

An Empirical Study: The Implementation of a Virtual Learning Environment and ePortfolio

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Abstract

The use of educational technologies to support learning are utilised across many parts of education and training and institutions have invested heavily in technologies such as Virtual Learning Environments and ePortfolios. The advantages that these technologies provide have meant that eLearning is now supplementing and in some cases replacing traditional (face-to-face) approaches to teaching and learning and replacing the traditional paper portfolios. However, there is less evidence of the uptake of these technologies within private vocational training organisations. This paper discusses the implementation of eLearning within an employer-led vocational training provider for the engineering industry and provides early feedback from the trainees.

Keywords

eLearning; VLE; ePortfolio; vocational training.

Introduction

Much of the research on networked learning has focused mainly on higher education or networked learning within organisations. Most would agree that eLearning now plays a major role in the delivery of learning within many educational institutions. VLEs provide a means whereby learning material and support is available to students 24 hours a day, seven days a week (Cook, 2005). However, less research has been undertaken on the use of educational technologies within private vocational training organisations, perhaps because there has been a lower level of such adoption within this environment. The purpose of this paper is to give greater insight into the potential use of educational technologies within private vocational training companies, stimulate further research into this area, and lay the foundations for a model to aid successful implementation. The paper aims to answer a number of questions within the context of one particular private vocational training company: (i) can a VLE supplement or in some instances replace specific elements of vocational training; (ii) can paper-based portfolios be replaced with ePortfolios; (iii) is the use of educational technologies the way forward for private vocational training companies; and (iv) ultimately can VLEs and ePortfolios be successfully implemented and used within private vocational training companies? Very few case studies have been carried out in this area; most have focused on higher/further education institutions or vocational training colleges.

In the next section, the paper will review past and current literature on eLearning, will give a general overview of VLEs and ePortfolios and a review of the use of VLEs and ePortfolios within higher education and private vocational training companies. The subsequent sections will introduce the company under investigation and then the methods and methodology used to collect and analyse the empirical data. The paper will finish with a discussion of the findings from the study and conclusions.

Previous Research

What is eLearning?

The term eLearning has been defined as “*the use of digital technologies and media to deliver, support and enhance teaching, learning, assessment and evaluation*” (LTSN, 2003, pg. 6). Some authors also distinguish between ‘online learning’ and ‘eLearning’, where *online learning* is used to represent any class that offers its entire curriculum via the Internet thereby allowing learners to participate regardless of geographic location (place-independent), theoretically 24 hours a day (time-independent). This is in contrast to the traditional classroom instruction, which is time and place bound, face-to-face, typically conducted in an educational setting and consisting primarily of a lecture/note-taking model, and *blended learning*, which is a combination of online learning and traditional classroom instruction. The term *eLearning* can be used as a generic term to encompass both (fully) online learning and blended learning, which is how we use it in this paper.

The research literature cites many advantages of eLearning, particularly the convenience and flexibility offered by the (asynchronous) ‘anytime, anywhere, anyplace’ education (McDonald, 2002), which gives learners time for research, internal reflection, and ‘collective thinking’ (Garrison, 1997). Moreover, the text-based nature of eLearning normally requires written communication from the learner, which along with reflection, encourage higher level learning such as analysis, synthesis, and evaluation, and encourage clearer and more precise thinking (Jonassen, 1996). However, eLearning is not without its disadvantages; for example (Connolly and Stansfield, 2007): costs may initially exceed more traditional methods; more responsibility is placed on the learner who has to be self-disciplined and motivated; increased workload for both students and faculty; non-involvement in the virtual community may lead to feelings of loneliness, low self-esteem, isolation, and low motivation to learn, which in turn can lead to low achievement and dropout; dropout rates tend to be higher in eLearning courses than in traditional face-to-face courses, often 10 to 20 percentage points higher. Perhaps one of the most damaging criticisms is that some eLearning simply replicates the social organization of traditional education and training and that the potential benefits of eLearning - of personalized and accessible learning experiences - are missed. This is one of the reasons this research is of particular importance: there is a high chance that the traditional nature of the company under investigation may implement aspects of eLearning but not utilize them to their full potential.

