How can you pilot lifelong learning? The experiences of the JISC distributed e-learning regional pilot projects

By Mark Johnson, University of Bolton and Sarah Davies, JISC

Introduction

The fundamental question of lifelong learning concerns the possibility of embedding sustainable practices amongst learners and within institutions which serve the needs of learners as they negotiate formal learning episodes across institutions, informal learning and the demands of everyday life. The identification of efficacious learner and institutional practices can lead to the formation of policy guidelines which can inform both the focus of technological infrastructure and pedagogic and organizational recommendations. One way to identify these practices is to try them out by attempting to embed the technologies that support them. Guided by well-established processes for the adoption of new technology (Rogers, 1962; Moore 1991) the JISC regional Pilot programme was specifically designed to intervene in the adoption cycle of a range of learning technologies in order to establish the long-term efficacy of the learner and institutional practices that evolved around them.

Background to the Pilots

The JISC regional pilots were devised in 2004 against a technological and pedagogical background which was recognized to be in the process of dramatic transition. Amongst the key features of this background were:

- A growing interest in a service oriented approach (SOA) and the creation of the JISC e-Framework (then the 'e-learning Framework') as a blueprint for sustainable technological development in e-learning. This had as its core background the importance of the repurposing of existing services in new contexts, and had also seen the creation of a number of e-learning tools developed by JISC over the previous year.
- The emphasis on the repurposing of content, partly driven through the recently defined standards and tools (e.g. RELOAD) in Learning Objects, and the emerging standard of IMS Learning Design. This entailed the recognized need to provide effective repository services for this content. This work also gave rise to other work within JISC, notably JORUM.
- The recognition that despite the success of widening participation initiatives, accessing and getting the most out of higher education still presented significant challenges for many non-traditional students. Related to this, discontinuous or simultaneous learning episodes and the movement of learners from one institution to another were identified as key attributes of

lifelong learner behaviour, leading to the desire for learners to be able to connect up with their previous learning experiences.

- The creation of technologies to support this in the field of e-portfolio. A number of significant developments with e-portfolio systems had been able to identify the key features that were important.
- The importance of enterprise systems thinking and the interoperability between learning systems and the general Managed Learning Environment.
- The recognition that reflective practice and personal development planning were important elements in the creation of self-directed and autonomous learners. This was linked to the work of organizations like the Centre for Recording Achievement.

Motivated by these factors, the objective of the pilot studies was to fund a number of projects which took a regional, cross-institutional and collaborative approach to supporting lifelong learners and facilitating progression. They would address the issues relating not only to learner mobility, but also the technical agendas of web services, learning objects and repositories. Thus in sum total, there was coverage of the main themes of the e-learning situation as it was seen in 2004. In addition, the projects were to be regional collaborations, mirroring HEFCE's belief that progression and widening participation are usefully tackled at a regional and sub-regional level. This regional, collaborative aspect of the projects would also stimulate cross-institutional cooperation.

The 21 projects that were funded can be divided into three principal themes.

- Developing technologies and practices to facilitate progression through investigating interoperability and the interface between learners and educational institutions.
- Development of practices and technologies to address collaborative teaching and sharing of resources
- Developing learner technological practices to support independent lifelong learners (e-portfolios)

These themes fit with the broader framework of the JISC development model. This aims to identify areas of activity which will collectively contribute to the development of policies, systems and structures at institutional, regional and national levels to enable the effective use of ICT to support learning and teaching. The activities identified are:

- Exploratory activities: exploring issues, new technologies and new approaches
- Prototyping activities: constructing prototype systems or processes

- Demonstrator/piloting activities: trialling the use of a new practice or technology in order to feed back into its development or inform the decision to move to wider scale use
- Transformational activities: implementing and supporting long-term change within or across institutions or communities.

The regional pilots were intended to be in the second half of this continuum: demonstrating and piloting tools, systems and approaches, and moving towards sustainable implementation where the piloting was successful.

Practices relating to e-portfolio technology featured in two of the themes above. Those projects geared towards independent lifelong learners focused on a general benefit of e-portfolio to student learning in a particular context (EPICS[1], e-PISTLE, FILE-PASS, MANSLE, MyWorld, PDP4Life). Those projects which were concerned with e-portfolios and progression examined the surrounding system infrastructure around e-portfolio systems, and dealt with issues concerning inter-operability, (RIPPLL, EPICS, PDP4Life) or trialled the use of e-portfolios to support students through application and transition points (ELP). Some projects also supported learners in the development of skills for lifelong learning through the provision of learning resources and learning activities on study skills (PLPP, eLISA).

