

How training organisations are using e-learning to support national training initiatives around apprenticeships and RPL

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Abstract

This project completed 21 interviews to investigate how organisations are using e-learning in innovative approaches that support more responsive, flexible and effective training, particularly in skills shortage areas. Findings revealed that industry developments are occurring within the bakery, and building and construction industries, in particular. The Bakers Delight and Hunter Institute partnership illustrates the value of industry partnerships, the utility of pilot programs up front and the virtues of using a variety of e-learning tools. The construction industry emerges as having the most developments around the use of e-learning strategies to promote more flexibility, higher rates of on-the-job training and opportunities for more accelerated completions of qualifications to assist in responses to skills shortages. Finally, the plumbing industry is exploring and gathering evidence around the best ways to transform training through the application of more blended forms of training. The industry stands as an exemplar in how to explore what is required. The national priority area of RPL practice currently has limited use of the new technologies. However, e-portfolio adoption is growing, and there are some examples of e-portfolio applications to support skills recognition. According to those interviewed, the key benefits of more e-learning for businesses in these areas of skills shortages include more flexibility, increased levels of on the job training, better quality in the training especially across multiple locations, more customisation of the training around business needs and cost savings. A major barrier exists around the challenge of changing mind-sets that are still locked into the traditional models of training delivery.

Introduction

The traditional apprenticeship is under pressure in responding to national skills shortages. Many have challenged the ability of the traditional model of apprenticeship training to respond to changing industry needs, especially around getting the balance right around the delivery of knowledge off-the-job, and the development of skills in the workplace. Employers clearly want

more work-based training, less time off-the-job for learners, shorter completion times for apprenticeships and better partnerships (Dickie et al., 2004; Callan et al., 2007). At the same time, we know little about what e-learning strategies are being used Australia-wide by our public and private training organisations to change apprenticeship training towards being more flexible, work-based and more accelerated.

The aim of this project was to investigate how organisations are using e-learning in innovative approaches that support national initiatives by providing more responsive, flexible and effective training. The current paper reports upon the findings to emerge from the completion of interviews and three case studies to build a clearer picture of e-learning innovations that are addressing key national initiatives, especially around apprenticeships and RPL.

Research method

Due to the need to explore the key initiatives and factors at work around e-learning and its applications, a qualitative approach was adopted as the major research method. A series of 21 telephone and face to face interviews were conducted during October to December 2008. All interviews were completed by the first author, and were recorded. On average, interviews were completed in 45 minutes to one hour. In addition, three of the interviews also formed the basis of the case studies. Those interviewed were Managing Directors, Managers of Innovations, Heads of School, Lecturer and Teachers, Project Managers, Program Support Officers, E-learning Support Officers.

Guiding this research was an extensive review of the literature, and the next section highlights key findings from that review.

Literature review

More responsive approaches for training

It is clear that development in new media and delivery technologies around information processing and communications have transformed the learning environment over the last three decades. Table 1 presents a summary of these developments. It updates and extends Laurillard's (2004) overview to incorporate some of the more recent technological developments. What is evident from the fast pace of technological development in e-learning software is the "movement away from a situation in which key decisions about learning dimensions are made in advance by the instructor or institution, towards a situation where the learner has a range of options from which to choose with respect to these key dimensions" (Collis & Moonen, 2001:10). The central drivers for this more responsive approach to training delivery are training:

- at the right time (flexibility in time)
- that incorporates the design and delivery choice (flexibility of place)
- for a number of trainees simultaneously (flexibility of delivery; see Elliott & Clayton, 2007).

Table 1: New media and delivery technologies for information processing and communications (Updating of Laurillard, 2004)

Date	New technology	Old technology equivalent	Learning support function
1970s	Interactive computers	Writing	New medium for articulating and engaging with ideas
	Local hard drives and floppy discs	Paper	Local storage with the user
1980s	WIMP interfaces (i.e. Windows, Icons, Menus and Pointing devices)	Contents, indexes, page numbers	Devices for ease of access to content
	Internet	Printing	Mass production and distribution of content
	Multimedia	Photography, sound, and film	Elaborated forms of content presentation
1990s	World Wide Web	Libraries	Wide access to extensive content
	Laptops	Published books	Personal portable access to the medium
	Email	Postal services	Mass delivery of communications messages
	Search engines	Bibliographic services	Easier access to extensive content
	Broadband	Broadcasting, telephones	Choice of elaborated content and immediacy of communication
2000s	3G Mobiles	Paperbacks	Low-cost, immediate access to elaborate content
	Blogs	Pamphlets	Personal mass publishing
	Social networking tools (e.g. MySpace, Facebook, YouTube)	Face-to-face and formal written networking	On-line networking for peer-to-peer knowledge sharing as well as social networking
	Simulations	Hands-on experience	Virtual experience
	Virtual classroom software (e.g. WiZiQ, Moodle, Lecturshare, WebTrain)	Classroom teaching delivered face-to-face in real time	Online learning platform delivered in real time using an interactive whiteboard, chat, and VOIP technology that allows audio and video sharing

	Blackboard and WebCT	In-class discussion and chalkboard	Virtual discussion boards, that may include mail systems, live chat, and content e.g. documents and web pages
	IMS Learning Design	Static delivery and assessment	A set of e-learning design and runtime tools that support a wide range of pedagogies; single, group and collaborative learning; and interaction with content and testing.

As identified also in Table 1, new media and delivery technologies continue to transform the e-learning environment. According to Gibbs and Gosper (2006: 47):

“Current learning management systems such as Blackboard and WebCT have been pivotal to the uptake of e-learning in the higher education sector in the past decade largely because of their capacity for online delivery. These, and other similar systems, when used creatively, are able to provide students with quite varied learning experiences, particularly in relation to the sequencing of content based, self-paced learning experiences.”

Another important development is the use of simulations using video or animation. These developments are providing learners with realistic experiences. As well, social networking software is now being used more to assist learners to make and maintain vital connections with their peers. This development teaches them how to use learning resources, while also supporting a more responsive approach to training (Bersin, 2008). The emergence of social software (e.g. group work tools, wikis and blogs) and social networking websites (e.g. MySpace, Facebook, and YouTube) is allowing teachers and students to make use of more dynamic modes of communication. However, it can be technically challenging for teachers to incorporate social networking into more comprehensive electronic learning that attempts to build specific learning outcomes (see Gibbs & Gosper, 2006.)

