to replicate its mistakes, but also not to allow its failure on some levels to drown out the enormous potential and good practice which it instituted on other levels. The evaluation examined both the pedagogical model underpinning the establishment of the UKeU and the organisational processes and business model adopted.

The UKeU was initiated in response to a perceived need for the UK to be a key player in packaging UK Higher Education internationally in a distance learning format (Bacsish, 2004). It was conceived not so much to respond to what others were doing, but to enable the UK to take a lead in this emerging world of e-learning. The e-University business model was based on a critical mass of high-quality learning materials being available online. These materials would be wrapped around by learner support and administrative mechanisms, commissioned in response to an identified demand, or offered by institutions and other organisations wishing to contribute to the e-University.

The UKeU was set up with an ambitious set of aspirations, which with hindsight might be considered somewhat naïve. Firstly, that the e-University would be an entity that will be different from, as well as ‘better’ than the other current offerings: ‘better’, not only in terms of its offerings, but also in terms of being proactive for tomorrow’s needs. Secondly, the e-University would capitalise on the UK’s strengths, knowledge, reputation and experience and exploit the opportunities provided by the ‘new economy’ technology and by the rapidly expanding markets. Thirdly, the e-University would be able to respond to demands and adapt in advance of others and so stay ahead. Fourthly, to take a global lead, the e-University would need to grasp new ideas in imaginative ways – even though some of them were recognised as being risky. As such the UKeU was set up as an independent company, which was designed to act as a broker with existing institutions in terms of marketing online British degrees.

A strong pedagogical vision underpinned the development of the UKeU learning platform, which aimed to apply best practice and the latest in innovative approaches and findings from e-learning research. Aspects included: taking account of how people learn online, recognising how different learning strategies influence the design of learning materials, understanding that electronic media operate with a fundamentally different model than print, taking account of the social dimension of learning, valuing the importance of interaction, and recognising the importance of learner profiles and assessment in the provision of learning material appropriate to the expectations and needs of users. These aspirations translated into the following ways in which the system was operationalised:

- **Learning objects.** The concept of courses built from small learning objects was central to the UKeU pedagogical approach. One of the perceived advantages of this approach was the notion that learning objects could be repurposed in different contexts. Objects were designed to be used in the context of learning activities and an important distinction was that what made information into a learning object was direction.
- **Course structure.** Clear and informative navigation through the material was considered critical, so that the students could work through the materials in a flexible way appropriate to their own learning preferences and the nature of the subject material. The aim was to ensure that the students were given a clear and efficient way of viewing courses at whatever level of detail they were interested in.
- **Student preferences.** The courses were intended to be student-centred, designed to meet individual student needs and preferences. The way in which students learnt was also considered important and in particular how the course could be designed to facilitate effective learning.
- **Learning activities.** Learning activities were designed to meet different needs; to support both independent and collaborative study. They were designed to be: student-centred, active and engaging, of an appropriate duration to ensure effective learning, collaborative and reflective, as well as being vicarious so that students would be encouraged to peer review and learn from each other.
- **Course models.** Three models were identified for course delivery: completely self-paced courses, semi-synchronous cohorts, and the ‘bush-taxi’ model (where courses are advertised without no fixed start date and start when there are enough

students to form a viable cohort). However, one of the problems of adopting a learning objects oriented approach to course design was that this made it difficult to provide overall cohesion to the course and to map the different elements of the course together.

- **Tutor role.** The tutor's role was seen very much as a facilitator of learning, keeping track of the students' progress and guiding them to be more independent learners.

So to what extent was this vision actually realised? Those interviewed adhered strongly to the key aspirations underlying the approach they adopted and believed that they had an effective e-learning model. However translation of this vision into actually course developments, working in conjunction with traditional institutions proved problematic. A number of reasons were suggested for this. Firstly, the HEIs involved were not experienced in developing e-learning materials and many of the developers and tutors did not have personal experience of working online. Secondly, the relationship between the HEIs and the learning technologist team at UKeU was problematic, there was not an ongoing and trusting collaboration, with HEIs not utilising the expertise of the learning technologists. Thirdly, the HEIs were inherently conservative in their approach and felt insecure about doing anything different from other HEIs. Therefore those interviewed felt that it was not the platform that restricted pedagogical approaches and innovation, but the individuals themselves involved in developing the courses and their lack of experience of e-learning. This was exacerbated because not enough emphasis was given to the staff development needs of those involved in the process, particularly in terms of pedagogical support. The learning technologists would have liked to have adopted a more proactive role in course design, but the HEIs misconceived the role of the learning technologists, viewing them essentially as 'techies', rather than e-learning experts who could help with the pedagogical design of the courses.

