Learning environments

Bob Banks and Gilly Salmon

Background

Our schools, colleges and universities traditionally provide access to learning and teaching, the generation of knowledge, archives of past learning, and – some would say- a special 'atmosphere' of scholarship. Learning takes place away from formal institutions too- such as in clinical practice, fields trips and gallery visits. The value of online learning environments lies in their capacity to augment and enhance these experiences. The scope, breadth and depth of possibilities have grown and grown over the past two decades. Millions of people now experience electronic environments as communities and as libraries, each providing access to untold riches of resource and other people for learning and knowledge sharing.

The online space, or learning environment, is less organized or controlled than the physical academy. Time works a little differently. Interdisciplinary is the norm not the exception. Contributions may be scrutinized for their usefulness rather than their status. Hierarchies are less obvious. The personal identity is more complex. Ownership of environments is based less on monetary value and more on commitment and access. One way- communication such as TV has been overtaken by interactive, creative and collaborative aspirations.

Online space is also far more interconnected than physical space. Information and Communication Technologies (ICTs) can integrate together a wide range of activities and information, in a coordinated way. This has revolutionised many industries, and has great potential for the various processes which make up learning and teaching - dialogue, engaging with learning activities and content, monitoring learners' progress, etc.. Whilst this will not necessarily lead to "better" learning, it does open up a wider variety of options, ranging across distance learning, through blending online learning with face to face provision, to more effective management of "traditional" ways of learning.

In this piece, we are not restricting the term "learning environment" to specific sets of functions, or products, such as Virtual Learning Environments (VLEs). Rather, we are using it to cover any groupings of ICT systems which integrate support for the aspects of learning and teaching.

Definitions

There are a wide number of terms used for online learning environments, often with subtly different and over-lapping connotations.

Systems supporting the broad spectrum of learning activities

- Learning Platform

This term is mainly used in the UK schools sector - where it has been promoted by Becta amongst others. (Becta, 2007) Its scope is much the same as Virtual Learning Environment (VLE), although it is sometimes used more broadly, to encompass systems which underlie the support of learning, like management information systems and school access control systems.

- Learning Portal

A web portal which provides access to a range of learning-relating information and services - which may or may not include a VLE.

- Learning Management System (LMS)

Synonymous with Virtual Learning Environment (qv)- but tends to be used in the US. Course Management System (CMS) is also more or less an American synonym - with a more traditional or institutional orientation.

- Managed Learning Environment (MLE)

An integrated system which not only supports learners and teachers as in a VLE, but also supports the functions an institution needs to manage and administer its provision of learning and teaching.

- Personal Learning Environment (PLE)

A system which enables learners to manage and control their own learning. This contrasts with a typical VLE (qv) where the institution is 'in charge of' the system, and the learning provision. With a PLE, the learner may, for example, with their teacher's support, take and configure educational resources and activities from several institutions. A PLE may be made up of loosely joined pieces.

- Mobile learning environment

An environment which supports learners as they move around the world, across a range of devices. Typically used for learning on location or ambient learning.

- Virtual Learning Environment (VLE)

An web-based environment which supports the main processes involved in learning and teaching, in an integrated way. Typically include asynchronous discussion forums, access to course resources and activities, management of learners' work, assessment, tutor and peer support.

- 3D virtual worlds

Web-accessed 3D Multi –user virtual worlds 3-D are increasingly being adopted by universities to provide new type of educational experiences building particularly on social networking, simulation and online gaming. Students and tutors work together in simulated environments as avatars which are visual mobile representations of themselves.

Systems focusing on more specific aspects of learning support

- E-portfolio support system

A system which enables learners to develop and mange their e-portfolio: an organised set of entries where they plan their learning, reflect on it, provide evidence of it, and share this where they wish.

- Learning Content Management System (LCMS)

A system which supports the management , sharing and deployment of online learning content / resources.

- Learning Content Repository

A system which stores and provides access to learning resources, with a search interface. Repositories may often be managed by an LCMS (qv): typically the term “repository” is used for relatively large stores, available across the Web.