Virtual Learning Environments (VLEs)

There are many definitions given for VLEs. The Joint Information Systems Committee (JISC) recommended in July 2000 that the term ‘virtual learning environment’ refer to “*the components in which learners and tutors participate in online interactions of various kinds, including online learning*” (Becta, 2003). There are many different VLE software packages available; some at considerable cost and others available as open source. Common VLE components include: course management; learner management; assessment; discussions boards; email and conferencing tools. Universities and colleges are using many of these components listed to support teaching and learning.

VLE Use in Higher/Further Education

eLearning and the use of VLEs are now an integral part of most educational institutions with educational technologies witnessing exceptional levels of growth in recent years, thus increasing connectivity and networking within educational institutions (Becta, 2003; Dunn, 2003). This may be partly due to the increased availability and reduced cost of computers, the familiarity with ICT among both learners and providers and the growing availability of the Internet and the use of broadband (Ofsted, 2009, Allan and Lewis, 2006). A study carried out by The Office of National Statistics (2007) found that 61% of households had Internet access. In another study carried out by Becta, a survey of almost 500 schools showed that all had Internet access (Ofsted, 2009). Schools, colleges and universities are heavy investors in up-to-date technology and virtual learning environments (VLEs). Even a UK Survey carried out by JISC in 2002, found that over 70% of all institutions in the education sector were involved in some kind of VLE activity with 83% of responding institutions reporting that they currently use a VLE (Social Informatics Research Unit, 2003).

VLEs are used extensively in across a range of subject disciplines. For example, VLEs are utilised in the delivery of medical, dental and veterinary education (Cook 2005), business management, computing and engineering (Hall *et al.*, 2000). A case study carried out in a private US University showed that the VLE was used primarily for the distribution of documents, advising students of assignments, and the posting of announcements. The VLE also has an important secondary use: it is used as a means of communication, such as emailing students (Dutton, Cheong and Park, 2004). Another case study of the implementation of a VLE into a

new UK university demonstrated similar results, however, the staff preferred to maintain face-to-face interaction to encourage student motivation (Heaton-Shrestha *et al.*, 2005). VLE use has grown significantly throughout the world. For example, the Asia-pacific region has witness an increase in VLE adoption in the last decade. VLE use in Hong Kong was introduced in 1994 with the Chinese University of Hong Kong establishing the Hong Kong Education network (HKEIN) (Hung *et al.*, 2006). The above clearly demonstrates the growing popularity of VLEs in the delivery of flexible learning.

VLE Use in Vocational Training

Vocational training can be broadly defined as “any type of job-related learning that raises an individual’s productivity, and includes learning in a formal vocational and technical school programmes in training centres or institutes” (Tsang, 1999). The use of VLEs is no longer constrained to educational institutions and example case studies into the use of eLearning technologies include the Australian army (Newton and Ellis, 2005), UK NHS (Allan and Lewis, 2006) and BAA Plc (Teare and Dealtry, 1998) and such research suggests that VLEs sit comfortably within vocational training colleges or in work-placements. Research has shown that the uptake of educational technologies within private vocational training companies is much less than in the educational sector, suggesting lack of financial resources as a barrier to their uptake. Government funding to help with the implementation of VLEs in the UK (both education and training) has diminished in recent years. Only 3-4 years ago colleges had access to funding of £1000 to £100,000 for initial development, none now receive external funding. According to an Ofsted Report (2009) a number of work-based learning providers were developing or intending to develop diploma programmes but only one provider intended using a VLE to provide additional support for learners but most agreed that a VLE would be of benefit. Some funding is still available although perhaps not to the same degree. One work-based provider was awarded with funds to provide each apprentice with £100 worth of multi-media equipment to allow learners to upload evidence to a VLE for assessment (Ofsted, 2009). The report further highlighted that another work-based learning provider was utilising funds through a Learning and Skills Council scheme to help pay for a developer on a short-term contract and without that funding no significant work (implementing the VLE) would have been possible.

