



East of England Educational Resource Network - EERN Final Report (Draft)

Author: Chris Fowler

Contact: cfowler@essex.ac.uk; 07710 302629

Date: 2 May 2006

Table of Contents

Acknowledgements	3
1 Executive Summary	4
2 Background	6
3 Aims and Objectives	6
4 Methodology & Implementation	7
5 Outputs and Results	8
5.1 Technical Integration	8
5.2 Usability Evaluation	9
5.3 Pedagogical Evaluation	11
5.4 Acceptability	12
6 Outcomes	13
7 Conclusions	14
8 Implications	14
9 Recommendations	15
10 References	16

Acknowledgements

The EERN project would like to acknowledge the help and support from the following:

1. The Project Partners

Chris Fowler, Michael Gardner, John Scott and Catherine Fung from Chimera, University of Essex
David Kraithman, Steve Bennett and Asli Adisen from the University of Hertfordshire
Clare Avery and Aaron Burrell from Suffolk College
Nik Bessis, Giorgio Venturi, Ian Robertson and Des Stephens from the University of Luton

2. The Associate Partners

Writtle College; South East Essex College; Hertford Regional College; Oaklands College and North Hertfordshire College.

3. The External Consultant

Prof. Terry Mayes, Caledonian University

4. The Funding Body

Sarah Davies, Programme Manager, JISC Executive

1 Executive Summary

EERN was designed to embed and pilot the DELTA system. DELTA allows practitioners to access and share learning resources. It is not a repository. It is a web service that will allow one to search, using semantic web technology, and point to relevant learning resources in other web accessible repositories. By making the pedagogical approach one way of searching for resources, DELTA also helps practitioners reflect on the pedagogical assumptions underpinning their choice. The aim of the pilot was to:

- Test the usability of DELTA
- Check DELTA's robustness and reliability
- Assess its perceived value, particularly its pedagogical benefits, to practitioners
- And its acceptability to all key stakeholders (IS personnel, senior managers and practitioners)

Further, the trial received additional funding to integrate Shibboleth, an authentication system, into DELTA.

The pilot consisted of three main partner sites, University of Essex, Suffolk College, and University of Hertfordshire. Each main partner also had associated colleges, for example, the University of Essex also used Writtle College and South East Essex College (SEEC). Each pilot site was designed to provide a differing learning context (courses and users) to fully test the overall objectives. In the case of the University of Essex, the focus was on Teacher Training (Certificate of Higher Education Practice). The University of Hertfordshire focused on a particular learning resources (lecture material) created by the use of a JISC developed authoring tool (Smirk), whilst Suffolk College looked particularly at resources available on a VLE (WebCT), for use in vocational courses. Both the University of Hertfordshire and Suffolk College focused on 'Core Study Skills' as their main curriculum area. An evaluation programme run by the University of Luton was created to assess the performance and value of DELTA within the EERN pilot trials.

DELTA, in the main proved easy to use. Problems were identified but most were superficial and have been rectified.

In general DELTA was inherently robust. The major reliability problem was addressed by restarting the DELTA service each day. The problem is still being investigated.

Most practitioners recognised the potential benefits of the pedagogical approach inherent in DELTA. In reality however, they found the terminology and concepts difficult. The evaluation also found some 'errors' in the underlying approach due to implementation problems. It is proposed to fix these implementation errors in a project extension, and to provide a context dependent help system, to overcome some of the more conceptual and terminological difficulties experienced by users.

Practitioners found the concept of 'sharing' a challenging one. There is a poor culture of sharing within HE and FE. The matter is compounded by the fact that to share also means creating the necessary metadata, which is not a simple or quick task. The metadata harvesting in DELTA2 has improved this situation but is limited by the lack of suitable repositories to

harvest metadata from, and does not address the 'pedagogical' metadata. Further, the searching and use of learning resources is not a continual process. Most lecturers infrequently create or update their lecture material (perhaps only once a year). The notion of 'continuous improvement' of quality through reflection and assessment is not a universally adopted one. Both of these cultural issues affected the uptake of DELTA (as reflected in the lower than expected number of trialists). Finally the use of Shibboleth requires support from the Institution's IS departments, and this support was forthcoming in most cases. However, it should be noted making Shibboleth work proved challenging.