Other approaches towards facilitating progression which were piloted by projects included the use of systems to help learners see the relationships between their skills, experience and aspirations on the one hand, and course offerings on the other (L4All, Learning Matrix). SUNIWE sought to harness interoperability as a way of empowering learners to become more independent and cross institutional boundaries.

Practices related to sharing of data – and particularly resources – made up the final section of projects. These projects sought to investigate practices and technologies for re-use of learning material. These included EERN, e-Swap, G4L, REHASH, L_20 and WM-Share. Projects sought ways in which content could be repurposed, either through investigating specific content modules in a domain (L20, REHASH, G4L) or examining ways in which object repositories could be searched (EERN), or created (e-Swap) or shared (WM-Share).

[1] Project acronyms are spelled out and further information is available on all projects from http://www.jisc.ac.uk/pilotsdetail.html

Review of Project Progress

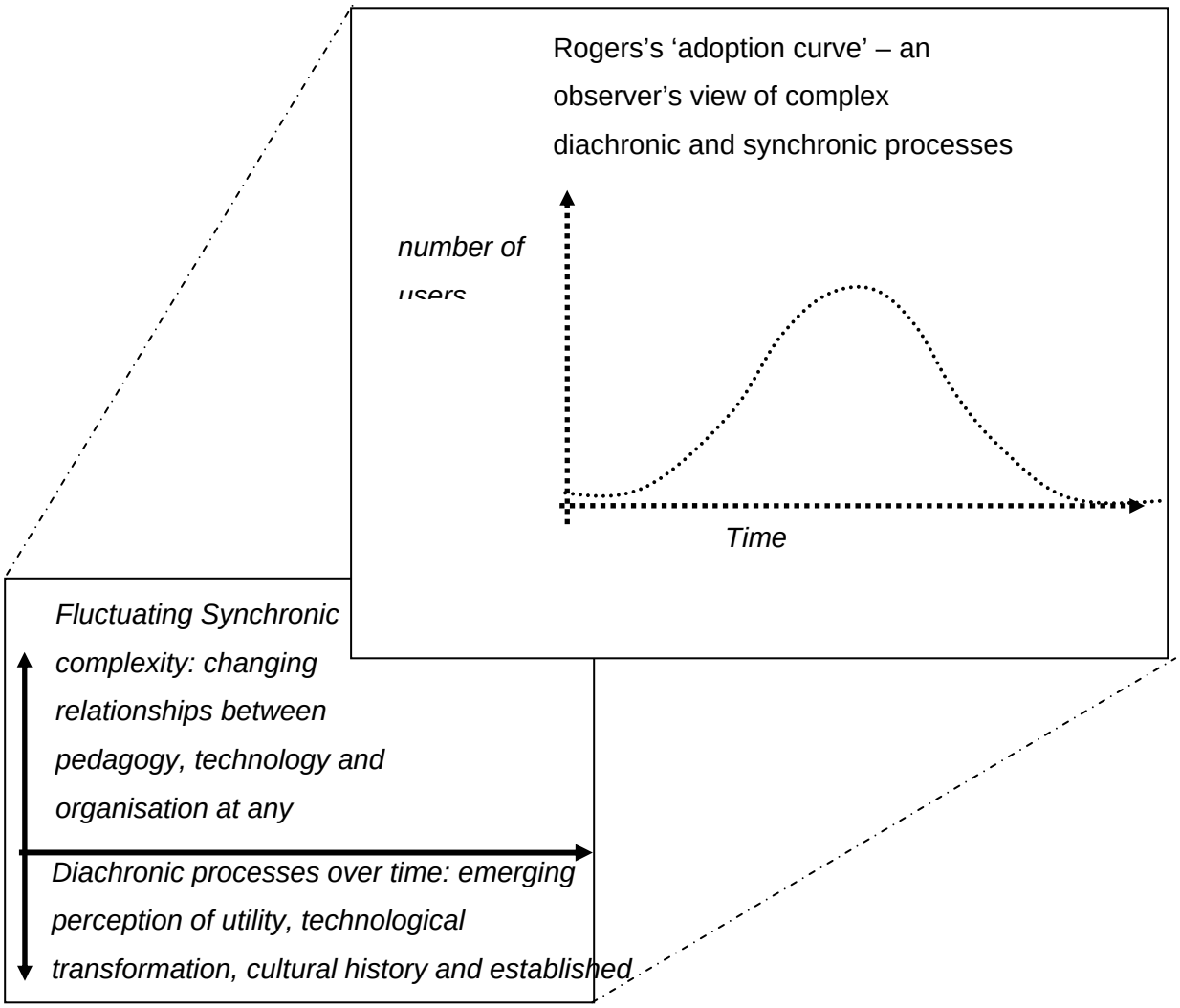
With the benefit of hindsight, we can chart the progress of projects from inception to conclusion. The aim of most projects was to investigate the effectiveness of the tools or approaches which they were piloting. In order to establish this, projects had to set up cross-institution working groups, review available technologies, implement existing technologies or plan and develop new technologies and devise strategies for embedding practice. These plans reflect the technology adoption cycle identified by Rogers in which a technological artefact (a tool, system or process) developed by a group of 'innovators' can be embedded through a community of 'early-adopters' and then to deeper embedding by an 'early majority' of users. Generally this is an approach which views the technological tool as separate from the adoption process: that given a technological artefact, particular types of communities of users will assemble around it over time. There are many instances where Rogers's curve seems to fit real experience, and the separation of issues of prototyping and piloting within JISC's development model reinforce this particular view of technological intervention, and this naturally influenced the conception behind many of the pilots.