The 2007 Horizon Report (New Media Consortium, 2008) describes the outcomes of a five-year qualitative research project that identifies emerging technologies that are likely to have a significant impact on teaching and learning within learning-focused organizations. The report proposes that the emerging technologies that will become mainstream use for teaching, learning or creative applications in the next five years include:

1. Grassroots video – where numerous people can capture, edit and share short video clips using inexpensive equipment such as a cell phone and free software
2. Mobile broadband – as mobiles provide an affordable portable platform for networking, new displays and interfaces support the use of mobiles to access almost any internet content
3. Collective intelligence - evidenced in projects like the Wikipedia and in community tagging with data gathered from the repeated activities of numbers of people
4. Data mashups – that tap into information produced by collective intelligence to develop our understanding of ourselves and our technological world

5. Social operating systems – seen to be the next generation of social networking, social operating systems leverage off the nature of organizations as networks of people, rather than around just producers of information and content.

The need to establish capabilities of teaching staff

Guthrie (2004) reports that VET teachers believe that the greatest factors impacting on their work in the next five years are new technology, increasingly competitive training environment, more flexible delivery, Training Packages, changes to funding and the changing roles and work of teachers and trainers. The vision for the future for VET teachers proposed in the 2008–2011 Australian Flexible Learning Framework Strategy describes a future where teachers are effective “managers of learning.” They will be skilled at using ICT to enhance the learning experience, freely accessing up-to-date quality learning resources, facilitating and managing learning, and more engaged with their clients.

E-learning is and will continue to be a key enabler in allowing teachers to respond to changes in the expectations of employers and workers about the nature of training. It is central to better training responses to meet the needs of a more diverse customer base that requires new products and services. Learners also expect more products and services to be customised, flexible and workplace-based. However, to be genuine “managers of learning”, teachers require well developed capabilities in several areas. As Webb and Cox (2004) describe them, teachers need what they call “affordances”, that is, an in-depth understanding of the learning environment offered the learner. In particular they point to teachers requiring capabilities around more complex pedagogic reasoning than in the past.

In another contribution to this debate on teacher capabilities, Kirschner and Davis (2003) looked at good practice in ICT teacher training across seven countries. They identified the need for teacher capabilities around:

- Competent personal users of ICT
- Competence to use ICT as a mind tool
- Mastery of a range of educational paradigms that make ICT a tool for teaching
- Mastery of a range of assessment paradigms which make use of ICT
- Understanding the policy dimension of the use of ICT for teaching and learning.

In “Ready, willing and capable”, a report that examines the teaching capabilities required in the Australian VET sector, Callan (2006) also puts forward a wide set of capabilities. His capability framework for teachers, trainers and assessors includes capabilities around engaging learners,

learner support, e-learning and other forms of learning, as well as capabilities around workplace learning and new forms of assessment. Together, these capabilities reveal that successful e-learning requires teachers and trainers with capabilities around being able to:

- Engage learners – including being able to demonstrate an understanding of a range of learning theories and techniques that engage learners and maintain this engagement; adapting learning and teaching strategies to suit individual students, their learning styles, past experiences, abilities and current work contexts
- Use and manage ICT – including being a competent personal user of ICT, with mastery of a range of educational paradigms that make use of ICT as a tool for teaching and assessment paradigms, with a good working knowledge of, for example, web/online options, video-streaming, chat lines, blogging, and SMS messaging
- Understand and apply flexible learning – including knowledge and skills in specific forms of flexible delivery, including distance, blended, e-learning, online and work-based learning to provide a wider range of options for VET learners, and has confidence in being able to adapt existing learning resources to achieve more flexible learning strategies.

As well, as a result of the shift from instructor to e-learning facilitator, teachers and trainers across numerous industries report more isolation, a loss of face-to-face teaching skills and subject knowledge, reduced opportunities for student interaction, and what they feel is an erosion of their identity as role models for learners. Consequently, the development of effective training strategies needs to be informed by the instructors' perceptions about the role of e-learning; how the position of instructors as role models and sources of knowledge influences their perspectives around e-learning effectiveness; and the need to provide more organisational support for instructors that define and value their role in e-learning.

Importance of creating a learning culture in businesses

In a survey of the main drivers for learning organisations, corporate training leaders identified organisational culture as the top predictor (Bersin, 2008). Specifically, an organisation's learning culture is comprised of the set of practices that embed learning into business processes, behaviours and organisational systems. Learning organisations show the ability to share and reuse content; to blend learning with other forms of training; expertise in collaborative learning strategies and programs; being able to create and enforce content development standards; and the ability to build high-impact learning and learning on demand. To illustrate further with an Australian example, an investigation of training in the Australian Army found that organisational culture was a key factor in influencing effective e-learning (Newton & Ellis, 2007). The army instructors reported that the primary capabilities required were around being able to balance and negotiate the priorities of the army's hierarchical organisational culture, the features of the learning environment, their understanding of learners' needs, and their personal beliefs about teaching and learning.

The success of e-learning is highly dependent on the openness of the business to how it organises work, the training associated with this work, and the learning culture to support this. If the organisational culture provides barriers to learning, and reduces opportunities for learners to share knowledge, not even the best e-learning environment makes a difference (Senge, 1990; Fuller & Unwin, 2003). Businesses with an “expansive learning culture” provide opportunities for training, reflection practice, and discussion with others in their multiple communities of practice inside and outside the workplace. However, what are labeled as “restrictive workplaces” will deny such opportunities to support the outcomes of any e-learning activity, irrespective of how advanced these workplace are in their use of technology and systems.

E-learning builds the quality of the training process

What constitutes ‘quality’ in the e-learning process is still open to debate. For example, Zheng and Smaldino (2003) argue that the robust application of a process of instructional systems design is one indicator of a quality course. Alternatively, Kidney and colleagues (2007) propose a matrix of quality attributes that apply across the different e-learning stakeholder groups of learners, teachers, and administration.

In terms of quality and impact, the OECD (2005) identifies both positive and negative pedagogic impacts arising from e-learning. Positive impacts around quality e-learning include:

- greater flexibility of access to materials and other resources
- the enhancement of face-to-face sessions
- improvements to teacher and student communication (e.g. by reducing cultural and personal student shyness, there are quicker responses to student queries; enhanced peer learning)
- improved retention and attainment
- greater employer interest
- higher student satisfaction
- improved quality assurance arising from the greater specification of e-learning course materials and activities.

Negative impacts include inconsistent terminology in courses; teachers being advantaged and students being less advantaged in access to technology; interfaces that are not user friendly; system unreliability; the lack of integration between online and print materials; a loss of face-to-face contact; and inexperience in the use of new technologies.