The Pilot proved successful in identifying specific issues with the DELTA system, demonstrating the effectiveness of Shibboleth, and in recognising the potential value of the system.

2 Background

The project aims to deploy and pilot an East of England Educational Resource Network (EERN). The EERN solution is based on the JISC funded DELTA system that utilises the power of the semantic web in the searching of educational resources located in distributed repositories (see <http://www.essex.ac.uk/chimera/projects.html>). By adopting EERN HE and FE Colleges in the region can share, deposit and annotate a full range different types of learning resources. Sharing these resources not only improves efficiency but also has the potential for teachers to reflect and improve their practice. A less tangible benefit arises from a greater sense of community that can result from sharing and critically, evaluating each others learning resources. DELTA adopts a web service architecture. However DELTA needed to be extended to create EERN through its integration with VLE's, authoring tools, and an authentication system (Shibboleth). DELTA is also pedagogically advanced in advocating and supporting a number of different types of courseware, including the concept of 'growing context' and vicarious learning. Users of EERN will not only be able to share repositories but also to author quality materials, and to collaborate in creating innovative courseware to serve the region.

JISC has been developing a strategy with associated frameworks and infrastructures to improve e-Learning within and between HEI, and HEI and schools, FE Colleges and the local community. Critical to this proposal is the open source and service orientated approach adopted by JISC. DELTA in particular was designed to interoperate with other services and to meet much of the functionality described in the JISC's E-learning Framework. The proposed pilot will be in part a test of DELTA's generic and open qualities.

The EERN will require collaboration between the Universities of Essex, Hertfordshire, Luton, Suffolk College and their FHE partners to produce regional repositories of e-learning materials and case studies discoverable via the DELTA system. It will produce two specific archives: core skills (led by Hertfordshire) and teaching case studies (led by Essex). Less specifically it will interface with a VLE (WebCT) thus gaining access to further resources, particularly those used to support work-based learning (led by Suffolk College).

3 Aims and Objectives

The overall aim of the project is to pilot an enhanced version of DELTA within the East of England Region that will benefit practitioners and learners alike and will contribute to the building of a community of practice within the region. To realise this aim the pilot must demonstrate the following quality characteristics:

- Validity: EERN must be able to meet a wide range of valid user requirements (including organisational as well as pedagogical ones)
- Reliability: the EERN system (including Shibboleth) should be robust and simple to maintain
- Usability: the system should be easy to use and with the required level of performance
- Acceptability: the deployment and use of EERN needs to be acceptable to a wide range of stakeholders (including teachers, learners, trainers, managers etc)

In addition to these pilot specific objectives there is also a regional agenda that needs to be addressed. Of particular relevance are the East of England Development Agency's (EEDA) priorities, which include:

1. Ensuring strong links between regional universities, research institutes, and the private sector in part by establishing close ties between the SME community and the research base to ensure maximum exploitation of intellectual property.
2. Maintaining and building upon the quality of research establishments in the region in part by promoting the strengths and distinctive roles of the region's universities and research establishments to the UK business community.

Three Pilots have been designed to meet the above aims and objectives.

4 Methodology & Implementation

The EERN project was planned in three phases.

The **first phase** was system integration. This included ensuring DELTA could work with other tools (WebCT and JSmirk), and with Shibboleth, an authentication system.

The **second phase** involved running three pilots at different sites. Trialists were identified for each site, and they were given one training session plus the user manual. The manual contained relevant support contact details. The trialists were encouraged to use the system for all their professional activities, and to encourage others to do so.

Pilot A: Suffolk College and associates. The focus is on tagging and using Core Study Skills resources to support vocational courses. A secondary objective was to explore accessing WebCT created courseware through DELTA.

Pilot B: University of Hertfordshire and associates. The focus was on Core Study Skills resources used in the regional associate colleges. A secondary objective was to explore accessing JSMIRK (an authoring Tool) created courseware.