However, it can be argued that the real picture of technology development and implementation is much more complicated and cyclical than the clearly delineated categories of the JISC development model, with many aspects being inter-related. This is reflected in the fact that many pilots from the outset involved activities from across the spectrum, with some ending up achieving most successful outcomes in the exploratory/prototyping areas of the model. The successes related to the transformational aspects of the model – particularly in embedding new practices and technologies – were rather fewer. This was due to a number of factors, including the lack of robust tools to pilot, and the feeling from practitioners that practice in some areas still required more exploration before piloting could begin. Many projects identified 'soft' factors as causal. The EPICS project started out with a commitment to achieve technical objectives, but recognised the need to rescope early on to address the real concerns of practitioners and institutions at the more exploratory, process-oriented level. The project identified problems in managing the variety of competing demands of different FE providers and urges us to "Understand that e-learning projects aren't just about e, or even just about e-student-learning" and that "Institutions need to prioritise learner needs as a key area of work.". In their project on the reusability of learning content, the EERN project had related complaints about prevailing cultural conditions – particularly those relating to 'gatekeepers' and the 'culture of sharing' and the general 'management of change' within institutions. FILE-PASS identified "working 'by proxy' with cohorts" as an issue, and went on: "some of the partner representatives did not have direct access to students, particularly those colleagues not based within a faculty but based within a service department. This lack of direct contact with cohorts caused organisational problems.". The G4L project

argued that it was difficult to “broker our blended model to end users and [provide]‘hand-holding’ to the required extent in order to demonstrate the value of e-learning within a work context.” The Learning Matrix project identified that “Explaining and showing the potential application of the distributed, interoperable approaches as viable business propositions” was difficult for a regional information service, which relies on comprehensiveness of coverage for its final value. And in some cases, the technology adopted was deemed not appropriate to the tasks to which it was put (MyWorld). Some barriers related to technical issues. For example, some projects had difficulties overcoming technical barriers associated with enterprise systems (firewalls, etc), while others had to address challenges associated with the implementation of the service-oriented approach, primarily caused by the high heterogeneity of the different services that had to be integrated (L4All).

Synchronic and Diachronic Factors in the adoption of new technological practices

The variety of experiences which gradually emerged through the course of the pilot projects may be seen in two principal ways. On the one hand, against the idea that technology and pedagogy are separable, the projects recognized the need for technology to be considered in the structural context of education at any one point – factors which, as Liber (2004) has discussed, link technology inseparably from pedagogy and organization. These may be seen as *synchronic* factors. On the other hand, the need to consider those factors which emerged over time, and which include the changes in attitude, technological changes and the dominance of established practice means that there is also a temporal, or *diachronic* dimension which must be considered. Diachronic and synchronic structures are nevertheless inter-related. On the one hand, diachronic factors can determine new organizational structures. Here it may be argued that the process of piloting a technology, or the processes involved in technology adoption in general are all diachronic processes. If the adoption is successful, then organizational change is the result: in other words change in the synchronic structure. In the other direction, it may be observed that synchronic structures can frame diachronic processes: thus particular organizational structures within an institution can determine the sorts of temporal processes that take place. We may diagrammatically represent this complex relationship between synchronic and diachronic processes as two axes, and show how an observer might witness these complex processes as a Rogers adoption curve:



