

Driving the future of e-learning

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Abstract

This presentation is based on a recent published strategic directions paper by Eklund, Kay & Lynch (2003) *e-learning: emerging issues and key trends*. The paper aims to integrate a review of literature to provide a high level comparative view of the current and future directions for e-learning, and possible implications for policy and practice. The presentation comments on current and possible events in other sectors that may influence the shape of e-learning. The session considers issues and developments of a technical, organisational and pedagogical nature that are likely to generate change in the use of technologies in education and training. The presenter offers a view of the driving forces for e-learning, an historical context for its development, and a vision for the future. Topics include: The meaning and state of e-learning as a "phase of consolidation". The drivers for e-learning and the size of the marketplace. International benchmarks to measure success. The impact of new technical standards and learning objects. How maturing software development practices and Instructional Design as an emerging discipline are changing e-learning development. Blended learning and new trends in Teaching and Learning derived from educational theory. Equity issues and Organisational Considerations. How e-learning is Transforming the workplace. E-learning as a component of corporate knowledge management. Return on investment. Predictions for future developments in e-learning.

Driving forces

There are many identifiable drivers for ICT-enabled instruction, and these may be classified as technical innovation, organisational and business developments, and the needs and demands of the individual learner. Often it is a combination of these three components that brings about change. Although the rate of development in each of the areas differs, they are clearly not mutually exclusive, and developments are invariably led by the advent of new technologies. The capabilities of hardware, and the technical infrastructure to support it move ahead rapidly and often lead to development in other areas. For example, technologies such as wireless access to high bandwidth and web-enabled mobile phones are released to a market and initially adopted by enthusiasts. Business then experiments with possible viable models for the efficient use of the

technologies and methods for integrating them into organisational practices and culture. Finally, as end users become accustomed to the technology and the demographic profile shifts, they will more readily recognise its benefit and the technology becomes a part of their lives, and the cycle is complete.

A similar cycle exists within educational technologies. Educational applications leverage off base technologies and tend to lag significantly behind in their maturity cycles, not least because of the complexity of integrating them into organisational practices and culture, and in gaining broad acceptance from their users. For an educational technology to be mature, it must be firstly a stable technology, secondly it must be integrated into the business and provide a Return On Investment (ROI), and thirdly it must conform to workflow and practices of its core users, namely teachers and learners. They are the ultimate consumers of e-learning, and the clients of the VET sector.

The size of the e-learning marketplace in Australia

The e-learning market place has been expanding and is predicted to grow significantly over the coming years. While the discussion of e-learning is not exclusive to any particular technology such as the Web, it is there that most of the activity and interest is centred. It is worthwhile remembering that the Web as an underpinning technology for enabling communication, and as a means of delivering learning, has been with us for only ten years. In that time, there have been multiple enhancements of the fundamental concept of the Web.

Statistics for the Australian market are difficult to find, but IDC (as cited in Payne, 2002) anticipates that the e-learning market in Australia will be worth US\$65 million by 2005, growing at an annual compounded rate of 22%.

The reasons behind the relative maturity of the Australian e-learning market include the standardisation of language with relatively few language barriers within the country, a top-quality infrastructure, national as well as state governmental support, a conducive sociological culture that supports all types of learning, and a widely-dispersed population. While IT e-learning dominates the Australian e-learning market at present, non-IT e-learning, which may be vertical-industry-specific, function-specific or soft-skills-related, may grow to be on par with IT e-learning in the next 5 years (Payne, 2002).

A phase of consolidation

It is common in the literature to characterise the current state of e-learning as being in a phase of consolidation. Just as business was forced to re-examine business models for software development following the dot-com boom and bust, it is now no longer popular for futurists to make outrageous claims about the proliferation and transformation that e-learning will bring. In the last three years, Educational Technology conference keynotes (Prometheus, 2002) have replaced their rising graphs predicting the impact of e-learning with more humble reminders of the importance of pedagogical principles. Others (Brabazon, 2002) have adopted a stronger reaction to the

failures of e-learning and maintain that at the classroom level technologies have provided little benefit, and that such initiatives are commonly driven by a misplaced desire on the part of educational administrators to be a part of the movement. The reality is that the present is more a time of reflection and refinement based on an uneven march to maturity. As Viviane Reding, Member of the European Commission responsible for Education and Culture, noted in her speech at the opening of the Learned Forum Karlsruhe, on 4 February 2003.