More generic systems used to support learning

As well as systems that are specific to teaching and learning, more general systems have often been used to support learning, for example intranets, generic portals, generic messaging and collaboration support systems, blogs, wikis, Google applications. These could also be regarded as learning environments.

Social networking platforms

These grew up alongside VLEs and are now often being incorporated into the overall learning environment.

Findings from Research

Research into effective teaching and learning with technology focuses on practice, approaches and activities, rather than the learning technology as an environment. There is extensive research and development that throws light on the field, under the following headings:

- Learning environments and effective learning
- Adoption and uptake of learning environments
- Learners with disabilities
- Extending the learning environment into informal settings
- New types of learning institution enabled by online learning environments
- New approaches to learning enabled by 3D Multi-user virtual environments (MUVEs)

Learning environments and effective learning

Most research addresses a key question in some form: what difference does an integrated online environment make for learners’ experience or their learning, and how can positive enhancement be achieved?

One question is what theoretical framework or model can we use to structure such an investigation? Ellaway, Dewhurst and Mcleod (2004) use the “communities of practice” construct to evaluate the effectiveness of VLE use. They argue that just looking at the features afforded by an environment is of limited use: the real efficacy can only be approached by looking at the activities in which the community of learners is engaged.

European Schoolnet (2003) have surveyed learning environments across European Schools. They found that the motivation for the introduction of VLEs is typically ambitious: to act as a ‘facilitator of change in pedagogy towards a more learner-focused paradigm’. In contrast, however, the majority of reported practice is very ‘traditional such as for assigning tasks to students, file sharing, assessment exercises and exchanging messages. The report suggests that the reasons for this are a mixture of teachers moving slowly and cautiously towards more innovative pedagogies, starting by replicating their existing approaches in a new environment, along with possible orientation of some of the VLE systems towards

“traditional” course delivery. (The Annex also summarises several published approaches to selected a VLE.)

Browne et. al. (2006) present similar findings in the higher education sector in the UK. Synthesising studies by UCISA, JISC and others, they suggest there is clear evidence of increasing use of VLEs from 2001 to 2005, but not of related widespread change in pedagogic practice. From 2006 onwards, focus moved towards the key learner experience.

An exploration of learning environments for specific learner-centred pedagogies has been performed using LAMS (Learning Activity Management System). (JISC, 2005, LAMS, 2010) This found that LAMS can be very effective at engaging learners in positive learning experiences, in ways that were perceived as difficult to achieve without the technology. For example, the use of the environment for a whole class to contribute their views to a structured discussion proved far more engaging than face-to-face approaches, particularly with boys who previously tended not to participate in class discussions.

Berry and Partridge (2006) - writing from primary school experience - suggest that factors which tend towards effective learning through online platforms include: - a rich, stimulating environment with varied resources and activities - an emphasis on activity, experience and experimentation. - teachers can readily make or tailor their own resources - encouragement of creativity - emphasis on social learning, and encouragement of all learners to express their voice. - making learning fun.

Aubrey-Smith (2007), focussing on young children, suggests encouraging incremental, learner-centred engagement with an environment. For example initially inviting access to view pictures and messages, then engaging through postings, quizzes etc., then more protracted engagement, responding to peers’ contributions, and making their own choices on activities and tools to use.

Educators inhabiting online environments need to revamp and extend their skills to enable and promote the new literacies required by interactive online environments. At the same time, students seek to extend their experiences within the constrained classroom environment and university-provided VLEs with wider social networks, and sensory rich gaming environments to develop a multilevel literacy, an 'amphibious skill in moving between enclosure and World'. (Alexander 2008). Enhancing learner self-esteem, motivation and self-efficacy is one of the foundations on which to build a successful learning environment. Environments need to draw on materials, face-to-face interactions and digital engagement to give coherent feedback to the learner, to allow learner and tutor to monitor performance and to create a framework for review and progression planning. They should be aware of different pedagogical approaches and how these relate to learning processes and target audiences. An effective e-learning system needs to be flexible enough to evolve, to blend a range of pedagogical approaches, to adapt to the needs of different cohorts and modify, or personalize, learning face-to-face to allow for individual needs and differences.