In addition, some critics claim that the volume, complexity and interchangeability of terms make it difficult for businesses to make well-informed decisions about e-learning strategies. If we agree that

a consistent and strong vision guides organisational learning (Senge, 1990), any big picture thinking is very difficult when decision makers in organisations cannot see the forest for its terminology trees. Some businesses report being bogged down by their advisers in technological issues (the how) to the point that the larger purpose of an e-learning strategy (the why) is lost by business.

However, a related development is the emergence of value adding activities to assist businesses to achieve quality in their e-learning activities. Value-added services that can be provided by training organisations, and are predicted to increase over time, include customised forms of training needs assessment and skill-gap analysis, support for curriculum design and development, pre- and post-training mentoring and support, the provision of reporting and tracking tools, hosting and management of internet or intranet-based learning systems, and the provision of advisory services around e-learning.

The learner perspective

The 2008 e-learning benchmarking survey shows that e-learning continues to have a significant impact on how students choose to engage with e-learning to enhance their vocational skills and employment prospects (I & J Management Services, 2008). Access to e-learning is a major factor for students looking to undertake a significant part of their training online. The flexibility offered through e-learning is particularly important to those students wanting to upgrade their skills, to continue to work or students seeking to re-enter the workforce.

As Edwards (2005) reminds us, there is learning around “within-person changes” that modify the way an individual interprets and acts in his or her world. Of the 1,500 student respondents to the 2008 e-learning benchmarking survey, 62 percent reported that the e-learning in their course had increased their confidence in using computers and new technology (I & J Management Services, 2008). It had also enhanced their general skills base for using technology at work and at home. Also they had positive expectations about the impact of e-learning on their current and future employment outcomes. For example, approximately 65 percent consider that e-learning in their course will help them to get a better job, a promotion or more responsibility in their current job.

In this same survey, the key benefits students identify with e-learning include flexibility, choice, and the capacity to balance home, life and work commitments, especially for more remote learners (I & J Management Services, 2008). In particular, students value flexibility about when and where they undertake their learning, while also recognising that a lack of motivation and poor study

discipline could inhibit successful learning. As a further testament to their overall satisfaction with e-learning, 70% of VET students surveyed would recommend e-learning to their friends or work colleagues, while 28% would strongly recommend e-learning.

We can add to this picture the findings from the non-VET research literature. Specific forms of ICT use can have a positive effect on student learning. For example, there is evidence that blogs support reflective learning, wikis encourage student collaboration, and the increasing use of pod castings is seen to reflect the position that they can aid student learning (Kim & Bonk, 2006). In other work, students have reported upon the attributes of quality e-learning. They mention easy accessibility, good usability, and having accurate and thorough instructions. They prefer intuitive navigations, well-integrated tools and correctly working links, materials and media (Kidney et al., 2007).

However, there are negative consequences of an e-learning environment for some students. These reported consequences include:

- a reduction in opportunities to develop oral presentation skills (Kanuka & Rourke, 2008)
- difficulties in working with other students on collaborative tasks (Gibbs & Gosper, 2006; Leijen et al., 2008)
- the inability of the virtual learning environment to provide students with opportunities to deliver their end products, such as solo performances and to display their work (Leijen et al., 2008)
- being de-motivated when frustrated by the navigational difficulties of different software, by the need for different passwords, and problems in downloading material (Gibbs & Gosper (2006).

Teacher perspective

The 2008 E-learning Benchmarking Project (I & J Management Services, 2008) also reports a widespread use of e-learning practices among VET teachers and trainers. In the main, this group holds positive attitudes to the use of e-learning. The majority of teachers and trainers report being supported in their use of e-learning in terms of their access to computers, the internet, e-learning resources and professional development. Specifically, 62% of VET teachers and trainers report that the use of e-learning has improved their teaching practices. In particular, e-learning practices enabled them to:

- Facilitate a more personalised approach to student learning
- Encourage a greater interaction between students
- Improve learning outcomes for students
- Make learning more interesting for students.

From a delivery perspective, e-learning covers a continuum ranging from using technology in a classroom with a teacher being present, to learning in a virtual classroom where there is no face-to-face contact between student and teacher. Creating learning experiences for students along this continuum involves using technologies of various kinds and in various ways. There are also important decisions for teachers to make. The teaching strategies required in a classroom where students are working with technology is different in kind from the monitoring and behind the scenes support required of a teacher when students are independently carrying out a task at a distance, over a period of time, on a discussion board or in a chat room (Gibbs & Gosper, 2006).

The non-VET research shows the importance of teaching staff being committed to the development of e-learning resources. Particularly where faculty work with a team of experts, the use of e-learning technology increases the quality and cost-effectiveness of course design (Kanuka & Rourke, 2008). Also how instructors choose and use technology plays a vital role in the development and expansion of e-learning (Cox et al., 2003; Kim & Bonk, 2006). The attributes of quality in e-learning that teachers seek include:

- easy to teach
- intuitive course management
- customisable
- consistent with information they deem important
- quick preparation for semester after semester
- easy to update and add new information (Kidney et al., 2007).

However, teachers identify a number of concerns around e-learning. The key issue with e-learning over face-to-face teaching is the increase in the time required to complete previously straightforward tasks. Specifically, teachers report increased time pressures placed on planning and preparation; on learning and administering new programs; on converting and uploading course data; and in responding to large numbers of written communications from students (Foreman, 2001; White & Myers, 2001). As well, teachers find that the operational complexity of e-learning management systems demand more effort than is required of a conventional teacher for activities such as accessing grades or exchanging files.

In summary, the introduction of e-learning is encouraging teachers to re-think their roles as well as the roles played by their students to deliver quality instruction and training. The role of the teacher is shifting. Under e-learning, we have seen the emergence of the teacher coach and less so the teacher as instructor and knowledge teller (Steffens, 2008). Similarly, the role of students is being

transformed. This transition is from knowledge receptors into knowledge seekers and knowledge constructors. Looking further into the future, Gibbs and Gosper (2006) propose that with the next generation of learning technologies and learning management systems, there will be an even greater focus on the learning aspects of e-learning, rather than on its delivery. Specifically, the learner will grow in status as a co-contributor to learning, and not merely as an acquirer of knowledge.

Adding value to the training of business

The vision for the future for business and industry proposed in the 2008–2011 Australian Flexible Learning Framework Strategy involves businesses investing in workforce development and recognising that flexible learning can fit around other business priorities. Measures of how e-learning adds value to training for business tend to focus around indicators that relate to the uptake, use and impact of e-learning.