Pilot C: University of Essex and Partners . The focus was on Educational resources to support the teaching of a Certificate in Higher Education Practice (CHEP) course offered to lecturers at Essex and its associate colleges.

The **third phase** involved the evaluation of the pilot sites. These were planned and undertaken mainly by the University of Luton, who were not trialists, and therefore could remain independent.

The aim of the evaluation was to provide formative and summative assessment of the EERN solution with respect to the following system qualities:

- **Usability.** Are the EERN systems fit to their purpose (effective, efficient and satisfying) in the EERN pilots context of use (user, tasks, socio-technical environment)?
- **Pedagogical needs.** Are the EERN pedagogical ontologies meaningful and useful for practitioners? Do the practitioners perceive the benefits of the reviewing process in developing curriculum/managing classes?
- **Acceptability.** Do the practitioners find the learning tools to ease their workload? Do they perceive its benefits? Are the managers willing to endorse the new technologies in their organisation?

The above attributes are emergent qualities of the EERN solution, relying not only on technical features, neither in the pilot environment or in the 'training & support' provided, but on the combination of those factors.

A wide range of evaluation methods were adopted. These are summarised in Table 1 below.

Table 1. The seven evaluation methods employed

<i>Evaluation Method</i>	<i>Level of detail</i>	<i>Type of data</i>		<i>Effort Spent</i>
		<i>Qualitative</i>	<i>Quantitative</i>	
1) Usage logs	low		X	Dec.-Feb.
2) Web surveys	low	some	X	Nov.-Dec.
3) Interviews	high	X		Nov.-Jan.
4) Usability tests	high	X	X	Nov.-Jan.
5) Satisfaction questionnaire (SUS)	low		X	Nov.-Jan.
6) User diaries	high	X		Nov.-Jan.
7) Pedagogy workshop	medium	X		Feb.

A full description of the evaluation methods can be found in the EERN Evaluation Plan (Venturi, 2006).

5 Outputs and Results

5.1 Technical Integration

The original plan was to ensure SMIRKBOARD and WebCT, were integrated with DELTA, and that Shibboleth could be used as the authentication/authorisation system. However, early feasibility studies (see Scott 2005b) discovered that the partner site using WebCT (Suffolk College) was not using the latest version which could be used with Shibboleth. In practice the partner site the procedure for creating resources for WebCT was to author them externally and then to import them. It was therefore decided to use DELTA to point to the original resource rather than a WebCT version.

DELTA was able to successfully access SMIRK created resources stored on SMIRKBOARD. DELTA2, another JISC funded project, was being developed during the EERN trial. This necessitated the creation two versions of DELTA, one with Shibboleth integrated and one

without Shibboleth. The interdependence between the two projects caused no difficulties and both benefit from their close collaboration.

With respect to the deployment of Shibboleth, all partner sites have Quanxi IdP installed and working. Additionally all sites with the exception of University of Hertfordshire have Shibboleth Service Provide version 1.2 installed and working. All partners were able access each others internal resources as well as externally referenced sources. Deploying Shibboleth was not simple, partly due to the poor quality of the given installation guides at the time. It was therefore necessary to write our own EERN specific installation guide (see Scott , 2005a), which was successfully used by the partners.

5.2 Usability Evaluation

Twenty-nine DELTA users agreed to participate in the trial. Fifteen of the users were from FEIs, eight HEI and 6 from both. About half the users (N=15) were direct users (i.e lecturers, course developers etc); and the other half (N=14) were indirect users (i.e. IT managers, support staff etc). Fourteen of the DELTA users were set a number of tasks to complete from which 29 usability issues were noted. Table 2 below summarise the seven major usability issues.

Table 2. The main seven usability issues with DELTA.