This contextualisation of Rogers curve avoids what Lawson (2006) identifies as two fundamental problems in thinking about technology. On the one hand, it avoids the technological determinist position that the technology causes the social change inherent in adoption. On the other, it avoids the constructivist position that the success of the adoption is dictated by the community. Instead, we see the phenomenon that Rogers describes of distinct groups of users which gather around a technology and which rise and fall over the adoption cycle is a projection derived from the complex interplay between synchronic and emergent factors. The practices and technologies of Web2.0, for example, may be represented by the adoption curve, where innovators led to early adopters and early majority. But the cause of this process is neither solely the gradual accumulation of members of a community of practice or the technology itself. The rise in users is a structural (synchronic) social change produced through the interplay with existing historical factors and the structural change produced by the technology itself.

Over the course of the pilot projects, a number of instances of the effect of diachronic factors which affected the synchronic aspects of the projects can be detected. The most dramatic example of this is the emergence of web2.0 technologies over the course of the projects. Web2.0 technology has often been termed ‘disruptive technology’ (Christensen, 1995) , in the sense that the uptake and social transformation effected by that technology challenges existing practice. In the case of these projects, Web2.0 was disruptive because it challenged much of what the pilot technologies were trying to do. Whilst the basic plan for embedding technologies mirrored Roger’s technology adoption cycle, the disruption caused by the web2.0 technology set up a competing adoption cycle. This not only affected the technological aspects, but increasingly it affected the perception of the utility of the technology: with e-portfolio projects, for example, learners were increasingly likely to ask “can’t I do it in MySpace?”

The perception of the utility of technology has been identified by Davis (1989) as an important element which has both synchronic and diachronic dimensions. On the one hand, perception of utility and ease of use is structurally related to aspects of pedagogy and institutional organization. On the other hand, perception of utility changes over time. As the request to use MySpace demonstrates, the impact of Web2.0 was not just technological, but also affected judgments may by learners and teachers about the efficacy of the technologies being presented to them. Also key to this was the articulation of a ‘business case’ for some of the practices being piloted. Here many projects struggled with issues of interoperability of e-portfolios and federated services. Emerging experience with the technology, problems with interoperability standards (notably IMS LIP, UK LEAP and IMS ePortfolio), problems concerning the representation of learner profiles and the broader issues of learner ownership of data all contributed to a more critical examination of the rationale for the interoperability of e-portfolio over the course of the projects. This made it increasingly difficult to articulate a solid business case for e-portfolio interoperability, or the appropriateness of the implementation of Shibboleth for e-portfolio identity management.

Prevailing cultural conditions within institutions also presented problems for projects which sought to work with existing structures, but found that these were not suitable to guide projects in effective ways. It was often commented that institutional structures did not allow for radical pedagogical change – and made projects difficult to coordinate through ‘official’ channels: a feeling summarized by the ELP project who remarked that there was a “complex interplay between technical, administrative, teaching and project staff in multiple institutions which needs to be co-ordinated to achieve results and overcome problems”. Such problems reflect on the extent that ‘established ways of doing things’ within institutions, and within institutional management structures have an affect on any change management process. JISC itself was also part of this process in having its own management

structures and preferred ways of doing things (for example, the FILE-PASS project commented that JISC project management guidelines were not always appropriate to a pedagogically-driven project). Like other factors that were identified by the projects, this has both a synchronic and diachronic dimension. Synchronically, management structures and practices framed the ways in which projects could perform. Diachronically, established and habitual institutional practice exemplified what Margolis (2000) calls 'path dependence': the ways in which practices established over time partially determine the course of what change is possible at any particular point. The 'path dependence' of institutional practice can make the cultural changes necessitated by the introduction of new technology more difficult. This was particularly noticeable in some of those projects which dealt with sharing and reuse of learning objects, especially those looking at practitioner contribution of content. An organisational adoption study conducted as part of the L4All project found that a strategy is needed to engage organisations and lifelong learners in the long-term adoption of systems in order to create a critical mass of regular users. Staff and learners often need support in envisaging the benefits of a system in terms of the potential behaviours or practice it may enable.