Discussion of these indicators and practices is provided, for example, in the 2008-2011 Australian Flexible Learning Framework Strategy, in the bi-annual employer survey process proposed for the 2009 E-learning Benchmarking Survey, and through the report on national e-learning indicators (I & J Management Services, 2005). Specifically, the indicators often seek to measure:

- The percentage of businesses offering e-learning opportunities to employees
- E-learning as a percentage of all structured training provided by employers
- The number of industries investing in e-learning for long-term workforce development.

Overall, there is growing evidence that innovations around e-learning are effective for industry stakeholders. This evidence includes the:

- Uptake of e-learning around vocational education and training
- Growing sophistication around the use of technologies to delivery and to support workplace learning
- Increased provision of e-business services by training providers (I & J Management Services, 2008).

However, a continuing concern is the difficulty around gathering empirical evidence that demonstrates the impact of the new technologies on learning outcomes (Steffens, 2008). A number of factors make it difficult to show any cause and effect relationship. These factors include the complexity of different learning environments, as well as the variability in attitudes, motivation, beliefs, knowledge and the skills of individual learners.

However, a major difference between e-learning and other forms of training is that e-learning can be tracked. A business can track and know everything that the learner does, unlike classroom training. A business can monitor and measure employee training activity to determine cost-savings, the return on investment and other efficiencies. The opportunity is there to measure the impact of the e-learning investment. From this perspective, e-learning is being promoted as a business performance improvement tool rather than a training tool.

Numerous case studies report that e-learning is proving cost-effective for business and industry. Cost benefits include reduced travel and staff replacement costs, and reduced time required to organise and release staff for training. For example, in a case study of Energy Australia, an e-learning demonstration is reported to have saved the organisation more than \$100,000 per year in staff training costs. E-learning reduced the frequency that workers had to attend the training centre, and reduced significantly the time taken for course delivery (Emeleus, 2008).

Similarly, Rod Peadon, Learning and Development Consultant, NSW North Coast Area Health Service, reports that an e-learning demonstration designed to educate staff about violence in the workplace was invaluable. The demonstration provided just-in-time training. Health industry staff were not required to be released for extended periods of time, and they did not need to employ additional staff to replace those attending the training (Peadon, 2008).

A Safe Food Handling e-learning demonstration project, funded by Australian Flexible Learning Framework in 2006, also shows how e-learning can be an effective platform for delivering training to food handlers. Training was more affordable for small business operators, and not only helped to improve the understanding of food safety concepts, but also improved the relationship between food handlers and Environmental Health Officers (Lang & Macpherson, 2008).

Richard Matheson, Executive Director of Australian Stainless Steel Development Association (ASSDA) (<http://www.assda.asn.au>) describes the application of e-learning resources to meet the training needs for skilled welders in the stainless steel industry. E-learning provides a rich resource that is promoting practical skills, while reducing training time when compared to face-to-face learning. Issues around literacy and numeracy are being managed through smart e-learning design. They are using e-learning to allow the learner to see the process and the required outcomes through the eyes of the trainer. The weld pool, for instance, can be animated to show the trainee how to

make the weld. Reports from industry partners indicate that the e-learning module reduces face-to-face training by about one working day.

Finally, a case study of Australian food and meat processing businesses reveals that having skilled employees is essential for the capacity of such enterprises to stay customer-focused, innovative and financially viable (Mitchell, 2004). E-learning is viewed as a new method for providing timely, cost effective and efficient training. However, there are many challenges around implementation. These include collaboration between all stakeholders and advanced skills on the part of the training organisations especially around a collaborative approach to planning the implementation of flexible e-learning. Once introduced, also there needs to be mechanisms for monitoring the impact of these new learning strategies, determining what training needs are best met by e-learning, face to face or other methods, and a commitment to the longer-term to allow the training program to meet learner, enterprise and provider expectations.

Enablers and barriers to e-learning

There are trade offs around any form of learning (Sims, 2008). E-learning can emancipate learners from the tradition of a teacher-centered environment. The concept of the “nomadic learner” highlights the ability to learn in any location, at any time, and with anyone. There is more opportunity for learning that is collaborative, contextual, and connected. On the other hand, the onus of responsibility for learning falls more on the learner. This independent and nomadic learner therefore needs to develop the appropriate capabilities to work with a more complex network of people and technologies.

In the same way that the learner is empowered, it is argued that the teacher as a figure of knowledge and control is disempowered in these more connected environments. Like the learner, the teacher needs to develop new skill sets that allow them to participate in this connected environment, especially through acknowledging how their knowledge and experience are a critical part of student learning.

Newton and Ellis (2007) in their example of e-learning in Australian army demonstrate these challenges. For instructors, e-learning was a change in their role. They felt more isolated from the learning process in self-paced e-learning classrooms than in the face-to-face classroom. They had concerns about being seen more as technical experts than as instructors; that their teaching skills would diminish; and they needed more organisational support around the value of their new role. In

response, this support was provided around a mentoring system where instructors shared experiences with the new instructors; an induction program that focussed on how to use e-learning to improve training outcomes; more opportunities for instructor-initiated interaction with e-learning that allowed instructors to check if students understood; and fundamentally through the acceptance of a blended e-learning approach.

A recent Australian study (Bofinger & Whateley, 2002) indicates that learners who use online learning can report negative learning experiences. Learning experiences were labelled as confusing, difficult and unpleasant. These online courses were judged to be more time consuming when compared with on-campus learning. At the core of these problems, however, was a system that was low on flexibility, including requirements such as strictly paced reading schedules, and assignments and compulsory residential or weekend schools that did not account students' needs and lifestyles. Although there was e-learning, the approach failed because of its standardisation in the delivery of education, where every learner was viewed in the same way. There was little attempt to learn from the students it produced.

Foreman (2001) argues that teachers 'will not trade mules for tractors' until learning management systems are as easier to operate, and as easy to use, as the traditional face-to-face classroom teaching. In a similar vein, instructors and students often underestimate the time required for e-learning. There is the time involved in writing rather than speaking ones thoughts, dealing with the number of student communications, and the time required to learn the program or new technologies (see White & Myers, 2001; Park & Wentling, 2007).