# Issue	<i>Our recommendation(s)</i>
<p>1. Understanding of key terms. The meaning of the key terms related to the pedagogical metadata is unfamiliar to the user, especially Learning Resource Type, Practice activities, Generic Learning Activities and Context. One typical error consists in choosing the wrong perspective (learner's instead of teacher's and vice-versa). Help on-line is available but it takes long to find the piece of information practitioner is looking for. Some information is missing from the help (e.g. description of Practice Activities). <u>As a consequence</u>, practitioners may decide not to go ahead with the classification of learning resource and drop the task.</p>	<p>Provide context-help for each of the terms employed. Preferably the information provided should be:</p> <ul style="list-style-type: none"> - Definition of key term. - Direct reference to the user guide, jumping in at the right point (HTML anchor). - Examples, especially for PAs and GLAs.
<p>2. Defining the subject area. The subject field show tips based on the ontologies stored. However, tips are slow to appear and people fail to notice or give not too much importance to them. <u>As a consequence</u>, (a) people may fail to find resources through advanced search by subject and (b) they may use the subject field as a free field regardless of the ontology.</p>	<p>The choice of a subject area should be constrained by the ontologies.</p>

# Issue	Our recommendation(s)
3. Constraining a unique choice. It is not possible to select more than one generic learning activity/type of resource. <u>As a consequence</u> , people could not find the learning resource later.	Give the possibility to select one or more (e.g. through the use of a HTML checkbox list).
4. Aspect and behaviour of links. The links: (a) do not have an active, state, like for standard web pages. <u>As a consequence</u> , the pointer doesn't change shape when 'mouse-over' and people may fail to notice that it is a link. Example: some people failed to notice that "info" in search results is a link. (b) They do not have the attribute 'visited'. <u>As a consequence</u> : users may not remember where they have already been.	People expect DELTA to be consistent with standard web interaction styles. State a "visited" and "mouse-over" attribute in the DELTA CSS.
5. Refining through advanced search. Users may fail to notice that they can refine their search through advanced search. When they do, they do not find the terms they used in the full-text search and they are confused.	Make it clearer that it is possible to refine the search. In the form, make it clear that the search is a refinement, including the key terms that they used in full-text search.
6. Error recovery. When DELTA crashes, it produces only a generic error message, without explaining why the error happened and how to carry on the task. The back button does not always work as usual.	Provide specific and clear error messages, with an exit strategy (e.g. a link) that allows the user to go one step back.
7. Reviewing. The review action is not as usual on the bottom left, but on a tab in the resource page. <u>As a consequence</u> , when asked to do so, some users couldn't find it.	Add a button "review this resource".

These main findings were confirmed by the DELTA Expert Walkthrough, undertaken as part of the DELTA2 project. The walkthrough also confirmed that the User Guide was too demanding and a 'minimal' manual was recommended.

In addition to DELTA, JSMIRK was also evaluated for Pilot B users only. The seven main usability issues found are summarised in Table 3 below:

Table 3. The main seven usability issues with JSMIRK

# Issue	Our recommendation(s)
1. Inflexibility in saving the smirk project. It is not possible to save on directories	Give the possibility of saving files wherever the user needs through a

# Issue	Our recommendation(s)
other than C:. In the help file it is not explained where the file is saved and the tool does not help in finding it.	standard “save as” dialogue box. If it is not possible, at least give the possibility to the user find it easily, without digging into the file system to find it A shortcut would be sufficient.
2. Uploading content into the SMIRKBOARD was not possible due to a software error. We tried to upload then through FTP. We had problem in configuring the FTP because practitioners were not familiar to FTP settings.	Allow to upload content in different ways. If FTP must be used, use a step-by-step procedure to configure it.
3. People asked to answer to a message in the message centre couldn't find how to do it (SMIRKBOARD).	Give a “reply to” in the message centre.
4. The spell check caused the crash sometimes, due to the lack of some MS libraries.	Several users experience unexpected error messages. Make sure that the installation packages come error-free.
5. Not filling the title field of the slide, despite the accessibility audit before publishing.	Give higher prominence to the slide title field (ex. bold, colour, font height, etc.)
6. To delete the slide, it is necessary to go to segment sorter.	Provide a delete option on the left bar.
7. People didn't understand the meaning of the cross close to the slide, someone tried to use it to delete the slide, but it didn't work out.	Use another symbol (ex traffic lights) and explain it (via tool-tip). Make it clickable, in order to see the accessibility audit of that slide.

Note. The evaluation discovered in total 21 usability issues with JSMIRK/SMIRKBOARD, and they are fully reported in the Venturi and Bessis' WP5 Evaluation Report.