Identifying Efficacious Practice and Sustainable Technology

Given this complex picture of transformation, we must ask whether it is possible to identify practices which have some efficacy over an extended period of time particularly given that one of the main characteristics of the mechanisms presented is one of continual change. To some extent it would appear that for a more successful adoption curve projects needed to have greater foresight of the potential impact of external trends and technological changes. But technological predictions are notoriously difficult. Having said this, what is predictable is the continual presence of change itself. It is reasonable to assume that whilst the practice of learners, teachers and institutions may be in constant flux, their practice will nevertheless be focused on maintaining their viability within an environment of constant change. For learners, the pressure of work and the need to be mobile means that a variety of changing circumstances can affect the ways in which they pursue their learning. For institutions, continual diversity in the student population presents major obstacles which require organisational change to overcome. Given this outlook, it is possible to identify a persistent rationale behind practices which deal with the complexities generated by continual change.

At the time of the inception of the regional pilots, the solutions to the management of complexity for learners and institutions included technologies like e-portfolio, repositories and learning objects. E-portfolio technologies appeared to present one way of dealing with both the complexities of diverse learner needs, and the complexities the institution faces in dealing with diversity. The technologies of learning objects and repositories similarly sought to address the complexities of managing and delivering content. The service-oriented approach of the e-learning Framework was also seen as a

way of addressing the complexity of different institutional and pedagogical contexts by offering the potential for flexible, combinable services and facilitating interoperability between systems and applications.

But have the regional pilots shown that these technologies do not *work*? In answer to this, we can see that the technological outcomes of the projects were generally successful, and positive results were obtained from many pilot cohorts.

Practices, processes and concepts which the regional pilots validated or provided support for include:

- The processes associated with e-portfolios and personal development planning: many users in a wide variety of cohorts responded well to e-portfolios or technology performing similar functions. Users sometimes remained positive about the concept of technology-supported collection, reflection, selection and presentation despite experiences with poor or unsuitable e-portfolio systems. However, most students need some tutor support, and this type of process usually works best when embedded into the curriculum or used in a real task which learners value. The intended audience for some e-portfolio presentations (examiners, employers, admissions officers) are yet to be convinced of the usefulness and feasibility of dealing with this type of rich information.
- Transfer of key learner data and learner-authored information where there is a clear business case (e.g. in electronic admissions.)
- Discipline-specific repurposing and/or sharing of learning resources: projects had success in repurposing and sharing learning resources in modern languages, medicine, engineering and study skills.
- Regional views on learning opportunities combined with various types of information, advice and guidance: lessons here are being taken forward by some of the HEFCE-funded Lifelong Learning Networks.

What was much less successful on the whole was the attempt to embed practices associated with those technologies within an institutional setting. However, considering the synchronic and diachronic factors that have been discussed, the causes of the problems of adoption are highly complex. The central issue with this, and the key outcomes of the regional pilots, is that successful adoption depended on the performance of a balancing act between the various synchronic and diachronic factors that linked the technology, its development, the ‘path dependence’ of institutional and pedagogical practice, articulation of rationale and the perception of utility and the reaction to emerging disruptive technologies.

Socio-Technical Transformation and the successes of the Pilots

Given this need to perform a balancing act, the causes of the lack of success in embedding technological practice would appear to stem from an overly rigid conception of technology adoption in the initial stages of the projects. The identification of aims to embed technological artefacts within teaching and learning situations already placed an artificial dividing line between the synchronic structures of education where technology, pedagogy and organization are entwined. This separation was partly through organizational convenience, because it presented a way of managing the project that was relatively easy to describe. Furthermore, it had theoretical support in Rogers's technology adoption curve.

Rogers's observation of the diffusion of technology, or Moore's identification of 'chasms' (Moore, 1991) fit many examples of technological emergence. However, these are observers' views, and if there is a central lesson to learn from the regional pilots it is that the observer's viewpoint is very different from that of active agents within the process. Whilst adoption curves might appear to be the case on the surface to an outside observer, they are the result of much more complex interactions between synchronic and diachronic processes. In essence, a 'classic' adoption curve is the result of an effective coordination of many competing forces. The problem in adopting Roger's basic categories (innovators, early-adopters, etc) is that it creates a misleadingly simplistic impression of the true nature of the complexity of the challenges of technology adoption. The pilot projects have gradually uncovered the extent to which effective adoption necessitates a dynamic coordination of synchronic and diachronic factors. This has important implications: not least that it means that there may be many ways of achieving this dynamic coordination.