Our attention is moving from the technology and the infrastructure, towards the practice, the pedagogy, the content ... We are now concerned with issues of: context, effectiveness, efficiency, standards and quality. And we are examining the wider implications for curricula, for training and technical support, and for organisational change within the educational establishments (Reding, 2002).

This re-examination of priorities and tendency for skepticism reflects both the growing maturity of the industry and an acknowledgement of the failures of e-learning, or at least its past failures to deliver on a set of unrealistic expectations. Many organisations are hesitant about the use of e-learning due to failures, either real or perceived, within other organisations; and also because of a lack of knowledge and understanding of the possibilities. Martyn Sloman and Mark Van Buren refer to recent research into e-learning in Fortune 500 companies both in the US and the UK. The survey showed that 62% of Learning Technology initiatives were not successful: only 1 out of 4 learners were satisfied (ASTD, 2003).

Early initiatives and expectations have been largely driven by a market that has been too keen to adopt technologies for their own sake, an acceptance of the hype surrounding the potential benefits and the need for organisations to be seen as technologically progressive to gain market advantage. However, for many the experimental phase has come at a high cost and small return, as the failure of e-learning to provide multiple examples of success, both in student learning and efficiency of delivery, has been evident (Imel, 2002).

Building on successes

There are a number of principles of 'pedagogical effectiveness' (Brennan, 2003) that are generally accepted in e-learning development, and derived from both theory and practice in teaching and teaching materials development. These heuristics include those centred on the materials, and the environment created by the teacher/facilitator to enable learners to effectively engage with these materials to achieve learning goals. The literature in all sectors is growing and consolidating to the extent that there is a generally accepted view of what is best practice or good practice, in designing instruction, creating usable environments to deliver it, and facilitating it.

Common in the literature across all sectors is the practice to report on an e-learning implementation in terms of its aims, format and outcomes, and identify elements of it that are considered best practice. Case studies in e-learning are popular, indicating the newness of the field and the tendency for action research as a methodology. There are

numerous studies, and while it is sometimes difficult to generalise the results, there is some evidence that the role of the teacher is more important than the instructional designs of the content. For example, as a part of the Series 3 Toolbox Evaluation (Online Learning Content in VET) (Eklund & Kay, 2003) conducted across 34 implementations some 'successful' trial sites for online delivery were identified. Success included criteria such as the size of the implementation both in numbers of students and teachers; technical complexity; considerable positive feedback from teachers; and evidence of some innovation in deployment and teaching practice. At each best practice site, the key success factors were identified. These were:

- An enthusiastic teacher(s)
- Local support from, and direct access to, an ICT-experienced teacher/mentor
- Significant institutional support in the form of relief time and/or encouragement
- An implementation appropriate to the local environment, often a sensible or conservative implementation that allowed the teacher(s) the opportunity to review the Toolbox and discover its value as a learning aid
- Positive initial experiences with the Toolbox at the installation phase.

It is clear that a successful implementation of e-learning depends on the competence of the practitioner to access and select quality content and then integrate it into the teaching context. This hypothesis assumes that teachers mediate ICT applications when they are successful, and that ICT's academic value relates positively to teacher competence (Kirk, 2002). This conforms well with the current trend to blended learning approaches – those that recognise facilitation is a key component for success. Other writers (Coleman & Laplace, 2002) have identified a range of key success factors that include ensuring executive and upper management sponsorship of the project, visibility of the project within the organisation, the structure and accountability of the development/implementation team, and a careful deployment strategy that includes training.

Learning Object standards

One of the clearest directions that e-learning has taken in the last few years is in the development, promulgation, and adoption of a range of technical specifications and standards for e-learning. The creation of technical specifications and the development and adoption of technical standards are key activities ultimately underpinning the success of e-learning globally. If organisations are to protect and maximise the return on their investment in learning technology, content and services the systems they use must be interoperable, usable, manageable, and durable (as characterised by Norman & Da Costa, 2003, p.4).

Technical specifications or standards are a way of ensuring that the technology content and services developed for e-learning meet these criteria. A range of standards, originating in the emergence of low-level technical protocols such as SGML and XML, has been developed. They are based on a desire to rationalise a growing collection of

developed resources into interoperable, sharable content, higher level standards such as the Shareable Content Object Resource Model (SCORM).