The above demonstrates that VLEs are moving towards the commercial sector, albeit slowly. It has been difficult to present much literature on the use of VLEs in this setting, but this does reinforce the need for further research into this field. When discussing VLEs, it should also be considered that the use of ePortfolios have also grown in use as discussed next.

ePortfolios

As with VLEs there are many definitions for ePortfolios and various ways in which they can be used. NLII (2003) defines an ePortfolio as “*a digital collection of authentic and diverse evidence drawn from a larger archive that represents what a person has learned over time, on which a person has reflected, designed for presentation to one or more audiences for a particular rhetorical purpose*”. ePortfolios can be classified into various types – assessment, presentation, learning, personal development and multiple owner (Curyer *et al.*, 2007) but in reality most are a combination of these types. If a standard approach was adopted for ePortfolios, institutions and organisations could share and exchange ePortfolio data. This could lead to the streamlining of the processes connected to prior learning, with student transitions through courses and with training that involves either sequential or parallel movement through multiple institutions and companies (Curyer *et al.*, 2007). This could also help to fulfil the concept of an ePortfolio being utilised throughout lifelong learning. Richardson and Ward (2005) carried out an in-depth study of 12 different ePortfolios and found, amongst other things, that no two systems were identical or offered the same range of functions. However, an ePortfolio tends to be chosen on a ‘fit-for-purpose’ basis and often vendors may customise their ePortfolios to suit a particular customer. However, according to Berlanga *et al.* (2008), although ePortfolios are designed for lifelong learning, they are rarely used in this manner.

ePortfolio Use in Higher/Further Education

According to JISC (2008) ePortfolios represent the latest in a line of technology-based innovations that are becoming an integral part of the learning landscape in HE/FE. Student ePortfolios developed out of faculty-assigned, print-based student portfolios as far back as the mid-80s. They were typically found in art-related disciplines or those that consisted of substantial written components such as English studies and gained greater importance in education during the mid-90s. Student ePortfolios are commonly found in college programmes where teachers use them to provide evidence of competence. This includes communications, maths, business, nursing, engineering to record students’ learning experiences and skill set (Lorenzo and Itellson, 2005). The Open University has been using ePortfolios as an assessment tool in online courses for many years

(Mason, Pegler and Weller, 2004) and the University of Washington developed an ePortfolio in 2001 to allow students to record their entire educational learning experiences in an organised and integrated manner. A survey carried out by Strivens (2007) found that of those who participated in the survey, 20 institutions (54% of those with an ePortfolio) commented that the ePortfolio was available to all students across the institution. The increase in the use of ePortfolios in HE is further supported by Beetham (2009) who states that work is currently being carried out to integrate VLEs, student record systems and ePortfolio tools to provide formative feedback and supporting the feedback for review and planning. It appears that educational institutions have embraced the concept of ePortfolios and appreciate their value.

ePortfolio Use in Vocational Training

Portfolios (paper-based) have been utilised for many years; for example, Austria has been using portfolios in teacher training for the past 12 years and covers topics such as supervision and professional upgrade in vocational education and is regarded as a working portfolio, as examination for teachers is impractical (Dorninger and Schrack, 2007). ePortfolios are well suited to vocational and working environments as they capture the concept of lifelong learning and support individuals as they travel along school, higher/further education, training and employment (Dorninger and Schrack, 2007; Richardson and Ward, 2005). Learners gather learning evidence and define these evidences through a self-reflection process. They attribute their competences to learning products or outcomes and reflect on how they acquired those competences. From a pedagogical perspective this process helps learners to better understand how they learn and helps them to become self-directed learners (Berlanga *et al.*, 2008). ePortfolios have been endorsed by some of the major vocational examiners such as City & Guilds. City & Guilds (2009) undertook a survey of 95 colleges and training providers and found that although cost savings were significant, the main advantage was the reduction in time taken for candidates to complete their qualification when using an ePortfolio. However, although feedback was positive, only 16% of those surveyed used ePortfolios. Some centres expressed fear over technical glitches, which could result in lost work, and some resistance to change was also noted. The literature demonstrates that ePortfolios offer a valid way to assess and ensure completion of an individuals training, and while usage is not pervasive, uptake is growing.

Case Study- East Kilbride & District Engineering Group Training Association (EKGTA)

East Kilbride & District Engineering Group Training Association (EKGTA) is an employer-led training provider for the engineering industry with charitable status. Established in 1966, EKGTA aims to serve the needs of the employer, whilst ensuring candidates have the opportunity to develop the knowledge and skills necessary in employment. The Association specialises in training Modern Apprentices at craft and technician levels, and in basic engineering skills training to national standards. EKGTA provides training in other disciplines but apprentice engineering training is its core business and for this reason the main focus is directed towards that training. A Modern Apprenticeship Programme may involve:

- A period of training in an approved training centre (off the job).
- Completion of a Level 2 Vocational Qualification.
- Attainment of core skills to intermediate one level (minimum).
- Completion of a National Certificate (day release at FE College).
- Completion of a Level 3 Vocational Qualification in company.

