Advanced Learning Environments 2016

Clive Holtham, Martin Rich and Leona Norris

Cass Business School, City University London, 106 Bunhill Row, London EC1Y 8TZ, U.K.

Abstract: In the first section we address key aspects of the future of learning environments in the context of types of change in technology environments, in particular Christensen's distinction between sustaining and disruptive changes. We consider the development of virtual learning environments up to 2016, which is essentially an evolutionary or sustaining period. We also discuss a number of possible factors which will affect the development in this period, and consider alternative perspectives which might exist within higher education institutions.

1 INTRODUCTION

The strategic future of virtual learning environments has been considered by van der Heijden (2012). Starting from the flattening growth of adoption, van der Heijden went on to carry out a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis using the language of business strategy.

There are starkly different views about the future of learning environments, some of which were accentuated in the "VLE is dead" debate at the ALT-C conference in 2009. In general, monolithic VLE's such as Moodle and Blackboard are challenged on the one hand by even generic content management systems such as Drupal, and on the other hand by "modular" products, most particularly massive online open courses (MOOCs), as well as by elearning products which make little or no claim to be comprehensive (Pearson 2012), by innovative cloud based educational applications, and by strategists who envisage a wide constellation of learning technologies and tools, with the VLE being "merely" one type of specialist application (Millard et al, 2011).

Most of the challenges outlined above are essentially tactical, concerned with products available today and meeting today's problems and aspirations. But technology is a fast-moving area, and a key dimension of this paper is how technologies to enhance learning may develop over the next decade, and the implications of this for the virtual learning environment community today.

Academically, this paper is located in the intersection of the discipline of business strategy, together with the discipline of learning technology. Its underlying perspective is from a position of strong support for the achievements of the VLE community to date, and positive views about the but articulated, namely that the positive nature of short and medium term perspectives could well create the climate for a worrying shortfall in longer term strategic thinking.

2 LEARNING ENVIRONMENTS TO 2016

We now go on to consider some broad alternatives open to higher education institutions. These are typical of the options open to institutions currently and for the next few years in terms of the institutional strategy. We have created three existing options, and deliberately constructed a fourth option which is scarcely feasible at present. Our primary focus in this paper is VLEs by 2016.

Within the broad field of eLearning, we focus here almost wholly on virtual learning environments and their broad competitors. This largely excludes the area of content, of classroom and student personal technologies, of virtual worlds and of other important areas. This is a relatively mature market, dominated in the USA by Blackboard. According to the Campus Computing Project (2011) Moodle has a 19% share of a market that appears to be becoming increasingly competitive. The proportion of survey

participants reporting that their institution uses various versions of Blackboard (including Angel and WebCT) as the campus-standard learning management system (LMS) fell to 50.6 percent in 2011, compared to 57.1 percent last year and down from 71.0 percent in fall 2006. Concurrently, Blackboard's major LMS competitors – Desire2Learn, Moodle, and Sakai - have all gained share during this period, and new LMS providers, including Epsilen, Instructure, and Loudcloud, among others, are generating significant interest
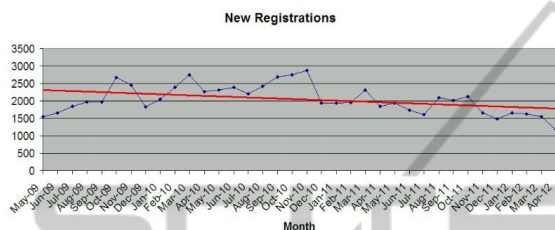

Figure 1: New Registrations (moodle.org 2012).

3 PEDAGOGIC FRAMEWORKS SHAPING VLE DECISIONS

This paper reviews a variety of VLE architectures and develops one that could be expected to emerge by 2020. A pedagogic architecture needs to contain all relevant support to education, both technological and physical, and enables the relationship and balance of the components to be examined. It is vital that it clarifies genuine alternatives enables the relative costs and benefits to be evaluated. And it needs to be remembered that there will not be one right way, not even within a single institution.