Higher level standards aim to provide a consistent and useful means to describe, catalogue and share instructional resources. As a consequence, a layer of technical quality in them, as well as in the tools used to generate them is created. Specifications and standards developed, tested and tracked by the IMS Consortium, W3C, EdNA, Prometheus, EduSpecs and other bodies include descriptors of content, user profile, intellectual property, instructional goals, interactions and outcomes in a Learning Object Model (LOM). Organisations such as The Learning Federation (TLF) have developed specifications for educational soundness, accessibility, and use these to aid the development process and maintain quality from multiple perspectives.

Maturing software development

Within the multimedia and web development industry there is clear evidence of a gradual maturing of practices, through the adoption of more formal methods derived from software engineering, and the recognition of standards. Just a few years ago it was common for the development of a large website not to include any user profiling or requirements gathering, for accessibility standards to be completely overlooked, or for testing to be ad-hoc. Many of these providers have left the market, defeated by a lack of process, and business sponsors are becoming far more demanding of providers to demonstrate quality of process in development. There is also a much greater acknowledgement and understanding of User Centred Design (UCD) standards and the importance of usability in design, and these improved processes are assisting to create better quality e-learning resources – those that are more efficiently produced and better meet the needs of the target market. Again it should be recognised that the principles of UCD are not new, but are being rediscovered by an industry that is gradually recognising that success in a project and quality of a product can only be achieved by sound development practices.

Instructional Design using technology or Instructional Systems Design (ISD) is a newly rediscovered discipline. Currently in the software development industry, there is a lack of understanding of the role of the instructional designer as a participant in a multi-disciplinary development team, or even where instructional designers may be found or trained. It combines knowledge of educational theory and practice with appropriate technologies to enable learning, and encompasses the whole of the development and evaluation lifecycle. One of the foundations of instructional design is that it is a component of a user centred development process. It is based on knowledge of the application of learning theory to designing experiences that promote learning and leverages from a significant literature associated with designing good learning – an activity taught in teacher training courses for hundreds of years. It involves choosing appropriate technologies and designing interactions that promote effective and efficient knowledge transfer.

Trends in educational theory and blended learning

Educational Theory has also had an impact on using ICT, as content creators search for a theoretical basis to justify their designs, and as technology is seen increasingly as an enabler of learning. The rise of cognitivism as the dominant 'post-modern/post-behaviourist' learning theory and the recognition of the importance of the social context for learning is changing curricula and teaching practice. Significant trends in linking pedagogy and educational technology are emerging worldwide as learners; trainers and teachers evaluate the capacity of e-learning to improve learning for different types of skills and competencies (Reding, 2003; Straub, 2003). Effort is being directed at determining the factors that create effective electronic learning environments (Khan, 2002), and the broader factors that create successful e-learning programs (Frydenberg, 2002). This includes establishing a basic framework for Web-based or electronic learning covering dimensions as diverse as the pedagogical; technological; interface design; evaluation; management; resource support; and ethical considerations and establishing standards to cover domains such as executive commitment, student services and instruction and instructor services that support the delivery of e-learning programs by institutions.

Further, studies are being made of how students use ICT to support learning delivered by conventional methods (Rourke, 2002), and to create a social climate equivalent to that found in the classroom (Oren et al, 2002). There is also a great interest in the literature in cognitive and other forms of learner profiling to ensure the fit between student's learning needs and skills and the product offered via educational technology.

Discussion of cognitivism and constructivism in learning focuses on achieving higher-level learning (Hung & Nichani, 2001) in engendering independent, self-reliant learners who can employ a range of strategies to construct their own knowledge. ICT is seen as an enabler, a means of acquiring knowledge, a metacognitive tool. The attainment of higher-order knowledge, attitudes and approaches embedded in a social context and made all the more possible through technology is an aim of education in the post-modern society. Early education is undertaken in preparation for further, lifelong learning and multiple careers through an ability to undertake training and professional development that furthers both individual and organisational growth.

Blended learning allows for a range of teaching and learning practices to be combined into a custom-made learning experience for each individual learner. The term has come to describe a well-thought-out combination of e-learning and other training methods - the future trend will use the concept of blended learning more effectively - proactive blending, which means 'taking into consideration the strengths and weaknesses of technology-mediated learning' (Brodsky, 2003).

A number of sources have recently cited the growing trend to blended learning that is, incorporating the use of ICT into the instructional process to augment rather than replace face-to-face delivery. In Smith (2001) blended learning is described as 'a method of educating at a distance that uses technology (high-tech, such as television and the Internet or low-tech, such as voice mail or conference calls) combined with

traditional (or, stand-up) education or training.’ It is likely that this is not actually a measurable trend away from online delivery and towards a blended mode, but more of a recognition that this mode is commonplace, meets the needs of larger numbers of students and teachers, and seems to be a key component of the more successful uses of ICT.