Both users of EERN and JSMIRK showed average user satisfaction as measured by Brooke's Software Usability Scale.

5.3 Pedagogical Evaluation

The pedagogical evaluation focused on how well users understood and could use the underlying pedagogical ontology. The major task affected by the underlying pedagogy is the classification of learning resources. In this task users had to 'tag' a newly discovered learning resource into one of a number of learning resource types (e.g. case study, lectures, teaching tips). These learning resource types were identical to those used in the RDN/LSTN Resource

Type Vocabulary¹ classification system, and therefore reflection, difficulties and there were many, in classifying resources reflects that scheme rather than the underlying pedagogical ontology. Users did also find the pedagogical summary confusing particularly as it failed to distinguish between choices made by the user against those inferred by the system.

Finally it should be noted that both the experts who reviewed DELTA2 as part of that project concluded:

*DELTA is potentially a very useful tool, with a particular value in raising awareness of pedagogy in learning design and curriculum development. It would be a particularly useful tool for educational developers. However, its value will depend critically on a critical mass of resources and users being established.*²

This is also reinforced by the EERN Evaluation conclusion that both the list of Learning Resource Types and Generic Learning Activities need to be revisited to ensure that pedagogical approach is fully maximised.

5.4 Acceptability

The acceptability criteria proved over ambitious. The duration of the trial, it was felt, was too short to truly test how acceptable using DELTA is for the different stakeholders (particularly Practitioners and IS managers).

In terms of practitioner there was an initial usage peak after training and this gradually declined. Interviews with users suggest this decline was due to a number of interrelated reasons:

1. The lack of a 'sharing' culture in many of the Institutions. Why should they 'give away' all their effort to people who are potential or actual 'competitors'. A reward structure might help encourage sharing in the short term, but it is not a sustainable solution.
2. DELTA is ultimately dependent on making available a wide range of learning resources, but tagging resources was time consuming and difficult. Only 10 EERN users actually added their own resources. The remaining 200 or so were tagged and by DELTA staff. The issue of critical mass is a key sustainability one.
3. The review and creation of teaching materials, where DELTA could be most useful, was not a continuous process. Curriculum revision and development tended to take place between June and September. The trial unfortunately failed to recognise this and DELTA was not available during that critical period.

Quality assurance needs to be addressed. DELTA's approach that the quality of the materials is owned by the community of users, who could comment on quality and usage through DELTA's annotation system, is still a large change in practice and culture for many users.

¹ See <http://www.rdn.ac.uk/publications/rdn-ltsn/types>.

² Mayes, J.T, Creanor, L. and Fowler, C.J.H. DELTA Evaluation Report. <http://www.essex.ac.uk/chimera/projects.html>

With respect to the IS departments, there was more success. Many Institutions embraced Shibboleth recognising its long term value, and showing willingness to take over and maintain the relevant servers.

6 Outcomes

The ultimate value of the EERN trial of DELTA will vary according to a number of different perspectives.

First there is the perspective from the technology itself. Was the DELTA system, robust, and usable? The results discussed in the previous section would suggest that the value of DELTA would be enhanced by changes to:

- DELTA's user interface, including a context dependent help system to supplement and replace parts of the User Guide. Many of the user interface issues have been addressed as part of the DELTA2 project and the creation of the context dependent help system is part of the proposed extension to the EERN trial.
- the underlying pedagogical ontology, and how it manifested within the system. In particular the 'pedagogical approach' to tagging, and its summary table need to be revised to make them more understandable and useful.
- The formal adoption of the total DELTA system (including Shibboleth components) by the partner's IS departments. Most partners are willing to do this, but some further work (e.g. updating installation and maintenance guides and Federation agreements) is still required to ensure a smooth transition from Chimera to the partner institutions.

In general the DELTA system proved to be both robust and reliable. The major issues described above revolved around the usability of the user interface and the underlying pedagogical ontology.

