

How do we know if e-learning is effective?

Rosemary Luckin, Fred Garnett*, Julie Coultas* and Benedict du Boulay*

London Knowledge Lab
Institute of Education
University of London
London WC1N 3QS
r.luckin@ioe.ac.uk

*The ideas Lab
University of Sussex
Falmer
Brighton
BN1 9QH

Abstract Amidst all the enthusiasm and claims about technology transforming the way we teach and learn, is there also a body of evidence to support the premise that e-learning helps people learn: is it effective? A team at the University of Sussex has conducted a modified systematic review of the literature in order to investigate these questions: What works in e-Learning? How do we know it works? What factors influence how well it works?

1. Introduction

This paper gives a brief overview of this work. The roundtable discussions at e-learn 2006 will allow us to elicit feedback on these from International stakeholders and thereby enrich the review. In this paper we offer an initial definition of e-learning and discuss the subject areas of Work Based Learning, Undergraduate Education and Medical Education. We offer a different approach to the discussion of each in order to provide something that is relevant to as wider audience as possible and in this way to provoke discussion of the key emerging issues at the roundtable event. With respect to Work Based Learning we discuss the scope of our review, its audience, and what needs to be done next. For Undergraduate Education we offer a contextualized case study and for Medical Education we give a brief summary of its special nature.

<i>Questions that we hope will contribute to the round table are emboldened and bordered.</i>

2. Do we have a good Definition of e-learning?

During the review many definitions of e-learning were found, for example in the commercial and training sector some researchers make a distinction between learning and training and suggest that human resource development is moving away from training and towards learning (Sambrook, 2003). In this context e-Learning is defined as: *Any learning activity that is supported by ICTs*. Within formal education, the Department for Education and Skills in England and Wales has offered a broad definition: *“If someone is learning in a way that uses information and communications technologies (ICTs), they are using e-Learning”* (DfES, 2003). Within medical education and the health sector the Department for Health cite Rosenberg’s (2001) definition: *e-Learning refers to the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance* (Department for Health, 2003).

These varying definitions of e-learning focus on different issues. Some are concerned with the technology used by the learner(s), varying from specifically “internet” technology to generally “information and communication technology”. Others focus on the kinds of interactions that learners have with systems, stuff and other learners: “continuous and collaborative processes”. Others again focus on outcomes e.g. “enhance knowledge and performance”. Each of the definitions has its merits, but none quite hits the mark. As part of our initial consultation with a variety of experts we developed the following definition: *e-Learning is the capability required of learners/users in order that they can manage their own learning in the 21st century, using technology as appropriate*

to context, sector and task (May 2004). At the end of the project we offer the following definition for discussion at the roundtable event:

E-learning is a portmanteau term covering:

- *The **set of skills** that enables learners to exploit technology in order to develop understanding or capability;*
- *The use of **computer technology** in learning with a particular focus on internet technology*
- *A **style of learning** with a particular focus on technology-mediated interactivity and collaboration*

Point for discussion at the roundtable: Is this a good definition?

3. Where and what is the evidence about the effectiveness of e-learning?

The evidence that can be found within journals, websites, conference papers and presentations across numerous disciplines offers a vast range of types and qualities of evidence. There are large scale multi-institution studies looking at both process and outcomes, well-conducted but small-scale laboratory experiments and more impressionistic studies of individual class or college interventions. Disciplines vary with respect to the evidence that is regarded as valid. Likewise, data collection and analytical methodologies vary. But, what evidence should we count as valid?

We chose to prioritize empirical evidence when it was available. The evidence that we included in the review fell into two broad classes both of which may be focused on the learners themselves or on the learning situation and context:

- Evidence about *outcomes*: For example, evidence of learners developing particular capabilities or institutions having met particular targets. Evidence may be comparative to other non e-learning methods. This type of evidence may also be concerned with the indirect effects of particular learning experiences. For example, that the learner shows greater propensity to engage in further learning experiences after completing some e-learning.
- Evidence based *process measures*: For example, that learners are able to engage in experiences and behaviours that they would not be able to in other situations; or that the roles of teachers are changed.

Point for discussion at the roundtable: What should count as evidence?