Level 2 competence involves the application of knowledge and skills in a significant range of varied work activities, performed in a variety of contexts. Some of the activities are complex or non-routine, and there is some individual responsibility and autonomy. Collaboration with others may often be a requirement. Level 3 competence involves the application of knowledge and skills in a broad range of varied work activities performed in a wide variety of contexts, most of which are complex and non-routine. There is considerable responsibility and autonomy, and control or guidance of others is often required. There are six instructors who deliver the practical element of the qualification with the academic element delivered on-site by a local college. Once the trainees return to their company, the continuation of the training is overseen by advisors who visit trainees on average every 12 weeks.

EKGTA is a very successful and forward thinking company. Management and staff appreciate that the advancements in technology could potentially support and enhance the training programmes they offer. Before

the project, technology within EKGTA was used primarily for the recording of completed assignments (ePortfolio) and the storing of lecture material, therefore was used far below its potential. This project came about when EKGTA entered into a two-year partnership programme with the University of the West of Scotland to implement a VLE. Initially the project focused solely on the VLE but as it progressed it became apparent that a new fully integrated ePortfolio was also essential to the success of the project. EKGTA use two ePortfolios, one at Level 2 and one at Level 3. The ePortfolio at Level 2 gives on-site candidates access to all lecture material, standard assessment documentation, and in some instances multimedia. For Level 3 candidates, advisors use the Modern Apprentice (MA) online ePortfolio system. At Level 3, candidates are not a captured audience; therefore regular remote communication between advisors and candidates needs to be undertaken. After extensive desk research and in consultation with staff and management it was decided that Moodle, an open source (free) VLE and the Learning Assistant ePortfolio best met EKGTA's needs.

eLearning at EKGTA

Engineering is a traditional industry with traditional methods of instruction with much of the learning being of a practical nature, however for EKGTA this is supplemented by underpinning knowledge that is delivered via short lectures and by referencing large PDF documents. Trainees are required to satisfy the underpinning knowledge element of the training to obtain their final certification. The practical nature of the provision has at times made it difficult to gain the trust of the instructors and to make them appreciate that there is a place for technology in the teaching of engineering training. This was one of the considerations when deciding when and where to launch the pilot. All trainees go through a weeklong induction programme - a general induction and a workshop induction. The large PDF documents for each unit were redesigned into bite-sized chunks with graphics to make them more appealing and suitable for online learning. Supporting quizzes were also developed to test knowledge and understanding, thus reinforcing what the trainees were taught. Unfortunately, at this time Moodle was being hosted internally and trainees could only access Moodle whilst on the premises, however, trainees now have access 24/7 for the remainder of the pilot. The second part of the pilot involved a group project that all trainees undertake. This is designed to encourage and develop team-working skills that are applicable to real-life working. This gave the opportunity to introduce other tools, such as a wiki to encourage collaborative working, a forum and an assignment folder. Some of the trainees are not based at EKGTA full-time; therefore the wiki and the forum allow trainees to communicate with each other when face-to-face conversation is not possible. The wiki has built-in tracking making it easy to evaluate the contribution of each trainee. Trainees have been encouraged to use the wiki for recording formal decisions, such as who will be project manager and why. The forum is to be used for more informal discussion relating to the project. When the project ends, trainees upload the folder containing all documentation to the assignment folder ready for marking. Trainees are assessed through their practical skills (building a truck) and the completion of a group report (based on the contribution and recording of each team member's contribution to the project through the wiki). Although an in-depth analysis of the group project has yet to be carried out, early indications are that the wiki and the forum caused confusion, with some stating that a wiki was a project management tool. This will be addressed when a second group of trainees undertake the group project by allocating more time to explain and demonstrate the use and purpose of the wiki. Further to this, early findings from a staff survey indicated that buy-in for the VLE has not been fully realised as yet. It may be useful to identify an instructor who can 'champion' the VLE and move the implementation forward. The findings for the induction program are discussed in the next section.

ePortfolio (Learning Assistant)

As stated earlier, EKGTA were operating two ePortfolio systems, one at Level 2 and one at Level 3. The systems were not integrated; therefore when trainees made the transition from Level 2 to Level 3, all trainee assessments were transferred to CD. This was not very efficient and most trainees did not know where their CD was once they left EKGTA. This had a number of consequences; for example, trainees could not refer to lecture material to aid in the completion of knowledge-based assignments. This often meant that the advisors would attend meetings with trainees to check progress but the knowledge-based assignments would be incomplete, which would result in further visits. The MAs online did not track uploaded evidence or communication between the trainee and the advisor resulting in the advisor spending many hours trying to map evidence to the correct trainee.