Adoption and uptake of learning environments

Staff and/or organisational development is universally recognised as critical for the successful adoption of learning environments. One example is the NIACE E-guides programme, used with over 1000 teachers in Adult and Community learning. It has been evaluated, and reported as largely successful. (NIACE, 2004) In employs a cascade model. Within this, small groups engaged in hands-on activities were found to be the most effective approach to staff development, and formal sessions and presentations were the least effective delivery method.

There is an important stream of thinking around organisation maturity or “e-maturity” as a main driver of success in improving learning and teaching, and successful adoption of

digital technology for learning, including learning environments. In the UK schools and further education sectors, Becta are leading significant investment in this approach, under the heading “self-review”. (Becta, 2009) In higher education, across many countries, benchmarking exercises HEA (2008), OBHE (2008) have some similarity. These focus on processes and tease out an organisation’s comparative strengths and weaknesses, in order to identify and implement possible routes to improvement.

Investment in a learning environment should have a positive effect on overall pedagogy and the culture of learning in an institution. It can catalyse much broader changes. For example, Aubrey-Smith (2007) reports on experience of effective adoption in the infant school sector, emphasising potential positive impacts on the whole school culture.

Learners with disabilities

There is potential for ICT use, within a well managed environment, to bring real benefits for learners with disabilities. A Techdis briefing (Techdis, 2007) gives an introduction to this idea, and there are a number of case studies - e.g. Gerrard, (2006) In addition, a number of projects have researched the provision of learning environments specifically for learners with particular disabilities. For example, the PACCIT APPLE project researched the terms on which people with learning disabilities could benefit from ICT for learning, including a prototype VLE supporting these needs (RIX Centre, 2009) In addition to specific materials and technologies, such as multimedia and digital cameras, enhancing learning and autonomy, it was found that access to the internet environment helped learners to engage with popular forms and culture, and helped affirm their self-concept and social identities.

Extending the learning environment into informal settings

The potential of online learning environments to support learning beyond the walls of the school / institution is very powerful. Futurelab reviews look at the environment for informal learning outside school in general (Sefton-Green, 2004)) and in museums and galleries (Hawkey, 2004).

One example which has been evaluated in detail across a number of pilots (Loveless et. al., 2007) is Futurelab’s “Create-A-Scape” Here, learners use mobile devices to create their own “mediascapes”. These are narratives using sound and images, captured by the learners, and located, through GPS, in physical space. The pilots illustrate the wide range of potential applications - school campus and tourist guides, support for creative writing through role play in the school grounds associated with the story ‘Kensuke’s Kingdom’, and a ‘Moonwalk’ in the school playground to support mathematical activities. The pilots took place in primary, secondary, and special schools. Successful use was felt to be most likely where it is part of a broader move to more personalised learning, learner empowerment, and more flexible and informal learning.

Online environments have great potential to link into museums, galleries, and similar institutions. Museum resources are available online today go way beyond the occasional lesson plan or thumbnail reproduction available via the Internet 10 years ago. Art museums imagine, create, and deliver a broad array of teaching resources and tools. within higher education producing, commenting, and classifying are just as important as the more passive tasks of searching, reading, watching, and listening. If schools follow this same trend, in the future, art museums may produce educational content and users in the form of teachers contribute by evaluating, classifying, and adding to art museum content to build their own sophisticated collections of resources that can be shared with others.