Many reports confirm that time is one of the major impediments to e-learning retention and the carry-over of the learning to the workplace. Learners have competing demands around work, employment, family, and other responsibilities. If the e-learning system cannot be used easily and efficiently, learners have to spend too much time locating information, becoming annoyed and frustrated. They do not complete the required training, and their businesses do not get their return on the training investment. One answer to these challenges around time and usability is the need for designers of the training to allow users to interact effectively, clearly, and in a timely way with the system.

Finally, the Mack Consulting Group (2007) investigated the enablers and barriers to industry uptake of e-learning in small business. They found that on-the-job informal training is predominant in the

small business sector. Convenience, flexibility and accessibility are key factors driving the use of e-learning by small business. However, the key factors discouraging the uptake of e-learning by small business include the time, cost, concerns about effectiveness, and a perceived lack of relevance to their business. In addition, many small businesses are unaware of suitable e-learning tools or have not considered e-learning as viable training option.

Findings and discussion based on the interviews

E-learning use to gain more responsive approaches to training in skills shortages areas

Skills shortages of bakery apprentices

The bakery and pastry industry is a very good example of an industry where its employees have difficulties accessing traditional methods of training using block release. The vast majority of employers are small to medium sized enterprises. Many of the employees are casual, working hours are highly variable, businesses are located in small towns and regional locations, and travel costs can be high. Again, small businesses find their productivity markedly affected by the absence of staff at training.

However, the Hunter Institute in NSW has moved to providing training for students beyond the traditional forms of block release to more flexible options across its various campuses. This Institute has made considerable progress around new forms of more blended delivery. One champion of this initiative, Gary Sewell and his team continue to grow his well-known e-learning program to train bakers for a number of top baking franchises across the country including Bakers Delight and Tip Top. His most recent project is around fast tracking the Certificate III course into one year. The partnership with Bakers Delight has also lead to other training including a course for their national sales staff working. Following the apprenticeship model, this training is delivered in the workplace using tools such as chat, photostory, email, SMS and traditional self paced packages.

In summary, the Hunter case highlights the benefits of designing learning around using the technology that learners use everyday, and they are most comfortable with. The Bakers Delight and Hunter Institute partnership shows the value of using pilot training programs up front, and in allowing apprentices access to materials they can manage at their own pace. It also illustrates the virtues of using a mix of tools. These include movies, video games, photostories, blogs for use with assessments and text to explain the processes behind bread making, accessed through computers, laptops, personal digital assistant (PDA) or mobile phones. Evidence of workplace activities and learning is recorded using mobile phone or PDAs before being posted onto blogs. In addition, this design includes the strong use of regular forums and chat room sessions with teachers and students to back up the learning.

Skills shortages in the building and construction trades

A number of training providers in Queensland, Western Australia, Victoria and South Australia are tackling how to deliver more flexible training to the building and construction trades. The Blue Dog Training company in Queensland has designed apprenticeship training to integrate training into the workplace in a way that suits day to day operations. Blue Dog Training has developed generic learning and assessment methodologies that can be contextualized or customised to suit the individual's learning style, working environment and the needs of the employer. E learning tools allow more self-paced and self-directed learning, while each learner is assigned a course trainer who supports the practical and theoretical components of the course. As with the Transforming the Trades initiative in Western Australia and its use of the concept of work tasks concepts, at the core of this flexibility at Blue Dog is a new way of thinking about learning content. Blue Dog view the training process in terms of learning objects that are much smaller chunks of learning than units or modules. These interactive objects typically require from 10 to 30 minutes for the apprentice to work on line at their own pace. Each of these self-contained chunks of knowledge is stored in an online database that can be accessed anytime. The results are tracked and feedback is immediate. As a self-paced assessment model, it is up to the learner as to how long the assessment takes, but on average, the suggested time frame is completion within a six month period. The assessment process also incorporates RPL processes.

Western Australian providers are experimenting with ways to combine face to face delivery and e-learning. Tim Oliver at Swan TAFE is using the opportunity and funding provided by the Transforming Trade Training initiative to incorporate into carpentry apprenticeships the greater use of digital storytelling. This tool has proved to motivate students, making their contributions more creative and engaging them more in the learning process.

At Chisholm Institute of TAFE in Victoria, teachers in the building and construction programs need to respond to increased student numbers around training in various skills shortages. Their focus is upon more innovative ways to combine workplace and off the job training and assessment so that learners are more engaged, and teachers are using their knowledge and skills in the best possible ways. For Rodger Carroll and his team at Chisholm Institute, a partnership with the University of Melbourne encouraged the examination of mobile technology for delivery and assessment. The software Lifeblog allows mobile phones to provide a mobile diary or a mobile blog. This development also opened up opportunities around the use of e-portfolios.

Turning to South Australia and its construction programs, significant developments have occurred relatively quickly at TAFESA in the use of Moodle with pre-vocational Certificate I training, as

well as with the Certificate III carpentry apprentices. Students in the carpentry trades are able to record and edit their own videos and podcasts, and use websites such as Youtube and Google Video to upload and share information with other students. Using flash drives provided to students, they are able to download material and add in movies and digital photographs from building sites or other locations. The view among teachers at TAFESA is that students have responded well to the opportunities provided by Moodle. There is increased access and participation, and students are adding in more information and are more able to keep a better record of what they are doing and learning.

Plumbing industry's response to skills shortages

This industry is exploring and gathering evidence around innovative ways it might be able to transform its training. The industry is an exemplar in how to explore what is required, and what is available, as shown through two recent reports. One report is its 2008 review report "*Plumbing apprenticeships: Drivers and impediments*". This report shows a willingness to investigate within and outside Australia new ways to deliver training to plumbers in order to respond better to skills shortages and industry needs. The findings of a second 2008 report, "*National best practice for plumbing industry training*", were also highlighted in this interview with Fred Baltesch. This review is again impressive. The industry is looking across Australia and New Zealand for best practices, as well as across industries for ideas that might be used in the plumbing industry.

The use of RPL and e-portfolios

Overall, the progress around RPL continues to be seen as slow by those interviewed. RPL practice currently is seen to have limited use of the new technologies. Many factors are cited behind the slow take-up of RPL generally. Systemic barriers exist to the implementation of RPL, while many argue for the need for more support for RPL assessment in training organisations. Assessments for RPL are seen to be burdensome, while the terminology is judged to be complex and cumbersome. In addition, the interviews revealed differences in RPL processes and systems across States. However, it is widely accepted that using smart tools can free up resources and speed up the process considerably.

There is evidence of significant professional development activity occurring in many States around RPL and the application of on-line assessment tools, including most notably efforts in 2007-8 in Western Australia, Queensland and Victoria. The greater uptake of RPL is linked in these States as a direct outcome of these increased efforts at professional development, especially among teachers.