The conclusion from the evaluation was that in many ways perhaps the UKeU vision was an idea ahead of its time. It attempted to bring together people from diverse backgrounds (in order to achieve the vision), but no steps were taken to try to smooth the way for cross-sector and cross-cultural relationships formed on the basis of mutual understanding and respect.

The findings raise a number of important issues for existing universities and their e-learning developments and the kinds of technical, organisational and pedagogical issues arising from the evaluation are generalisable to any e-learning project. However, one more specialised finding from this particular evaluation is that the commercial aspects of these kinds of initiatives can result in corporate/academic divisions – a tendency towards 'business' or 'industry' talk; is not likely to find much favour among many academics. Despite this – it can be argued that academia has the potential to learn significantly from the experience of Industry of the integration of technologies and that this knowledge could be usefully transposed into the academic arena.

4 Case study 2: A ‘technical intervention’ – the TOIA e-assessment project

The second case study is primarily focused on a technical intervention; the JISC-funded TOIA (Technologies for Online Interoperable Assessment) project, which focussed on the development of a free e-assessment tool for use across FE and HE. The intention was that the project would demonstrate best practice in achievement of interoperability and implementation of the e-assessment standards. The project was also about capacity building and raising the profile of e-assessment across the FE and HE sectors. The findings of the evaluation cover the following broad themes: project aspirations, links with related projects, key success factors and outcomes, dissemination mechanisms, reasons for using TOIA, usage, comparison with other e-assessment tools, TOIA support and a hosted service and views on continuation.

The findings of the evaluation highlight that the project was timely; occurring at the start of an upsurge in interest in development and use of e-assessment across FE and HE. The project steering group worked well bringing together a range of expertise in e-assessment. The project explored an interesting model of technical development through partnership with a commercial company and outsourcing of the product development. This enabled the project to produce a high-specification, high-functionality e-assessment system within 18 months of the project inception. The project was deemed to act as a valuable catalyst to raising the profile of e-assessment across the sector and enabled individuals to trial a high-end e-assessment system, as well as enabling them to explore its potential use for teaching and learning. The project used a range of appropriate mechanisms to disseminate the product and acted as a test bed for demonstrating proof of concept in interoperability by implementing and demonstrating the potential of the Question and Test Interoperability (QTI) e-assessment standard.

The overarching key success factor of the project was that it enabled the development and deployment of a high-end, robust and extensive e-assessment tool across FE and HE. The speed of development achievable because the project worked in partnership with a commercial company meant that a functional set of tools was available within about 18 months of the project’s inception and unlike many development projects, this meant it was possible to concentrate on the use and uptake of the system and to make an informed judgment on the longer term viability of such a project by the community. However the development of a working relationship with an outsourced development outfit abroad was not without its teething problems and the development of a clear and effective communication mechanism proved critical to the success of the project.

The decision to outsource the technical development to a commercial partner clearly enabled the product to be developed much more quickly than would have been possible with in-house university developers. However involvement of a commercial partner did raise a number of issues. A key issues was that ultimately the commercial partner was looking for a return on investment. But a second issue was that there was

some wider disquiet in the e-assessment community about use of public funding to sponsor a commercial development, albeit under a JISC project. This is important because clearly it is critical that the sector engage with and develop a trusted relationship with relevant vendors in the area. Furthermore there was as tension between partnership with a commercial outfit and the development of an open source product; TOIA occurred just before the Open Source movement became important.

Overall the perception was that TOIA contributed to the interest in e-assessment across the FE and HE communities and was part of a suite of e-assessment projects (then and after) which helped to reinforce and strengthen the e-assessment community. Evidence of this is visible in the range of e-assessment projects which have arisen since TOIA.

5 Case study three: A ‘pedagogical intervention’ - the Neonatal project

The Neonatal Training in Europe Leonardo da Vinci project developed an online course for Neonatal practitioners across Europe. It consisted of the development of six modules. Delivery was achieved via an online course in the Moodle, Virtual Learning Environment, however course materials were also made available via CD ROMs. Over one hundred participants initially enrolled on the course which ran from April 2005 – April 2006. The evaluation focused on a series of key evaluation questions concerning the learning materials developed by the project, the perceptions of the participants involved in the programme, and analysis of how well the project had achieved its stated aims and objectives. The main conclusion from the external evaluation was that the project had met its stated aims and objectives and that the project team had delivered a successful online course. On the whole, tutors and tutees engaged enthusiastically with the course materials, engagement with the communication mechanisms through the chat and discussion forums was more mixed. It was evident that participants enjoyed the course and found it valuable, with the most important element of the course consistently being cited as the opportunity the course afforded for the sharing of expertise and best practice with colleagues across Europe.