Issues of adoption were particularly challenging for those projects which aimed to work across a region for the benefit of independent lifelong learners, rather than concentrating their efforts on particular cohorts or institutions. These projects by their nature had a much less clear, and more difficult to reach, user group, making it difficult to co-develop the technology and processes with users. Articulating a strong business case to individual institutions was difficult, as was steering a common technological solution between diverse local conditions, but some of the technologies developed by these projects have been taken up by the Lifelong Learning Networks (LLN), as they target the LLNs' key objectives.

The formation of new relationships was often cited as a major success of the pilots, and in many cases, the lessons learnt about differences between different institutional cultures has been beneficial on a number of levels. The reaching of eventual conclusions by the pilots depended on strong

commitments from partners, even when the situation looked bleak. Institutional buy-in and JISC funding created a determination not to fail with projects and this was important to try to understand the full extent of the complexities involved in the embedding of the technology. This determination saw projects through difficult patches with technology. By having a focus on regional collaboration, the difficulties of managing change within and between institutions were amplified, and this again presented key opportunities for identifying the nature of the problems of embedding technological change.

Conclusion: How can you pilot lifelong learning?

There are two views of the purpose of a lifelong learning pilot. We might view it as being to identify and embed new sustainable technologies which support the management of the complexity of learners' lives and institutional practice. With this perspective, while the projects had some success in identifying and trialling effective technologies and approaches, they generally were not able to embed these technologies. On the other hand, the act of attempting to use and embed technology reveals something about the mechanisms that are at work in the educational system itself, and the complex mechanisms of technology adoption. In this sense, this pilot has been successful and important. In terms of JISC's development model, the projects' achievements have been at the exploratory, prototyping and demonstrating/piloting levels, rather than at the transformational level at which sustainable change is achieved. However, lessons learned from the experience of piloting the technologies and processes has informed both institutional (ELP, EPICS) and national strategies (RIPPLL), and the work of regional bodies such as New Technology Institutes (G4L) and Lifelong Learning Networks (Learning Matrix, EELLS, RIPPLL, L4All).

From the evidence of the projects, it would appear that the mechanisms of technology adoption suggested by Rogers and Moore are insufficient guides to determine the successful structural and organizational change produced by the technologies. In particular the concept of the technology as an artefact to be embedded sits uneasily with the findings of many projects that indicate that Liber's view of the entwined relationship between technology, pedagogy and organisation is correct. However, Roger's model also ignores the diachronic factors – particularly those mechanisms related to other competing or disruptive technologies that emerge and the mechanisms relating to user perception and problems with prevailing cultural practice and conditions: it relates to an observer's view of technological adoption, rather than that of an active agent.

Given this deepened understanding of the mechanism, we have argued that to produce change requires an awareness of the complexities of synchronic and diachronic factors and an effective approach to their coordination. Thus the challenge is to balance:

- Close inter-institutional and inter-personal relationships which balance out and (in some cases circumvent) institutional structures (synchronic)
- Agile and iterative development processes which engage all key stakeholders (diachronic)
- Articulation of a business cases, local knowledge and organisational logic for changing practice (diachronic)
- Coordinating projects through winning hearts and minds at all levels rather than 'managerial coordination'. (diachronic/synchronic)
- Flexibility to adapt to local conditions (diachronic)
- Flexibility to embrace new directions and emerging technologies (diachronic/synchronic)
- Consideration of non-rational factors for user motivation, including branding, aesthetics and design appeal of technology (synchronic)
- Awareness of perception of utility (synchronic)
- Awareness of the impact of technology on existing pedagogic and organisational structures (synchronic)

Some projects had more success than others in coordinating these factors, but the successful ones did it in different ways. For example, some projects demonstrated their agility in reacting to the emergence of web2.0, whilst articulating a pedagogic case for doing so. Others approached their projects from the start as a change in practice, and invested heavily in supporting staff and students through this. The importance of an appealing, easy to use user interface in establishing new practice was also recognised.. Recent projects which have grown partly out of the regional pilot experience have adopted agile development practices and are demonstrating sustainability and embedding of practice (XCRI). At a deeper level, this emphasis on a coordination of factors means that the processes of innovating, piloting and embedding of new technologies are processes of control of complex mechanisms. With an emphasis on control, the exercise becomes one not of asking "What technology? Where?", but a broader "What interventions? How?": whilst the former focuses on technological artefacts and situations, the latter focuses on efficacious organisational change and human action.

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