4. The 5 Key factors that influence how well e-Learning works in the three sectors reviewed.

The review suggests that there are 5 keys that institutional and contextual factors that will always have an influence on the success of e-Learning. Overwhelmingly, it is the human factor rather than the technology that matters. On the individual level:

1. The confidence of individuals in their own abilities when engaging in e-Learning is crucial
2. Prior knowledge at both the operational level (how to do it) and the conceptual level (understanding) is important

On the social level:

3. The presence and involvement of a teacher/trainer can have an impact on how well e-Learning works
4. Communication - the continuing dialogue between the teacher and the learner and also between learners is important
5. Tutors, faculty members, and fellow workers can have an influence on the adoption of new technologies through role modelling and social learning

Point for discussion at the roundtable: How generalizable are these 5 factors??

5. Work Based e-Learning

What does this survey cover?

The survey covers a literature review of Work-Based e-Learning (WBeL) and then provides an analysis of what can be learnt from that review. However this provides a partial picture of the effectiveness of WBeL focusing on those issues covered by research. This leaves both gaps and a lack of clarity, particularly, in terms of definitions and WBL contexts, but provides useful information on key issues. The research is particularly strong in identifying the range of issues relating to the learner in WBeL. Issues to do with experience, motivation and barriers as well as relevant approaches to learning are covered well. This research allows us to identify five key recommendations on aspects that need more research.

What this survey doesn't cover

The lack of broad-ranging research on both Work-based e-Learning and Work-based Learning (WBL) means several issues are not covered. For example the overall purpose of WBL isn't clear; various relationships have been hypothesized by researchers in providing a framework for their research, but this doesn't provide a consistent framework we can map to. Work-related knowledge and skills in this country are typically seen as something that the employee brings with them or learns on the job

Issues about the nature of the organization in which WBeL takes place aren't addressed. Is the organization a knowledge organization, or a learning organization? In which case Learning, Information and Knowledge would be key HR concerns and allow for coherent provision.

<i>Point for discussion at the roundtable: What are the important issues for Work Based Learning that need to be included?</i>

Who might be interested in this survey in the UK and why?

1. The Learning and Skills Council: the main funder of work-based learning, who also have government, targets to deliver in terms of Skills for Life
2. Sector Skills Councils: who have a responsibility for defining the skill sets of employees in various industries and the developing sector-based Academies (such as the Retail Academy) who provide resources for meeting these vocational requirements.
3. The Association of Learning Providers: the professional organization of WBL providers who are currently developing generic WBL e-learning strategies for their members
4. The University for Industry (Ufi): the main providers of online work-based learning resources through learndirect, and have developed many strategies to maximize take up of WBeL.
5. The Quality Improvement Agency (QIA): who have the remit for improving the quality of learning across all Post-16 provision, including WBL.
6. Adult Learning Inspectorate: who have the responsibility for reviewing all learning provision against the Common Inspection Framework. This will continue after their integration with OFSTED.
7. The Department for Education and Skills: who have the responsibility, through the e-strategy, for integrating WBeL into all Post-16 e-learning by 2010.
8. Organisations such as Knowledge Base who are being developed as the national "experts" on WBL.

<i>Point for discussion at the roundtable: Internationally, who are the interested parties and what is their interest?</i>

Future work

These conclusions and recommendations need to be developed and analysed against other sources of information about WBL and WBeL. In many ways Work-based e-learning is only beginning to be taken seriously by policy makers now that the e-strategy is concerned to treat all aspects of e-learning equally and to provide system-wide integration. In Post-16 education this is taken to mean the integration of Further Education, Adult and Community Learning, Work Based Learning and Offender Learning. EU i2010 has targets aimed at both the transparency of education across Europe and the integration of formal, non-formal and formal learning. This requires WBL to integrate into formal provision. A key driver in this is the UK Government's target that everyone should attain Level 2 qualifications (which has recently been extended to include Level 3 targets). For this national target to be achieved

many employees need to develop their qualifications and the government will need new strategies for promoting WBL. Learning from effective WBeL can help in this endeavour.

Point for discussion at the roundtable: What are the international Drivers?

6. Undergraduate Education: a contextualized case study

This case study describes an institutional decision making process about the need to invest in e-learning. Our review needs to offer institutional managers and policy makers clear information about why they should invest money in e-learning and what is likely to best meet their needs. Through this case study we highlight the issues that are pertinent to this audience. The institution used as the case study has made little investment in e-learning to date and is wanting to make a decisions about what it should do next. They are operating in a context where the Higher Education Funding Council have highlighted the needed for institutions to develop e-learning strategies and have allocated some resources for this purpose.