Most ePortfolios are driven by the learner, that is, the learner is responsible for the maintenance of the ePortfolio and decides who has access to its contents, but in some environments, as in the company under investigation, this may not be desirable. Some aspects of vocational training need to be driven by the instructor, not the student/trainee. Internal examiners and external verifiers often need access to trainee assessment material and that assessment material cannot be amended once verified; the assessment material must be locked from the trainee once it has been assessed. In this instance, EKGTA required a measure of customisation of the ePortfolio that included allowing multiple assessors and the instructors having overall control of the ePortfolio.

Methodology and Methods

A within case study approach was undertaken as the authors are actively involved in the project. Gerring (2007, p20) defines case study as “*the intensive study of a single case where the purpose of that study—at least in part—to shed light on a larger class of cases*”. It is hoped that at the termination of the project it will be possible to develop a model that will aid practitioners in the successful implementation of a VLE and ePortfolio into vocational training companies. It is further hoped that by publishing results and outcomes, more research will be carried out in this key training sector. The aim of the current study was to obtain early feedback from the trainees on the first course developed in an online format within Moodle, namely the Induction course. As a result, an experimental design was not considered necessary and two surveys were developed: one to obtain the trainees views of the course and one to collect some demographic information on the trainees. Overall, 26 students were enrolled on the Induction course at the beginning of August 2009 and the survey data was collected on completion of the course towards the end of August 2009. The remainder of this section discusses the findings from the first survey.

Demographic Questionnaire Results

26 participants completed the demographic questionnaire. 25 (96%) of the respondents were male and 1 (4%) of respondents were female. The mean age of participants was 17 (SD = 0.748) with a range from 16 to 19. 17 (65%) of participants started an apprenticeship at EKGTA when leaving school, 9 (35%) of participants did not. The majority of the participants (18, 69%) left school in 2009, 6 (23%) left school in 2008 and 2 (8%) left in 2007. The majority of the participants (23, 88%) indicated that they had no other full-time employment in the past while 3 (12%) did. 1 participant indicated that they worked in the hospitality sector. 19 (73%) of participants indicated that they had not attended college prior to attending EKGTA. 6 (23%) of participants indicated that they had attended college prior to attending EKGTA. The courses that were undertaken were primarily in the areas of construction (joinery, roofing, brick-laying, etc) and creative industries (art, fashion design, media, etc). These courses were undertaken at intermediate, NC and HNC level. Table 1 shows the standard grade qualifications and Table 2 the intermediate/higher qualifications achieved by the participants.

Evaluation Questionnaire Results

41 participants completed the evaluation questionnaire. Participants were asked to rate their level of interest in the training on a scale of 1 to 4 (1 being a low level and 4 being a high level) for each of the section of the Induction course, namely Day 1 General, Workplace Environment, Tools & Maintenance, Business Improvement Techniques, ICT, COSHH & Hand Care, Fire Prevention, Risk Assessment, Electrical Safety, Measurements and Materials. The overall results were generally positive indicating that the training was sufficiently interesting for the participants. The area of the training that had the highest level on interest was Electrical Safety (Mean = 3.41, SD = 0.59). The areas of training that received the lowest levels of interest were Business Improvement Techniques (Mean = 2.93, SD = 0.65) and the General Introduction on the first day (Mean = 2.93, SD = 0.80). Participants were also asked to rate whether they found the training sufficiently challenging (1 = lowest, 4 = highest). Electrical Safety was rated as the most highly challenging (Mean = 3.29, SD = 0.60) while the General Introduction on the first day was rated as the least challenging (Mean = 2.75, SD = 0.71). The overall approachability of the trainers was rated highly by the participants in all areas. The average rating for approachability across all areas was Mean = 3.46, SD = 0.86 with a range of 3.32 to 3.59 out of 4. Participants were asked to rate how much they believed that their knowledge improved in the particular areas. The area rated as having the highest level of knowledge improvement was COSHH (Control of Substances Hazardous to Health) & Hand Care (Mean = 3.51, SD = 0.60). The area rated as having the least level of knowledge improvement was the General Introduction (Mean = 3.17, SD = 0.68). Participants were also asked to rate how appropriate they considered the duration of the activities to be. Overall the results were not particularly positive. The most appropriate rated duration was for Electrical Safety (Mean = 3.15, SD = 0.76) and the least appropriate rated duration was for the General Introduction (Mean 2.75, SD = 0.74). Participant ratings for the helpfulness of teaching aids were generally positive. The highest rating for teaching aids was in