Key findings were as follows:

- The induction programme was viewed as important as it helped introduce the course to the participants and helped them to orientate themselves in the online environment.
- Participants showed a good knowledge and use of both the asynchronous and synchronous discussion tools.
- The central team were sensitive to the changing dynamics of the online course and adapted the presentation and structure of the course accordingly.
- The development of a good set of course materials, a well structured and signposted website and a clear induction programme were particularly valuable. The central team played an important role in the project in terms of overall

coordination, final editing and general quality assurance in the development and delivery of the course.

- It was interesting to note the importance placed by participants on the use of chat to undertake and discuss tasks. Chat appeared in some cases to be used in preference to the discussion forums, providing participants with the opportunity to engage in real-time and focused discussion around particular topics.
- A somewhat surprising finding was that participants also used the chat facility post-event; by downloading and reading archived chat sessions. This represents a passive, individually focussed use of a tool, as opposed to the more traditional view of chat as an active, time-dependent, collaborative tool.
- Social Network Analysis and Content Analysis of the discussion forums and the chat sessions indicated vibrant and engaging discussion amongst the participants with a high degree of focus on task. Groups are dynamic with inter-changeable roles between tutors and tutees in terms of focus on learning related or teaching related contributions.
- The professional discourse of the groups was evident in the Content Analysis – with a shared repertoire of language acting as an important facilitator to aid communication and foster collaboration amongst the participants.
- Participants liked the course for a variety of different, personal, individual reasons – some liked working through the material on their own, others valued the chance to collaborate via the discussion groups, others enjoyed the quick, fire conversation generated through chat. This suggests that it is important to build such variety into designing course of this kind, recognising that participants will have different skills, levels, interests and learning preferences.

6 Case study four: A ‘cross-cutting intervention - the e-Bank project

The final case study, the JISC-funded e-Bank project, does not fit neatly into the categories of intervention outlined at the beginning of this paper as it focuses on a project which bridged both research and teaching and hence represents an interesting example of an attempt to apply outputs and innovations in research to teaching. The aims of eBank were threefold: i) to make research data available through open access, ii) to link data to research publications and iii) to utilise research data directly in a learning context.

The evaluation looked at: the project aspirations and the origins of eBank, collaboration and inter-disciplinarity, links with related projects, key success factors and outcomes, dissemination mechanisms, barriers and enablers to uptake, conceptual models underpinning the project, and the student experience of using eBank material. The evaluation foregrounded a series of key issues with current research practice processes and potential ways in which technologies might address these. These concerned the nature of electronic data and the way in which it is archived, managed and retrieved, as well as issues to do with the human and

organisational aspects of the research process and how better use of technology might improve research processes.

The project achieved five inter-related achievements: i) a data repository of crystal structure data, ii) a metadata application profile, iii) an aggregator service, iv) integration within a nationally support subject portal, and v) demonstration of the use of eBank-type material in a teaching context. Two key success factors are evident: the productive nature of the interdisciplinary team involved and a comprehensive dissemination strategy with appropriate targeting of relevant stakeholders to ensure buy in and take up of the concepts underpinning the project. Identified barriers and enablers centred on nine key issues: ownerships, research practice, level of ICT skills, institutional infrastructures, publishers' attitudes, technical issues, funding drivers, competing agendas and IPR issues.

A key benefit of the project was the inter-disciplinary approach adopted – drawing on the expertise from Chemists, Librarians, Information Scientists, and Computer Scientists eBank developed out of a set of inter-connected interests in a shared problem space. It brought together subject experts from different disciplines with an underlying shared understanding.

It is evident that there are a range of political complexities and sensitivities associated with this type of development, not least because the essence of the project related to issues of ownership and control, and potential intervention/changing of standard establish practice and ways of doing things; the project needed to steer a careful path through this complex maelstrom. The ideas embedded in eBank have the potential to fundamentally change research practice. However, this vision if instantiated across the research domain would have a huge impact on research practice leading to changes in the roles of the different stakeholders (students, tutors, researchers, publishers, professional bodies, etc) involved. The project was mindful of this sensitivity and maintained a careful balance between pushing the vision forward and taking account of different stakeholder perspectives. Despite these complexities the project did appear to achieve a remarkable degree of success. They were able to put in place mechanisms for getting relevant stakeholders on board; working with their different agendas and finding compromises that suited all. Working directly with the publishers and professional bodies was of particular note as this gave weight and credence (and sustainability) to the project outcomes.