Transforming the workplace

There is a range of significant barriers to organisations adopting e-learning. In the context of schools and VET, workplace practices and awards do not easily fit with the flexible learning concept. In business, e-learning is only beginning to be recognised as an investment in human potential and thought of in those terms. For schools, teaching and learning still takes place in physical classrooms, based on same-time same-place delivery methods, and teacher-centred approaches are the norm. Teachers work with a highly rigid curriculum that must be methodically delivered in a step-by step fashion, as they work toward strict assessment requirements. There is often little time for teachers to develop their ICT skills, no time to vary the delivery of content, and no time to implement new teaching methods.

Many teachers who have experimented with online forms of delivery have experienced an additional workload in responding to student emails. This raises industrial and workplace issues with respect to the time required to deliver teaching, particularly for casual staff that are paid hourly. VET and university teaching allocations are still based on lecture hours/contact hours or equivalents, and some administrators believe that if the students are not physically present for class the time is not a real part of the teaching allocation.

E-learning as a component of corporate knowledge management

The need for organisations to promote and capture learning at the individual, team, and organisational levels has fuelled considerable interest in the concept of the learning organisation. With the increasing sophistication of IT and the acknowledgement that institutional goals may be efficiently achieved through it, there is a gradual alignment of organisational goals with core IT infrastructure. As a result, e-learning becomes a component of performance enhancement, and the convergence of e-business and online learning in the ‘information age ’ is achieved (Mitchell, 2003). E-learning can also build on other knowledge management systems existing in a business environment.

The future

In this section I would like to present my personal view of a probable future for elearning. Forces that are aligning to shape the future for e-learning may be categorised as technical, teaching and development practices or organisational initiatives. Dramatic

changes in hardware and software and the continued mainstreaming of technologies into our lives through e-commerce and entertainment are providing a powerful and unstoppable force for the growth of e-learning. A new generation of learners is growing up with technology and will increasingly expect it to be deployed in undertaking training. Organisations, including schools, are developing better IT infrastructure and systems for efficient business and will be seeking to leverage off those efficiencies for the delivery of training. Businesses are seeking more skilled and flexible workers who can 'hit the ground running' and already possess some of those attributes thought once only achieved through experience.

The only certainty is change, and the only way to effectively accommodate change is through having sound processes. These are processes for identifying the needs of the learner, for designing experiences that efficiently meet learning objectives, for choosing appropriate technologies and creating motivating learning designs, and for measuring learning outcomes.

The key to the world of educational technology is that it is not advanced technologies that will be making the impact on education and training. In fact it is the mainstream technologies of the day that will be belatedly adopted and integrated into teaching and learning, once they have become accepted by the demographic of the day in so many other areas of their lives. It makes sense then that tomorrow's e-learning technology successes will be based on adaptations of successful technologies and their uses in business, and in the home. These will include business IT systems, the rise of internet commerce and home game systems.

Some commentators predict that 'training technologies will become so smart and intuitive that technology will no longer be the focus. It will be replaced by the application and how it serves their business needs' (Brodsky, 2003). The future of lifelong learning depends on reducing the gap between concept and implementation. The use of games and simulations in learning will help develop collaborative communication and strategic thinking (Fannon, 2003).

Much of learning design in the future will be based on learner engagement via active simulation (web based role play), the use of microworlds (rule based simulation) for personalised construction of knowledge, and collaborative problem-based learning, where learning activities centre on generating a solution in an authentic setting. These designs will be enabled by more interactive technologies but also led by a desire to lure customers to courses. The distinction between multimedia authoring and delivery and production for web-based delivery will dissolve. As development standards and practices mature, there will be far greater interoperability of content. Content presentation will become more interactive but no more expensive to produce, and there will be a natural collaboration between the game industry and e-learning development, as instructional designers create systems for a generation of learners who have grown up with gaming systems at home. The days of e-learning designs with a predominance of text will disappear, and blended designs using paper-based textual information and interactive web-based content will be popular. Typical learning designs will include

face to face presentations, group discussions online, the provision of a set of learning resources for problem solving, and individual interactive sequences engaging and exciting the learner. Much of the assessment will be formative with the teacher as mentor.