Western Australia is changing its focus to assessing competencies in clusters rather than at the unit of competency level, and is searching for the most appropriate software package. The Fast Track RPL process in NSW and the RPL assessment through the Skills Stores in Victoria are supported by the Competency Navigator tool.

The application of RPL during the process of closing the Mitsubishi automotive plant in South Australia illustrates what is possible. During 2008, this involved the use of on-line assessment of competency, together with a competency conversation, to assist existing blue colour employees to identify qualifications that they could take to other jobs after the plant closure. The process was completed as a partnership between TAFESA and Workforce Blueprint. This collaboration involved the design of an appropriate model and process, RPL facilitation and professional development for the coaches and assessors provided through TAFESA. Positive lessons from this process are that on-line assessments can be very efficient, a competency conversation in particular can assist in highlighting “naturally occurring evidence in their workplace or in documentation”, and the process proved to be highly respectful of the needs and past work experiences of employees.

The interviews revealed that e-portfolio adoption is growing, and there are some examples of e-portfolio applications to support skills recognition. However, the overall view across the interviews is that organisations are still exploring when, where and how best to use e-portfolios. Many believe that the best opportunities are around students using the portfolios to assemble evidence using videos taken by mobiles, cameras or special glasses or other tools, as well as by emails, e-documents and other forms of evidence. Staff at GippsTAFE are doing some RPL interviews on-line, together with the use of the on-line Competency Navigator. Like others, they see the potential application for e-portfolios, but note difficulties around managing the considerable forms of other evidence that are not electronic. Also an RPL project at Chisholm Institute that includes the building and furniture teaching staff is trialling the use of an on-line unit that introduces new students to web CT and RPL.

How e-learning is adding value to training for businesses

A wide range of benefits are cited by businesses, according to those interviewed in the current project. While it is always difficult to prove a direct relationship between training and returns on investment at an enterprise level, Callebaut chocolates report a 300% increase in their sales in the Hunter region, showing that the partnership with Hunter Institute has resulted in increased market awareness and sales. A frequent comment across interviews is that training organisations need to be

better at promoting to businesses how training is an investment decision. Significantly, they need to work with businesses to show how the greater use e-learning can maximise their investment returns. As mentioned across the interviews, this story to business needs to be about more flexibility, increased levels of on the job training, more customisation of the training around their business needs and in cost savings through reduced travel and time away.

A common theme across the interviews is how more flexible training gives businesses in regional and more remote areas better access to training. Distance from services is one of the biggest disadvantages of living in the remote areas of Australia. Blue Dog Training for example reports that the increased access to broadband services is allowing their employers and apprentices the opportunity to experience alternative training delivery methods, especially among the small to medium businesses that are the mainstays of the construction industry. Traditional block release is still a difficulty for the smaller employer particularly as the apprentice can be absent at busy periods. Blue Dog Training also notes that there is a ripple effect in country communities when key members of sporting and social groups are missing. About 40 percent of all Blue Dog apprentices are living and working outside the S-E Queensland corner, and the on-line delivery provided by this firm is central to encouraging these smaller businesses to invest in training.

A related benefit cited by business is around saving time. For the numerous forms of business that use welding technology, the Australian Stainless Steel Development Association notes the considerable time savings around training hours. Access to e-learning is being promoted by the Association as an attractor for encouraging businesses to invest in more training. Many interviewees pointed to the time savings and enhanced flexibility to training for businesses through the on-line delivery of the theory components. At TAFE Tasmania, they are using the pre-employment stage at schools as an opportunity to attract students into trades, including into the skills shortage areas such as refrigeration. They are using e-learning for the delivery of the theory components, as well as for some of the formative assessment.

A major benefit mentioned very frequently by respondents is the standardisation of training across different sites. Industry is attracted by the use of standard sets of quality resources that are already AQTG certified to provide more consistent and customised training across multiple sites. Hunter Institute gets such feedback from its industry partners in its various projects in the bakery trades (e.g. Woolworths, Bakers Delight, Goodman Fielder, Fresh Start). A related benefit for industry is the use and frequent updating over time of their in-house materials.

The enablers and barriers

Many enablers are cited, some of which are attitudinal, while others are about access to expertise, tools and industries motivated to try new things. Interviewees believe that one of the major enablers is the mind set of the training organisation and of the teacher. The driving philosophy should be to “give it a go”, being careful not to be too focused upon what the end product might be. As Glyn Milhenc at TAFESA describes the process, they are not so much looking at the end product. Rather they are adding and adapting, seeing what they can use, and not limiting their searches around a well defined end product. They find materials like instructional videos that are relevant, and add them in where best to meet the learning that they are trying to achieve. This approach allows the materials that students can use to be “well beyond what you ever imagined” in the outset of the project. Glyn also takes the position that it is all about collaboration and sharing of the e-learning resources that are being developed. When the resources are shared, obviously the choices and the flexibility increase.

Access to others is a key enabler. Simon Brown at Skills Tech Australia talks about the importance of learning in a learning community. He believes in the value of setting up and maintaining an online community that in his case is supported by accessing his personal network of people who share his passion for using new technologies to connect with students. This continued learning about social networking tools is proving useful for educational purposes, and in building the skills and confidence to operate them more effectively.

Many of those interviewed talked about models for e-learning delivery that use e-learning consultants employed full-time to work with teachers. This person or persons is most often described as being an ex-teacher, with considerable experience, so they can contextualise the resources for teachers. They need to have the discipline knowledge, skills in teaching and on-line skills. These people can also help in decisions about what tools to use.

Many interviewees spoke about the importance of helping teachers to select the best tools. Across various locations, including through the assistance of the Australian Flexible Learning Framework, considerable attention is being given to developing access to the best tools. All agreed that the focus should be on quality products, interactivity, integration and tools that engage the learner. Across interviews, people spoke of the role of having access to e-learning experts and the advice of others who were exploring the use of on-line tools. At best, individual teachers might have access to one e-learning adviser who is typically an internal appointment. On a few occasions, there is access to the expertise of an external e-learning consultant.