The Artist's Toolkit (www.artsconnected.org/toolkit/) is a good example of repurposing old material that used to exist as a slide set teachers borrowed from the museum, and taking advantage of current technology to add new learning aids. (Wetterlund 2008)

New types of learning institution enabled by online learning environments

There are significant cases where IT and online learning environments have enabled new approaches to learning, which would be difficult or impossible without the technology. In these cases, the online learning environment is an essential enabler for the learning. Three UK examples where there has been significant research into the learning which is enabled, are learndirect, Notschool and Ultraversity. Learndirect engages adults in lifelong learning. Notschool supports 14-16-year-olds who have been seriously disengaged from learning (e.g. excluded from school, school phobic, etc..) Ultraversity is a new approach to university education, based around an online environment, where students' learning is integrated with their own lives and work, and discussion between students is emphasised.

There is strong evidence of their successes. Learndirect have supported 2.4 million learners (albeit sometimes on very short courses) - 64 per cent of whom have returned for more, and 75 per cent of whom are in the priority areas of having basic skills needs or only low level qualifications. (UfI, 2009) For many learndirect learners, the combination of virtual and physical environment (learndirect centres) is crucial.

Over 50% of Notschool students have achieved formal qualifications - impressively high in comparison with similar students who do not "attend" Notschool. (Notschool, 2005) A study of Ultraversity suggests that a course design that emphasizes a high degree of trust in students' ability to self-manage learning can lead to a challenging, personalized and rewarding online student experience. Students demonstrated high levels of competence in managing work, study and life. This assertion is further borne out by the high degree of success achieved in terms of outcomes, judged by the degree results obtained by the cohort studied. (Powell, Tindal and Millwood, 2008).

For each of these very different institutions, the key drivers of success probably lie in the appropriateness of the overall pedagogic approach, and ethos, and its application in practice. Once this is in place, an appropriate environment is a great help, but the "best" environment in the world will not provide success on its own. In the case of learndirect, the large range of online courses are complemented by a large network of physical learning centres, where learners can be supported face to face. The face-to-face support is not mainly around the "content" of courses, but functions more to build learners' confidence, and provide advice and guidance on how learning can help improve their lives. This mixture of a physical and virtual environment is credited for a good deal of learndirect's success. With Notschool, the key goal is to restore learners' motivation and confidence in learning by emphasising their capabilities, and through mutual community support. Therefore, the online environment is based around sharing, discussion, and the fostering of a strong learning community.

In the U.S.A., there are many "virtual schools" which provide online learning for large numbers of school-age students. The movement is reviewed, and the experience of one example - Concord Consortium's Virtual High School - is researched in depth in Zucker et. al. (2003) Many of these schools use commercial VLEs - others have relatively rudimentary learning environments - with spaces to share teaching materials and students' work, and for teachers and students to communicate together. Zucker et. al. conclude that the keys to success lie in teaching and organisational skills which are not dissimilar to those required in "bricks and mortar" schools, more than the online learning environment per se.

New approaches to learning enabled by Multi-user online learning environments (MUVEs)

Learning has always used immersive experiences in the real world, such as apprenticeships, cooperative education, and on-the- job training, all of which have enjoyed long term success because they encourage hands-on experience and observation as key strategies for learning. In MUVEs it is possible to experiment not only with little risk in terms of danger or costs, but also in a myriad of ways, taking advantage of scale, texture, sound, and other attributes. Recently these platforms for social and business use have evolved and now offer highly flexible, configurable blank canvases for teachers to design new sorts of learning. These experiences, if designed by someone who is truly understanding and appreciative of the form, can be compellingly immersive and engaging. (Johnson, Laurence and Levine , 2008)

Implications for Practice

Successful Adoption and uptake

Factors which facilitate successful adoption include:

- A combination of a strong senior-level champion of adoption, and strong leadership, along with bottom-up support from teachers for uses of the environment.
- Resource allocated for practitioners to have time to champion the uses of the environment with their colleagues.
- A focus on the learning and teaching to be achieved through the environment - rather than just on how to use the environment's features. This may include an explicit focus on changes and improvements in pedagogical approach, with the learning environment seen as one important enabler within a bigger picture.
- A strong emphasis on staff development, grounded in the particular teaching contexts, and curriculum area of each staff member.
- Effective local and regional practitioner support structures

Effective learning

Some important points include:

- More effort and understanding is required to design effectively formal learning experiences in online environments.
- Effective alignment between positive pedagogical approaches of the teacher, and the capabilities of the environment
- Integration of the environment into the broader overall framework of learning and teaching, suited to the particular context.