the area of Electrical Safety (Mean = 3.49, SD = 0.51) and the lowest rating was in the Helpful Work Place Environment teaching area (Mean = 3.22, SD = 0.52). Participants were also asked to rate if Moodle helped in each of the teaching areas. Table 3 shows the rankings of perceived help Moodle provided in each of the teaching categories.

Table 1: Standard grade qualifications achieved

Standard Grade Qualification	Number of participants
Mathematics	21 (81%)
English	24 (92%)
Physics	17 (65%)
Craft and Design	13 (50%)
Biology	6 (23%)
Chemistry	10 (38%)
Geography	13 (50%)
Modern Studies	13 (50%)
French	16 (61.5%)
German	2 (8%)
Spanish	1 (4%)
Other	20 (77%)

The results of the evaluation questionnaire were, overall generally positive. Electrical Safety consistently achieved the highest ratings for level of interest, challenge, appropriate duration and perceived help provided by Moodle. The General Introduction on the first day received the highest amount of criticism primarily because of its duration as it was considered by participants to be too long and lacked participation and interaction. Participants provided some of the following qualitative comments regarding the duration of the General Introduction:

“Day 1 was not that interesting because there was not a lot of participation - it was all listening. I think the 3 day introduction as a whole could be delivered as a participation lesson.”

“The first day was not interesting enough. We were just thrown information and didn't have enough time to absorb the information.”

“Duration - induction was too long and it could involve the trainees more to make it more exciting.”

Participants also provide qualitative points for action and improvement. These primarily included: more interaction, more participation and the reduction of the duration of the General Introduction.

Table 2: Intermediate or higher qualifications achieved

Higher Grade Qualification	Number of participants
Mathematics	20 (77%)
English	15 (58%)
Physics	11 (42%)
Craft and Design	5 (19%)
French	3 (12%)
German	0 (0%)
Spanish	0 (0%)
Biology	1 (4%)
Geography	5 (19%)
History	5 (19%)
None	3 (12%)
Modern Studies	2 (8%)
Others	14 (54%)

Table 3: Ratings of help provided by Moodle in each teaching category

Teaching Area	Rank	Mean	Standard Deviation
Risk Assessment	1st	3.56	0.50
Electrical Safety	1st	3.56	0.55
Materials	1st	3.56	0.55
Measurements	2nd	3.51	0.60
Work Place Environment	3rd	3.49	0.51
Tools and Maintenance	3rd	3.49	0.55
Fire Prevention	3rd	3.49	0.55
COSHH and Hand Care	4th	3.46	0.50
Business Improvement Techniques	5th	3.44	0.59
ICT	6th	3.41	0.59
General Introduction Day 1	7th	3.33	0.58

Conclusion

This paper set out with three main objectives; to give greater insight into the potential use of educational technologies within private vocational training companies; to stimulate further research in this area and to lay the foundation of a model to help ensure successful implementation. The authors can conclude that the research demonstrates that this area could offer a rich source of future research, and that educational technologies could potentially aid private training companies in the training of apprentices. Much of the work carried out in this sector is hands-on and on-the-job training but it also consists of a substantial knowledge element that would lend itself well to the use of eLearning. However, it is early days to design a model but as the empirical data grows this should become possible. At this stage the authors suggest, tentatively, that eLearning can support and in some instances replace some elements of the vocational programme. The authors acknowledge that the practical element would be very difficult to replace with technology but it could be supplemented through other tools such as multimedia. Educational technologies offer the opportunity to open up learning in the vocational training sector, rather than restricting it to the traditional 9-5 scenario. If VLEs can be used to aid training in the Australian army then this suggests they can be used for vocational training. ePortfolios have already proved their worth within vocational training and the authors believe their use will continue to grow. If buy-in from end-users can be obtained and all the trainers can learn to appreciate the value that could be gained from educational technology then their use could diffuse throughout the vocational training environment.