Three Institutes stand out, however, around their use of a solid group of internal advisers to assist teachers around e-learning initiatives. Sydney Institute shows a core commitment to becoming a leader in the field of on-line learning. Evidence of this commitment includes the considerable expenditure on e-learning infrastructure, a commitment to the use of open source solutions, the establishment of “connected classrooms” with video conferencing and video white board, and the availability of a guiding e-learning framework and associated suites of tools. Secondly, GippsTAFE for a small institution is making significant investments in e-learning support so that teachers are given access to on-going support, and an e-mentor who is often well respected former teacher, and training support. A third example is Chisholm Institute. Its Educational Development Services group assists teachers to design and implement new teaching and learning strategies, while the organisation has recently committed a large expenditure to set up wireless communications on campus that can be accessed by teachers and students using mobile devices.

As some of this earlier discussion implies, a major barrier listed by almost all interviewees is the challenge of changing the mind-sets of many teachers still locked into a teacher-centric approach to training delivery. It is widely accepted that the majority of teaching staff are still learning to accept that organisations expect to have access to fast, flexible, engaging learning opportunities, packaged to suit their individual needs. Students expect much freer and more student directed learning. Also as many of those interviewed pointed out, students expect to see the use of training models that use modern technologies and that allow more training to occur flexibly. However, as several of those interviewed stated, despite the funding and the projects supported by the Australian Flexible Learning Framework and other sources, progress continues to be slow.

In summary, those interviewed expect that the pace will continue to quicken for more workplace training. The future is about more non-classroom based and more work-integrated programs. That is, more “learning in the context”, where industry gets more training designed in ways that suit their settings, and more “just for me” training where VET clients are able to develop skills in ways and at locations that suit them. The drivers for more e-learning include the need for more flexibility, rather than a primary concern around the acceleration of apprenticeships in response to skills shortages. In addition, equipment costs and space constraints will further highlight the benefits of more workplace delivery, while the shortage of trained and skilled teaching staff in some trade areas will drive the design of more on-line forms of delivery for the trades.

Conclusions

Firstly, as to be expected, e-learning is finding its niche in particular stages or aspects of the training, and in particular trade qualification areas that are encountering skills shortages. E-learning, for example, is proving to be an excellent tool for the delivery of underpinning knowledge and theory in many trade qualifications, as well as in the delivery of modules that are required for licensing and up-skilling within specific qualification areas. A second observation concerns how different trade qualification areas are responding to the use of e-learning to provide more flexible and effective training. At least from this project, it is clear that trade teachers in the areas of building and construction and bakery in particular, are leading the way. Thirdly, trades are using a wide range of e-learning tools both up-front at the pre-apprenticeship stage or at the initial stages of the apprenticeship training. They are exploring innovative ways to assess competency around tasks completed on the job. E-learning is integral to redesigning training so that less time is spent at the training provider, and more time, or even all of the time is allocated to the on-the-job skills development. For the smaller to medium sized employers that dominate many of the trade areas, e-learning is providing more flexibility and productivity benefits as apprentices and trainees are away less often doing off-the-job training.

The progress around RPL continues to be seen to be slow. RPL practice currently has limited use of on-line technology, but most States are ramping up their professional development programs to expose more teaching staff to the benefits and processes of RPL. E-portfolio adoption is growing slowly. There are some examples of e-portfolio applications to support skills recognition. However, the overall view across the interviews is that organisations are still exploring how best to use e-portfolios to aid assessment or to facilitate RPL. However, examples are emerging around the use of e-portfolios that are being built by students using evidence captured through photographs or videos taken by mobiles, cameras or video glasses.

In looking at the future of e-learning, the key words used by interviewees were about more partnerships, increased collaboration around meeting the training needs of industry and more immersion in the learning tasks (see also The New Media Consortium, 2008). E-learning is seen at its best where it exists in contexts that encourage collaborative learning and interaction. Also the interviews revealed the advantages of social networking tools around creating more support for learners in many of the trade areas.

Bibliography

- Bersin, J. (2008). Today's high-impact learning organisation. *Business Intelligence*. August, 54-56.
- Bofinger, I., & Whateley, G. (2002). The virtual conservatorium: A new emerging option for conservatoria. In B. A. Knight (Ed.), *Reconceptualising learning in the knowledge society* (pp. 134-149). Flaxton, Qld: Post Pressed.
- Callan, V.J. (2006). Ready, willing and capable: Teaching capabilities for the Queensland VET sector. Brisbane: Department of Education, Training and the Arts.
- Callan, V.J., Mitchell, J., Clayton, B., & Smith, L. (2007). Approaches for sustaining and building management and leadership capability in VET providers. Adelaide: National Centre for Vocational Education Research.
- Collis, B., & Moonen, J. (2001). Flexible learning in a digital world: Experiences and expectations. London: Kogan Page.
- Concannon, F., Flynn, A., & Campbell, M. (2005). What campus-based students think about the quality and benefits of e-learning. *British Journal of Educational Technology*, 36(3), 501-512.
- Cox, M., Abbott, C., Webb, C., Webb, M., Blakeley, B., Beauchamp, T. & Rhodes, V. (2003) ICT and Attainment: A review of the research literature. Annesley: DFES Publications.
- Dickie, M., Eccles, C., FitzGerald, I., McDonald, R., Cully, M., Blythe, A., Stanwick, J., & Brooks, L. (2004). Enhancing the capability of VET professionals project: Final report. Brisbane, ANTA.
- Dillon, P., & Ahlberg, M. (2006). Integrativism as a theoretical and organisational framework for e-learning and practitioner research. *Technology, Pedagogy and Education*, 15(1), 7 – 30.
- Edwards, A. (2005). Let's get beyond community of practice: the many meanings of learning by participation. *The Curriculum Journal*, 16(1), 49-65.
- Elial, G., Secundo, G., & Taurino, C. (2006). Towards unstructured and just-in-time learning: The "virtual eBMS" e-learning system. *Current Developments in Technology-Assisted Education*, 1067-1072.
- Elliott, R. & Clayton, J. (2007). E-learning for New Zealand industry training organisations: Analysis of benefits and barriers. In *ICT: Providing choices for learners and learning*. Proceedings Singapore. <http://www.ascilite.org.au/conferences/perth07/procs/elliott-r-poster.pdf>. viewed 10/10/08.
- Emeleus, T. (2008). Electrifying e-learning. *The Knowledge Tree*, 16, 1-5.
- Flexible Learning Advisory Group. (2007). 2008-2011 Australian flexible learning framework strategy. Canberra: DEEWR.
- Foreman, J. (2001). Trading mules for tractors: The pros and cons of adopting a course management system. *The Technology Source*, January/February. Michigan Virtual University.