We can divide the resources needed to implement a VLE into two types:

- Infrastructures - the basic level, most typically institutionally or even national; relatively static; commodity
- Content and apps - more related to the needs of schools, programmes and individual faculty and groups of students; relatively dynamic; often customised/proprietary

Today we can consider four alternative VLE infrastructures:

1. Transmissive: the traditional VLE, reflecting the traditional teaching approach in most societies. Here the VLE is used principally by lecturers as an organising tool to make resources available to students
2. Constructivist: supporting the learner to construct their own knowledge perhaps

implying a more flexible, lightweight institutional learning environment (ILE) with VLE as one of several components
3. Informal: rejects formal structures and processes; auto-didactic and social; Personal Learning Landscape (PLL) with the implication that students will build their own environment
4. Proactive: Proactive Environment for Learning (PREL), involves the intensive use of learning analytics, in which data collected through the learning environment is continuously collected and analysed, particularly in real time to make mid-course corrections to modules in progress

	Trans-missive	Construc-tivist	Informal	Proactive
Content/ Apps	Didactic	Didactic Social	Open Generic Social	Personal-ised Semantic Social
Infra-structure	VLE	ILE	PLL	PREL

Figure 2: Alternative VLE infrastructure.

Moodle as used by most universities is a transmissive VLE. However, Mark Stubbs (2012) at Manchester Met University sees Moodle as a way of "wrapping the institution around the learner". By contrast Hugh Davis (Millard et al, 2011) at Southampton sees Sharepoint, which is positioned by Microsoft principally as a collaboration product for commercial users, as its integrating technology and Blackboard as a narrow specialist tool.

In practice much of the support for a Personal Learning Landscape comes from those who are hostile to formal education, for instance ELGG (Tosh and Werdmuller, 2004). This is unlikely to be a feasible option for the vast bulk of universities, but VLE's and ILE's will continue to accumulate social software functionality, such as the Open University's Open Learn.

To provide a clearer and less technology-centric approach, we have built on the Southampton structure which does reference content and physical resources. It is vital to recognise three types of learning "process":

1. Administrative - important underpinning
2. Knowledge - important that this covers both explicit knowledge, such as in books and journals, as well as tacit knowledge in

humans that is shared by interpersonal communications

3. Pedagogic - what is needed for teaching and learning in any given class/cohort; can and must reflect a selected pedagogy

Linking these to the two types of resource produces a two dimensional framework, into which we can then allocate the various technologies.

	Admin-istrative	Knowledge	Pedagogic
Content/ Apps	Records Timetable Cohorts Handbooks	Generic content OER Books	Local content Modules Simulations Author/Present
Infra-structure	Buildings Accredit -ation	Catalogue Collabor-ation Tools Repository Social Space	VLE Assessment Turnitin Classrooms, labs

Figure 3: Two dimensional framework.

The red in figure 4 below shows how a classic monolithic VLE includes much functionality in itself (red text). By contrast, figure 5 shows a lightweight decentralised learning environment distributes functionality (green) while possibly still retaining a VLE (red) only for narrowly defined tasks.

Classic VLE	Admin-istrative	Knowledge	Pedagogic
Content/ Apps	Records Timetable Cohorts Handbooks	Generic content OER Books	Local content Modules Simulations Author/Present
Infra-structure	Buildings Accredit -ation	Catalogue Collabor-ation Tools Repository Social Space	VLE Assessment Turnitin Classrooms, labs

Figure 4: Monolithic VLE in two dimensional framework.

Consideration of a move away from formal education is nothing new. Over forty years ago Ivan Illich (1971: 72) advocated "a new style of educational relationship between man and his environment" (Illich, 1971: 72) using four channels:

● Reference services to educational objects
● Skill exchanges
● Peer-matching
● Reference services to educators-at-large

The third and fourth of these have particularly close resonances with contemporary approaches to

Institutional Learning Environment	Admin-istrative	Knowledge	Pedagogic
Content/ Apps	Records Timetable Cohorts Handbooks	Generic content OER Books	Local content Modules Simulations Author/Present
Infra-structure	Buildings Accredit -ation	Catalogue Collabor-ation Tools Repository Social Space	VLE Assessment Turnitin Classrooms, labs

VLE = red

Figure 5: Lightweight decentralised VLE in two-dimensional framework.

learning environments. Peer-to-peer learning, enabled by peer matching, is a key element of any constructivist learning process. Reference services to educators-at-large facilitate the ability to locate experts - in the Tosh and Werdmuller structure provided by the social networking component.

Hart (2001), notes that Illich prefigured the world-wide web. Laurillard (2012: 4) alludes to Illich's critique of formal education but observes that contemporary arguments against formal learning can "plunge us back into traditional approaches".

Budgetary pressures have made it driven the search for new ways to achieve (hickering and Gamson's (1987) seven principles of engagement:

● encourages contact between students and faculty,
● develops reciprocity and cooperation among students,
● encourages active learning,
● gives prompt feedback,
● emphasizes time on task,
● communicates high expectations, and
● respects diverse talents and ways of learning.