From the practitioner perspective, many of the key value issues are associated with sustainability and culture change. Was the DELTA system useful and acceptable? A number of issues were raised in the previous section that includes:

- Increasing the number of learning resources, preferable though links with already existing national repositories (e.g. JORUM)
- Increasing the number of subject ontologies and more critically making the creation and maintenance of subject ontologies more straightforward.
- More formal embedding into existing courses, particularly Teacher Training Courses, where the pedagogical aspects of DELTA are particularly valued.
- Adoption of DELTA as part of the Teaching and Learning Strategy in the partner institutions.
- Making DELTA more widely available to practitioners by incorporating it into the existing web tool portfolios (e.g. My SEEC, My Essex etc)
- Increasing awareness and visibility of DELTA through seminars, newsletters and other dissemination devices.

- Encouraging a greater discussion about the sharing of resources including the cost and benefits to the practitioner, IPR (particularly copyright issues) and interworking with other tools.

The pilot overall can be considered to be a success. The system and evaluation approach worked sufficiently well to allow valuable usability, utility and acceptability issues to surface.

7 Conclusions

The EERN pilot, like many pilots, was technically successful, but was challenged by key 'people' issues, some of which were unforeseen. It was expected to uncover usability problems and it was previously known that using the underlying pedagogical ontology would be challenging. The pilot allowed us to determine the exact nature of these problems and propose solutions. The acceptability area, however, was always less well defined. The pilot assumed that updating and maintenance of teaching and learning materials was a continuous process. It appears not to be so, and to be focused mainly in the summer months. Equally the resistance to 'sharing' was stronger than expected. Culture changes of this nature do not occur over night. Considerable work is required in embedding DELTA into everyday practice, and increasing its visibility and awareness of its pedagogical benefits.

EERN was successful on the technical sides. In particular the inclusion of Shibboleth proved very challenging but was implemented successfully. Likewise the adoption of DELTA by the IS department, at least in principle, proved relatively straightforward.

8 Implications

The main and key conclusion is that 'winning hearts and minds' rather than developing more technology is now what is required. The whole issue of managing change has important implications for the JISC and the wider Education community. E-learning in our Institutions as followed a common pattern in ICT uptake (see Jones & Gregor, 2006). In the mid nineties the overriding philosophy was very much 'build it and they will come' and they didn't. This was replaced by 'give them a reason to come' and we did, and they still didn't. The current approach is 'build what they want and build it fast' and the jury is still out but the signs are not promising. We need the fourth generation of 'build it and own it together'.

The early generations of e-learning adoption described above can be collectively described as adopting a purpose driven or teleological (Introna, 1996) approach with its strong emphasis on problem solving. This approach is also prevalent with the design and development community. Further, most HEI and FEI would claim to follow the teleological approach to their management (e.g. . mission & vision statements, corporate plans etc), yet change in general and the adoption of e-learning in particular has not been forthcoming. The fifth generation with its stress on co-evolution and ownership is a more ateleological approach embodied by its greater emphasis the whole, processes and equilibrium. The teleological approach is arguably suitable for design and development but not for implementation, and indeed the approach may well constitute a significant barrier to change (see Jones et al, 2005). At a more particular level, the difference between these approaches could be reflected in a strong top down approach, led by management, backed by plans and fulfilling a larger

corporate vision, versus a more bottom up approach, led by practitioners (champions), driven by local needs and decentralised (see also Laurillard, 2006). For example, the case for e-learning is normally expressed in terms of changing external circumstances driving the need to increase efficiencies and to force down costs (see for example, Fowler, 2000). These may have implications for the practitioners but are hardly address their day-to-day difficulties and concerns. There is gulf between the goals of the institution and the aspirations of its practitioners.

Jones et al (2005) argue that this gulf can be bridge by a combination of the teleological and ateleological approaches. Early insights in how this combination may work can be found in the experiences of using e-learning at Staffordhire University. Styles (2003) notes the all stakeholders need to recognise that e-learning is part of their normal practice. To achieve change is not a question of management edicts³ but of creating a 'symbiotic relationship between "culture" and 'policy and procedure".'