A focus on the human factors involved in developing of a successful learning community, regarding the learning environment as an enabler, rather than the main driver. To quote a Notschool report (2005a): "E-learning environments succeed where learning and technology are dealt with simultaneously and with equal regard in an integrated environment, hence the software platform becomes the online community complete with a range of learning tools."

Success factors for adoption

Opportunities to enhance spontaneity and emergent design are needed. Flexibility in the course design and facilitation should allow responsiveness to learners' needs as they emerge. Collaborative authoring tools, such as wikis and blikis, enable learners to build the course content in ways that are interesting and meaningful to them. Learners bring their ideas into a learning space that they are constructing.

Learners need to be coached how to learn online. Online learning is a fundamentally new learning experience. Just as educators need to learn how to teach online, learners need to learn how to learn online. It is important to create spaces within an online learning event that invite learners to reflect on how they are bound by discourses and practices from a traditional F2F classroom that extend back to kindergarten days—boundaries that include expectations about what learning is, what teaching is, how a learning experience should unfold, and the roles assumed by teacher and learner.

The use of diverse technologies for enhancing communication and social presence should be explored. Over a decade ago, Berge and Collins (1995) pointed to the fact that educators often do not take advantage of the latest technologies available to enhance learning. They argued, "there is no shortage of technology, only a shortage of the educational vision necessary to use the technology to create new educational environments" (p. 5). Indeed, communication in online courses has commonly been limited to text-based discussion forums. However, as Thomas (2002) cautioned, "the attainment of a discourse that is both interactive and academic in nature is difficult within the online environment of the traditional threaded discussion"

Teachers need to articulate and manage the expectations of the online community. Expectations of learners and teachers in online environments need to be discussed and made explicit. Much of this discussion should focus on the process of learning and the best way to achieve the learning objectives both as a group as well as individually. (Stodel,Thompson, MacDonald, 2006)

Learning activities need to make learning attractive and engaging - particularly for those who are not used to learn. In this respect, capitalising on prior learning, enhancing self-esteem and dignity of learners, valuing successful informal and non-formal learning experiences are fundamental to engaging with learning experiences, whether they are mediated by ICT or not.

Online courses seem to require a stronger definition of coordination, communication and planning strategies, as well as a clearly defined leadership, than face to face courses. The absence or limited clarity of any of these elements affects the effectiveness and enhancement roles of several of the procedures, in particular team meetings and students surveys. (Jara M, Mellar H, 2007)

While stressing the social construction of online meanings, Bond & Robertson. (2007) make several suggestions as to how to facilitate the social construction of knowledge in a such virtual spaces:

- A shared area of interest
- The presence of a cognitive challenge
- A willingness to engage with that challenge and put oneself in a position of risk; to think publicly
- A level of intellectual honesty; a willingness to acknowledge that one doesn't know
- A state of arousal (intrigue, curiosity, fascination)

- An emotional/intellectual commitment to pushing the boundaries; an openness to the new
- A willingness to pose open-ended questions rather than provide answers – to engage in inquiry
- A close attention to the other; in particular a willingness to listen with care and to work with the contributions of others
- An expectation of response; which in turn leads to a negotiation of meaning.

The most effective learning occurs where the learners' interests are aroused and their pathway meets their needs. Learners benefit from community membership, where they are involved in dialogue, exchange and collaboration. Within a learning community, the learners gain more self-confidence and control. The community provides them with the sense of a learning space with its shared experience of goals, cooperation and support. (Johnson and Dyer, 2006)

Issues and future directions

More work is needed on the fundamental questions of what benefits an integrated online environment can provide for learning, and how to ensure that these benefits are achieved in practice.