Why should an institution invest in e-learning?

Investment in e-learning could help the institution to:

- Achieve its Institutional aims
- Address Key Performance Indicators such as: student satisfaction levels and students Employability.
- Catch up with similar institutions and reposition itself. Not doing this could impact on their ability to attract the students they want
- Staff and students are eager to engage and move forward and can enable substantial gains in teaching and learning quality and satisfaction.
- Helps the institution to modernise and is consistent with other investments.

Point for discussion at the roundtable: What type of information could help this institution decide to invest?

What does the institution know about itself?

Our case study institution conducted extensive consultation and research to ensure that it understood the nature of its own e-learning context. This consultation exercise and research included:

1. Evaluating the readiness of the institution for e-learning through a staff audit. Overall Staff felt that the institution was “emerging” into readiness, but there were interesting differences between what the managers believed to be available in the institution and what staff and students believe to be available.
2. A questionnaire to explore what staff and students understood about e-learning and what their priorities were. This indicated that teaching staff wanted to have access to a wide range of learning technologies, targeted support for teachers to integrate ICT into their courses for use with students and more effective computing support. Students prioritized on-line access to course materials (i.e., lecture slides, reading lists, journals and books) and would most value the aspects of E-Learning that could be provided via an e-Learning package.
3. Creating a draft e-learning strategy for the institution: an initial small group of staff from different units created a map of the activities they normally complete in order to support teaching and learning. These activities were matched to potential technologies and used as the basis for scenarios about life at the institution. These scenarios were used to create an initial vision for an institutional strategy and to engage staff and students in the creation of a shared vision. Results of the consultation on this draft strategy confirmed that the e-learning vision at the heart of this strategy was appropriate.

The consultation revealed that the priority should be to support the needs of faculty and students in the use of E-Learning tools.

Point for discussion at the roundtable: How can the institution evaluate the extent to which this priority has been met?

A day in the e-enabled life of an undergraduate... a vision scenario

“Arthur is spending his morning at home. After some serious kick-starting caffeine consumption, and distraction activity e-mailing his friends back home, he gets down to work. The previous day’s session on campus had been very interesting. Karen, his lecturer, had engaged his group in an on-line discussion with Ted, her colleague, who was working in the Antarctic collecting data about the changes in the ice thickness of a lake. They had all been able to chat with Ted, and ask questions, using ichat or messenger. Everybody could see the discussion and join in via their tablet PCs. The data from the fieldwork that Ted had been conducting was displayed on the large interactive whiteboard in the seminar room, so that it could be referred to during the discussion.

Following this classroom exercise, Arthur is now spending his morning engaged in some on-line group-work. As a visiting student, he’s been really pleased to get involved in some intensive shared work: he feels that he wouldn’t have gotten to know British students in the same way without it – though he still finds their sense of humour weird! He has a problem worksheet to peer review. He downloads the worksheet and the model answers he’s to use to give his fellow-student feedback on their work. He doesn’t know whose work he’s looking at: the system allocates anonymised scripts at random. He finds it really interesting to see how other students have tackled the same problems as him, and likes seeing the model answers as well. There’s always a bit of good-humoured groaning about having to do this job every week – but he knows that he wouldn’t really look at the model answers properly otherwise, and he’s feeling pleased with himself at his much better than usual ability to get through the worksheets – so something is obviously working! In any case, right now he’s itching to see how to do Question 7, which had stumped him completely and has been bugging him ever since.”

Point for discussion at the roundtable: Is this what e-learning should be like for undergraduates? How can institutions know if it is effective?

7 The Special Nature of Medical Education

It is not our intention to focus discussion on Medical Education at the roundtable event. However, there are several special features about medical education and the effects of e-learning that are worthy of note. First, the students are largely highly motivated and want to achieve the understanding and skill that will enable them to “qualify” or do the job better. Second, medicine usually provides a technology-rich context so learners will be used to dealing with (not always well-designed) technology of all kinds, including learning technology. Third, much medical learning is undertaken “on the run”, in the evening, in breaks and indeed “on the job”. Finally medicine is a profession and one where mistakes really matter so the standards of skill, understanding and behaviour are monitored. These features all contribute to setting a context for e-learning which is likely to be different from, other contexts.

Point for discussion at the roundtable: What evidence can we use to evaluate the impact of context?

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