JISC has traditionally funded technology developments, but in e-learning arena in particular, it realized that the technology without a strong pedagogical base will be of limited value. The e-learning programme was developed specifically to meet this pedagogical need. Equally technology that is not fully adopted by education institutions is also of limited value. The regional trials and the Case Studies are certainly the first steps in the process of understanding adoption and diffusion, but it was still essential about the use, deployment and trialing of tools. As Dublin (2003) notes success is not just getting technology to work, but of course if it doesn't work, it won't be successful.

9 Recommendations

The specific recommendations are been detailed in the proposal to extend the EERN trial. The proposed extension activities are quoted below:

First there are activities that address some concerns raised by the evaluation of DELTA. In particular work is required to make the 'pedagogical approach' simpler and easier to use.

The second class of activities involve sustainability, and particularly focus on Shibboleth and Shibboleth associated activities. This includes for example upgrades and the creation of a formal Federation agreement.

The third class is concerned with embedding the new approach into practice at the individual and Institutional level. This includes both 'bottom-up' (e.g. inclusion in courses) and 'top down' activities (e.g. inclusion in Institutional strategies).

At a more strategic level, we would recommend that JISC needs to fund a strand specifically addressing the management of change issues. This would involve projects that shift the focus

³ Dutton et al (2004), for example, noted the importance of academic freedom to the extent that many practitioners would ignore instructions from their managers to use certain e-learning technologies

away from learners and practitioners to other stakeholders (e.g. managers). It should, for example, seek answers to questions like:

- What are main barriers to change (economic, human, technical etc) to adoption of e-learning technologies?
- What are the main drivers for change(e.g. cost reduction, improved effectiveness) and where do they come from (eg internal or external drivers)
- What are the main cost and benefits (including psychological, economic, organisational and pedagogical) of change
- What strategies of change are commonly used and to what success?
- What are the (management) characteristic of today's more successful and innovative institutions
- What are the implications of e-learning for the way Institutions and practitioners will need to organise and administer teaching and learning in the future?

There is not only a need to collect and collate further information on management of change within existing institutions (a la Styles (2003) and Dutton et al(2004)), but also to seek opportunities to 'test' such lessons in developing and implementing an e-learning approach to new (or green field) sites.

10 References

- Dublin, L. (2003). If you only look under street lamps....Or nine e-learning myths. *The eLearning Developers' Journal*, June 16.
- Dutton, W.H., Cheong, P.H., & Park, N.(2004) The Social Shaping of a Virtual Learning Environment: The Case of a University wide Course management System. *The Electronic Journal of Elearning*, 2.
- Fowler, C.J.H.. (2000) Going Virtual: Will IT help. *Journal of the Institution of British Telecommunications Engineers*, 1, 27- 35.
- Introna, L (1996). Notes on teleological information system development. *Information Technology and People*, 9, 20-39
- Jones, D. & Gregor, S. (2006). The Formulation of an ISDT for e-learning. *Proceeding of 1st International Conference on Design Science Research in Information Systems and Technology*
- Jones, D., Luck, J., McCoachie, J., and Danaher, P.A. (2005). The Teleological brake on ICTs in open and distance learning. Paper presented at the Conference of the Open and Distant Learning Association of Australia 2005, Adelaide.
- Laurillard, D (2006). E-Learning in Higher Education. In P. Ashwin (ed) *Changing Higher Education: The Development of Teaching and Learning*. London: Routledge.
- Scott, J.R. (2005a). EERN Technical Feasibility. EERN internal report, <http://www.essex.ac.uk/chimera/projects.html>
- Scott, J.R. (2005b). Shibboleth Installation Guides. EERN internal Report. <http://www.essex.ac.uk/chimera/projects.html>
- Styles, M. (2003) Embedding eLearning in a Higher Education Institution. Keynote Paper for: "At the Interface - 2nd Global Conference on Virtual Learning and Higher Education", 12th - 13th September 2003, Mansfield College, Oxford.

Venturi, G. (2006) Evaluation Plan for the EERN Pilots. EERN internal Report.
<http://www.essex.ac.uk/chimera/projects.html>

Venturi, G & Bessis, N. (2006) WP5: Evaluation Report. . EERN internal Report.
<http://www.essex.ac.uk/chimera/projects.html>