The energy in the e-learning debate surrounding standards will undoubtedly subside and be replaced by broader concerns relating to quality of learning experience. Standards will have their greatest successes at the lowest level of granularity, in the adoption of common formats for metadata, which will be embedded into authoring and information retrieval tools. Educationalists and instructional designers will not be discussing standards any more than they now have an interest in file formats of common applications. Their interest will remain in educational quality and design principles and methods of production. Higher level standards which sequence digital assets into a larger learning objects will lose favour as they find limited applicability in authentic teaching and learning contexts, and as rapid development tools for interactive multimedia sequences will defeat the importance of the reusability of these learning objects.

Much of the work done on standards leads to a set of tools for organising content at higher levels of granularity, and these take the form of e-learning authoring and knowledge management tools. This intelligent sequencing of higher-order granular content is built on a set of templates to select and sequence low-level information into a coherent document for research or for learning. Digital repositories will be sometimes used by developers but rarely by teachers. The resources they contain will soon date through curriculum change, teaching emphasis, the changing needs of the learner, and the use of new technologies for developing learning content.

As constructivism is eventually recognised as a philosophy about curriculum design rather than a learning theory, VET and schools will gradually reform their curriculum and learning structures. Eventually it will be recognised that a significant part of learning will not necessarily take place in formal classrooms at discrete periods of time, and students will enjoy more freedom to manage their own time to work on projects centred on a theoretical aspect of content. Problem-based learning using ICT where students access a variety of resources and collaborate to solve problems, now commonplace in VET and university teaching, will find its way into Secondary and Primary Schools. The teacher role as a guide, mentor and facilitator will continue to develop, with workplace reforms slowly offering a more flexible working arrangements for teachers.

A key goal of early education will be to prepare students for a wide variety of work contexts, for lifelong learning, and for a number of career changes. Much of a student's program will focus on the development of personal qualities and information management skills, often relating to authentic workplace settings. The bell sounding the beginning of the lesson will be replaced by a schedule of lectures, learning experiences and consultations with teacher-mentors. The role and expertise of the classroom teacher

will change and grow, with teachers being better paid and more qualified, and more able to shift to alternate careers. Many teachers will be seconded from industry.

Curriculum reform will de-emphasise declarative knowledge in specific subject areas, and subjects such as knowledge management for learning will be taught and closely integrated with other subjects. The rise of globalism will reform the social sciences curriculum, and online collaboration with other countries via WebQuests and other ICT-based projects will be common. Information retrieval will have undergone a significant leap with the successful development of search engines that are adaptive to the needs of the individual, accept queries in natural language and are based on the science of conceptual structures, now possible to realise with better quality metadata. Libraries will lead an information retrieval reform as well as the development of digital repositories, and the distinction between information for research and information that is sequenced to achieve an instructional goal will be less relevant than it is today.

The transition from school to VET or higher education will become more seamless than it is at present, as students embark on lifelong learning. Their individual learning styles will be identified through an induction process. Some e-learning experts see students increasingly 'self-service' their education and training needs, checking on their grades electronically, maintaining their portfolio in a digital repository, and holding continuous accounts with one or more providers. The computer will be a tool for transformative education (Jonassen, 1998), accessing, manipulating and representing information using increasingly larger elements of knowledge to solve problems and achieve goals. Within the VET sector, this will emerge as an emphasis on flexibility and heightened skills to select and exploit knowledge. Accompanying these skills will be increased expertise in design and delivery of scenario based learning and collaborative tasks, which encompass a range of communication tools and modes to foster strategic thinking (Fannon, 2003).

In the future more businesses will recognise e-learning's ability to build knowledge and develop skills while reducing training-related costs. E-learning will become more influential both for internal and customer training purposes. In the future more of a company's customers will go online to learn how make the best use of its services and products (Brodsky, 2003). E-learning is increasingly converging with other management tools, providing managers with a unified view of all financial, customer and employee information. E-learning will be integrated into the knowledge management of an organisation, and its ROI will be found in more traditional Human Resource models that focus on employee knowledge growth being a means of attaining organisational goals.

There is a growing literature on how e-learning is one component in improving business performance, and a recognition that training is often addressing the symptoms of performance and not the cause. There is no point organising a course of time-management for employees if the root cause of inefficiency in productivity is business processes or workplace culture. Staff training is just one component in the enhancement of business performance through organisational change. An integrated approach to

organisational knowledge management and performance improvement is providing new ways to examine ROI on e-learning.

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