Graham Gibbs (2010) has endorsed these in his comprehensive review of how education adds value to reciprocity and cooperation among students.

MOOCs are based around a scaled version of the concept of implementing a constructivist approach to education online. In recent discussions some thinkers see them as a disruptive force within higher education. We share the scepticism expressed by Brady (2012) because of the lack of any clarity applied to the business models underlying MOOCs.

One recent initiative in the field of MOOCs is FutureLearn, supported by a range of British universities, and this has attracted significant media interest (Coughlan, 2012). Its partners include the

Open University which has proved to be a valuable addition to the higher education landscape, but it has not superseded established universities.

One particular strand of work, building on the concept of proactive computing (Tennenhouse, 2000), is proactive learning (Coronado and Zampunieris 2010), which has particularly involved developing software that is activated by actions or inactions in Moodle.

4 FUTURE DEVELOPMENTS

Technologies beyond 2016 are likely to include the educational semantic web (Anderson and Whitelock. 2004), as well as intelligent tutoring systems. Stemming from research with small children (Meltzoff, 2009), Koedinger and Aleven (2007) describe an intelligent tutoring system at university level, where cognitive tutors provide a rich problem-solving environment with tutorial guidance and response to individual student performance.

REFERENCES

Anderson T and Whitelock D (2004) The educational semantic web: visioning and practicing the future of education. *Journal of Interactive media in education special issue on the educational semantic web*. http://www-jime.open.ac.uk/jime/article/view/2004-1

Beasley, R. E., & Vila, J. A. (1992). The identification of navigation patterns in a multimedia environment: A case study. *Journal of Educational Multimedia and Hypermedia*, 1(2), 209–222.

Berners-Lee T and Fischetti M (1999). Weaving the web: the past, present and future of the world wide web by its inventor. *London: Orion*,

Brady A (2012). Questioning Clay Shirky. *Inside higher education.* http://www.insidehighered.com/views/2012/12/06/essay-critiques-ideas-clay-shirky-and-others-advocating-higher-ed-disruption

Campus Computing Project (2011) The 2010 Campus Computing Survey. Encino, CA: *Campus Computing Project*

Chickering, A. W., & Gamson, Z. F. (1987) "Seven Principles of Good Practice in Undergraduate Education", *AAHE* Bulletin

Coronado, S. and Zampunieris, D. (2010). Continuous Proactivity in Learning Management Systems. In IEEE EDUCON 2010 Conference, pages 199-204.

Coughlan, Sean (2012). UK Universities in online launch to challenge US. BBC news http://www.bbc.co.uk/news/education-20697392

Gibbs, Graham (2010) "Dimensions of Quality" Higher Education Academy, York

Hart, Ian (2001): Deschooling and the web: Ivan Illich 30 years on. *Educational media international.* 38 (2-3): 69-76.

Illich, Ivan (1971) *Deschooling Society.* London: Calder & Boyars.

Johnson, L., Smith, R., Willis, H., Levine, A., and Haywood, K., (2011). *The 2011 Horizon Report.* Austin, Texas: The New Media Consortium. http://net.educause.edu/ir/library/pdf/HR2011.pdf

Koedinger, Kenneth R. & Vincent Aleven (2007) "Exploring the Assistance Dilemma in Experiments with Cognitive Tutors" *Educational Psychology Review* 19:239-264

Laurillard, Diana (2012): *Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology.* Abingdon, Routledge

Meltzoff, Andrew N. *et al.* (2009) Foundations for a New Science of Learning. Science, Vol 325. pp284-288

Millard D. E., Davis H C., Howard Y., McSweeney P, Yorke C, Solheim H and Morris D (2011) Towards an institutional PLE. *In Personal Learning Environment Conference 2011,* Southampton, 11- 13 Jul 2011 14pp.

Pearson Education (2012) What is OpenClass, http://www.joinopenclass.com/open/home/what

Tennenhouse, D. (2000). Proactive computing. Communications of the ACM, 43(5):43-50.

Tosh, D. & Werdmuller, B. (2004) The Learning Landscape: a conceptual framework for e-portfolios, Interact, 29, pp. 14-15.

Stubbs, Mark (2012) An Adaptive Response to the CETIS 2007 Innovation Challenge". (Slides from CETIS 2012 Keynote) http://www.slideshare.net/markstubbs/jisccetis- 2012-closing-keynote, *CETIS*, 2012

van der Heijden, Pieter (2012). The future with Moodle 2012. *MoodleMoot Ireland and UK*, 2012