- Fuller, A. & Unwin, L. (2003). Learning as apprentices in the contemporary UK workplace: Creating and managing expansive and restrictive participation, *Journal of Education and Work*, 16(4), 407-26.
- Gibbs, D., & Gosper, M. (2006). The upside-down-world of e-learning. *Journal of Learning Design*, 1(2), 46-54.
- Guthrie, H. (2004). The vocational education and training workforce. New roles and ways of working. At a glance. Adelaide: NCVER.
- Holmes, P. (2002). Online and just in time: The change implications of implementing e-learning solutions in a large organisation. In S. McNamara and E. Stacey (Eds), *Untangling the web: Establishing learning links*. Proceedings of ASET Conference 2002. Melbourne, 7-10 July.
- I & J Management Services (2005). National e-learning indicators. Australian Flexible Learning Framework. Brisbane: ANTA.
- I & J Management Services (2008). 2008 E-learning benchmarking project. Draft report. Australian Flexible Learning Framework. Canberra; DEEWR.
- IMS Global Learning Consortium, Inc. (2003). IMS learning design best practice and implementation guide. Revision: 20 January. http://www.imsglobal.org/learningdesign/ldv1p0/imslid_bestv1p0.html. Viewed 10/10/08.
- Jonassen, D.H. (2004). *Handbook of research on educational communications and technology*. Mahwah, N.J.: Lawrence Erlbaum.
- Kanuka, H., & Rourke, L. (2008). Exploring amplifications and reductions associated with e-learning: Conversations with leaders of e-learning programs. *Technology, Pedagogy and Education*, 17(1), 5-15.
- Kidney, G., Cummings, L., & Boehm, A. (2007). Toward a quality assurance approach to e-learning courses. *International Journal on E-Learning*, 16(1), 17-30.
- Kim, C.M., & Keller, J.M. (2008). Effects of motivational and volitional email messages with personal messages on undergraduate students' motivation, study habits and achievement. *British Journal of Educational Technology*, 39(1), 36-51.
- Kim, K-J., & Bonk, C.J. (2006). The future of online teaching and learning in higher education: The survey says... . *Education Quarterly*, 29(4) [online]. Retrieved February 12, 2007, from <http://www.educause.edu>.
- Kirschner, P., & Davis, N. (2006). Pedagogic benchmarks for information and communications technology in teacher education. *Technology, Pedagogy and Education*, 12(1), 125-147.
- Kraemer, E. W. (2003). Developing the online learning environment: The pros and cons of using WebCT for library instruction. *Information Technology and Libraries*, 22(2), 87-92.
- Kuriloff, P, C. (2001). One size will not fit all. *The Technology Source*, July/August. Michigan Virtual Library.

Lang, B., & Macpherson, R. (2008). E-learning on the menu for safe food handling. *The Knowledge Tree*, 16, 1-6.

Laurillard, D. (2004). E-Learning in Higher Education. http://www3.griffith.edu.au/03/ltn/docs/E_Learning_in_Higher_Education.doc. Viewed 10/10/08.

Liejen, A., Admiraal, A., & Wildschut, L., & Robert-Jan Simmons, P. (2008). Students' perspectives on e-learning and the use of a virtual learning environment in dance education. *Research in Dance Education*, 9(2), 147-162.

Mack Consulting Group. (2007). An investigation of the enablers and barriers to industry uptake of e-learning: Small business. *Australian Flexible Learning Framework*. Canberra: DEEWR.

Marshall, S.J. & Mitchell, G. (2007). Benchmarking international e-learning capability with the e-learning mMaturity model. In Proceedings of EDUCAUSE in Australasia 2007, 29 April-2 May 2007, Melbourne, Australia. http://www.caudit.edu.au/educauseaustralasia07/authors_papers/Marshall-103.pdf.

Mitchell, J. (2004). Implementing flexible learning in the workplace. *Australian Flexible learning Framework*. Brisbane: ANTA.

Newton, D., & Ellis, A. (2007). Development of an e-learning culture in the Australian army. *International Journal on ELearning*, 6(4), 543-563.

OECD. (2005). E-learning in tertiary education: Where do we stand? Centre for Educational Research and Innovation. Paris: OECD.

Oliver, R., Harper, B., Reeves, T., Strijker, A. & Westhuizen, D. (2002). Learning management systems: One size fits all? *EdMedia 2002, World conference on educational multimedia, hypermedia and telecommunications*, 2002 (1), (pp. 1498 – 1499). Denver, CO, USA, Norfolk VA, USA.

Park, J-H., & Wentling, T. (2007). Factors associated with transfer of training in workplace e-learning. *Journal of Workplace Learning*, 19(5), 311-329.

Peadon, R. (2008). Z-TV gets an 'A' for learning. *The Knowledge Tree*, 16, 1-6.

Pittard, V. (2004). Evidence for e-learning policy. *Technology, Pedagogy and Education*, 13(2), 181-194.

Senge, P. (1990). *The fifth discipline: The art and practice of the learning organisation*. Random House: London.

Servage, L. (2005). Strategising for workplace e-learning: Some critical considerations. *Journal of Workplace Learning*, 17(5/6), 304-317.

Sims, R. (2008). Rethinking (e)learning: A manifesto for connected generations. *Distance Education*, 29(2), 153-164.

- Sims, R., & Hedberg, J. (2006). Encounter theory: A model to enhancing online communication, interaction and engagement. In C. Jawah (Ed.), *Interactions in online education: Implications for theory and practice* (pp. 27-45). London: Routledge Education.
- Sims, R., & Jones, D. (2003). Where practice informs theory: Reshaping instructional design for academic communities of practice in online teaching and learning. *Information Technology, Education and Society*, 4(1), 3-20.
- Steffens, K. (2008). Technology enhanced learning environments for self-regulated learning: A framework for research. *Technology, Pedagogy and Education*, 17(3), 221-232.
- The New Media Consortium. (2008). The 2008 horizon report. Stanford: Creative Commons.
- Thompson, L., & Lamshed, R. (2006). E-learning within the building and construction and allied trades. *Australian Flexible Learning Framework*. Canberra: DEST.
- Webb, M., & Cox, M. (2004). A review of pedagogy related to information and communications technology. *Technology, Pedagogy & Education*, 13(3), 235-286.
- White, J. & Myers, S. (2001). You can teach an old dog new tricks: The faculty's role in technology implementation. *Business Communication Quarterly*, 64 (3), 95-101.
- Zheng, L., & Smaldino, S. (2003). Key instructional design elements for distance education. *The Quarterly Review of Distance Education*, 4(2), 153-166.