Social networking and "Web 2.0"

This mix of openness and microcontent, social networking and filtering, is not new to education. Recent history draws on earlier practice. Teachers have been fascinated by the pedagogical possibilities of hypertext since the 1980s. Web 1.0, as it were, allowed students to read and create static hypertext documents. The open nature of Web 2.0 platforms, extends this, helping learners pursue connections across multiple lines of thought. (Alexander, 2008)

The combination of e-portfolios, social networks and weblogs may have immense benefits for the learner. These tools and the ethos behind them enhance the prospect for deep learning. Creation of a learning landscape where learners engage in the whole process both academically and socially should increase the opportunity to build one's learning instead of just being the recipients of information. This ability to engage with other learners, pull in information from various sources, share thoughts and feelings, form communities of learning or social activity, interact with peers and tutors within one or more institutions, would create a milieu promoting user engagement and a deeper level of learning. (Tosh et al, 2006)

The UK Open University's SocialLearn project (SocialLearn, 2009) is a vehicle for exploring new ways to foster high quality learning in the "Web 2.0" world. Questions being investigated include:

- What principles underpin Web 2.0 learning ecologies?
- How can different tools be pulled together to work coherently for learners?
- How can the power of social networks, web 2.0 approaches and new technologies be used to benefit learners?
- What organisational and technical infrastructure will facilitate the kind of social, creative commons-based economics that are revolutionising sectors across society?
- What does an e-university look like in the new landscape of disaggregated learning service providers?

Social networking and learning are explored in more depth in "Using Social Software in learning" [1]

e-Learning is part of Lifelong Learning

This emerges as a recurrent trend in practice: bottom-up on-line informal and non formal learning is dramatically increasing and spill-over effects from e-commerce, e-governance, e-health or simply e-information are having significant implications on the enrichment of people skills and knowledge.

Learners controlling the environment

Wilson (2008) suggests that “Fundamental to the PLE [Personal Learning Environment] argument is the assertion that the median student population had shifted towards a high disposition towards technology, high confidence in its use, personal learning autonomy, and personal ownership of technology, and that institutions need to recognise and support this.” The Personal Learning Environment, whereby learners control their own technology configuration, and sequence of learning, in a peer-to-peer architecture, represents one possible response to this.

Personal Learning environments (PLEs) are not an application but rather a new approach to the use of digital technologies for learning. There remain many issues to be resolved, but the argument for the use of Personal Learning environments is not technical but philosophical, ethical and pedagogic. PLEs provide learners with their own spaces under their own control to develop and share their ideas. It is claimed that this provides more holistic learning environments bringing together sources and contexts for learning hitherto separate. Students learn how to take responsibility or their own learning. Critically, PLEs can bridge the walled gardens of the educational institutions with the worlds outside. In so doing learners can develop the judgments and skills or literacy necessary for using new technologies in a rapidly changing society. (Attwell G, 2007)

Learning Environments and learner-centred approaches

Exploration of PLEs represent one approach to learner-centredness, but they are by no means the only aspect. Understanding how other sorts of environment can help with learner-centred (and “personalised”) approaches seems important. Green et. al. (2005) in a Futurelab report provide an overview of digital technologies for personalisation.

Ubiquitous and mobile learning environments

Further research is certainly needed into the best forms of environment for learning with mobile and ubiquitous devices. See “Learning using mobile and handheld devices”. [2]

Extending learning beyond the walls of the institution - lifelong and informal learning

Digital technologies offer huge opportunities for making learning more relevant to everyday life, integrating and valuing informal learning, and enabling learning to occur whenever and wherever it is needed throughout life. However, further investigation is needed into the most effective environments for this.

Conclusions

Work across a wide range of sectors and contexts suggests that, whilst the online learning environment can be an important enabler, to be successful they need to be introduced and managed as one aspect of overall approaches to learning and teaching. There are many pointers to success, but ultimately the approach must depend on the specific context of the learner and the teaching.

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