Such a visionary project is not without associated barriers. Technical barriers identified included getting different types of data into a schema and/or a repository, decisions about the type of repository, as well as technical issues around developing, running and maintaining repositories. Sustainability was also a key issue, for researchers not knowing whether or not a repository was going to continue to exist over time was cited as a barrier to uptake. It is worth noting that this was also a key issue for the third case study (the TOIA project) where lack of uptake of the product by the community was to a large extent because there was a lack of clarity over its future funding and maintenance. For eBank there were also associated issues about the attitudes of journals and publishers to this new form of making data available and

whether they would be prepared to change their existing business models. Interviewees felt that until researchers were aware of the possibilities and convinced of the benefits, they will be unable to take full advantage of initiatives like eBank and unwilling to change their practice. Other barriers included: barriers to making data open and accessible, issues about data storage and maintenance, institutions lacking the necessary infrastructure or support facilities to develop and maintain data sets. Funding barriers (lack of finances to support the development or maintenance of a data set; competing institutional demands on resources) were also cited. Local agendas and politics are also likely to influence success, as is evident in other examples of large-scale technological intervention. One specific barrier for learning and teaching cited was the need for tutors and students to develop the appropriate range of 'e-skills' to design and deliver (from the tutor perspective) and to use (from the student perspective) resources like eBank. A further concern raised was about ensuring the embedding and sustainability of such innovations beyond initial uptake.

The evaluation also highlighted issues about the impact of projects like eBank on changing roles and organisational structures. It points to the blurring of the boundaries of ownership and control and of what constitutes 'research' and 'teaching'. Visionary projects like eBank raise a host of questions. What might be the longer term impact of projects like eBank on institutions - in terms of the division between teaching and research, and the balance between individual/central ownership and control of research data? What does it mean to be a librarian, a researcher, in this new context? In terms of cultural/social barriers there were a set of issues raised by the interviewees about ownership of data and/or community sharing. The approach adopted by the eBank project was about making the research process more explicit, hence exposing previously hidden processes and practices. But what does this exposure actually tell us about the research process? Is it an accurate reflection of actual practice? Who is this information for and how might it be used?

Use of the e-Bank material in a teaching context demonstrated a number of benefits: the importance of developing understanding through experience and by doing, access to data and 'real' results which enabled students to interact and hence develop their own understanding and the value of the real-life, authentic nature of the tasks included in the course. Students liked the ability to be able to download and manipulate datasets over the internet and the ability to see the translation of information from one format to another.

A core aspiration of the project was that by providing a link between published references and research data, it would then be possible to make an explicit link between the data and the final published material in a learning context. A student reading references supplied on a course reading list would then actually be able to go and retrieve the associated data, to manipulate and interrogate it according to some defined learning activity. More broadly, Lyon (2003) articulates a number of potential benefits for learning: providing access to authentic and up-to-date real research data and helping students to develop their evaluative and critical skills. Active engagement with datasets enabled students to understand difficult concepts for the

first time – by being able to experiment and use – for example linear regression – use in context enabled them to be able to see the relevance and value of such techniques.

Importantly, eBank was part of a much broader and imaginative vision of the future potential of providing open access to research data and the way in which technology can unlock this potential in novel and exciting ways, resulting in a potential shift in both the way in which we view and value information and the way in which we communicate and share information. The notions inherent in eBank and projects like it, offer the potential for a radical future in which both research and teaching practice are fundamentally changed because of the way in which technology is used.

Research-led teaching is a familiar part of the rhetoric of modern education in the UK (Brew, 2006) – particularly for the research-led universities, but providing evidence of examples of specific instantiations of ways in which research actually does impact on teaching is more difficult. The eBank project offered a real and tangible example and the experience of the eBank project highlights the potential innovative applications of technologies for both teaching and research. It raises a raft of critical questions about not only how we develop, manage and share information, but about the very nature of core concepts associated with education – what constitutes research, how is data valued and used, and what is the relationship between research and practice?

7 Conclusion

The four case studies described here provide different examples of e-learning interventions and illustrate how each raises a host of different questions and issues. In each case it is evident that there are valuable lessons which can be abstracted and applied elsewhere. Barriers and enablers to successful implementation of these kinds of interventions are dependent on a complex range of inter-connected pedagogical, technical and organisational factors. Using a mapping of project aspirations with actual outcomes provides a valuable lens to understanding the nature of the interventions and their impact and a means of generalising the findings.

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