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References

- Allan, B. and Lewis, D. (2006). Virtual learning communities as a vehicle for workforce development: a case study, *The Journal of Workplace Learning*, 18(6), 367-383
- Beetham H., (2009). *ePortfolios in post-16 learning in the UK: Developments, issues and opportunities*. Joint Information Systems Committee.
- Becta, (2003). *A review of the Research Literature on the use of Managed Learning Environments and Virtual Learning Environments in Education, and a Consideration of the Implications for Schools in the United Kingdom*, British Educational Communications and Technology Agency.
- Berlanga, A.J., Sloep, P.B., Brouns, F., Bitter-Rijkema, M.E., and Koper, R. (2008). Towards a TENCompetence E-Portfolio, URL: (<http://online-journals.org/i-jet/article/view/552/500>), [Accessed 16th October 2009].
- Connolly, T.M. and Stansfield, M.H. (2007). *From eLearning to Online Games-based eLearning: Implication and Challenges for Higher Education and Training*, In Social Implications and Challenges of E-Business (Ed: F. Li). Idea-Group Publishing: Hershey. ISBN: 1599041057, 42-56.
- Cook J. (2005). *Review of Virtual Learning Environment in UK Medical, Dental and Veterinary Education*, Institute for Learning and Technology.
- Curyer, S. et al. 2007. *Developing E-Portfolios for VET: Policy Issues and Interoperability*, URL: (<http://e-standards.flexiblelearning.net.au/docs/vet-eportfolio-report-v1-0.pdf>), [Accessed 16th October 2009].
- Dorninger, C. and Schrack, C. (2007). E-Portfolio's in Education-Learning Tools or Means of Assessment?, In *Proceedings of the International Computer-Aided Learning Conference, ICL2007*, Villach, Austria,
- Dunn S. (2003). *Return to SENDA? Implementing accessibility for disabled students in virtual learning environments in UK further and higher education*, London: City University.
- Dutton, W.H., Cheong, P., and Park, N. (2004). The social shaping of a virtual learning environment: The case of a university-wide course management system, *Electronic Journal of eLearning*, 2(1), 69-80.
- Garrison, R. (1997). Computer conferencing: The post-industrial age of distance education, *Open Learning*, 12(2), 3-11.
- Gerring, J., (2007). *Case study research, principles and practices*, Cambridge University Press.
- Hall, L., Harris, J., Bakewell, C., and Graham, P. (2000). Supporting placement-based learning using networked technologies, *The International Journal of Education Management*, 14(4), 175-179.
- Heaton-Shrestha, C., Edirisingha, P., Burke, L. and Linsey, T. (2005). Introducing a VLE into campus-based undergraduate teaching: Staff perspectives on its impact on teaching, *International Journal of Educational Research*, 43(6), 370-386.
- Hung, D, Der-Thang, C, and Wong, A. (2006). *An overview of Virtual Learning Environments in the Asia-Pacific: provisos, issues and tensions*, In "The International Handbook of Virtual Learning Environments (Eds: J. Weiss, J. Nolan, J. Hunsinger and P. Trifonas), Springer Netherlands.
- JISC. (2008), *Effective practice with e-Portfolios: Supporting 21st Century Learning*, Joint Information Systems Committee (JISC), London.
- Jonassen, D.H. (1996). *Computer-mediated communication: Connecting communities of learners. Computers in the Classroom*. (158–182). Edgewood Cliffs, NJ: Prentice-Hall, Inc.
- Lorenzo, G., and Ittelson, J. (2005). *An overview of ePortfolios*, Educause Learning Initiative.
- LTSN. (2003). A Guide for Learning Technologists. Learning and Teaching Support Network, *LTSN Generic Centre, E-Learning Series 4*.
- Mason, R., Pegler, C., Weller, M. (2004). E-portfolios: An assessment tool for online courses, *British Journal of Educational Technology*, 35(6), 717-727.
- McDonald, J. (2002). Is "as good as face-to-face" as good as it gets? *Journal of Asynchronous Learning Networks*, 6(2), 10–23.

- Newton, D. and Ellis, A. (2005). Effective implementation of e-learning: a case study of the Australian Army, *The Journal of Workplace Learning*, 17(5/6), 385-397.
- NLII. (2003). *EPortfolios*, National Learning Infrastructure Initiative (NLII).
- Ofsted. (2009). Virtual Learning Environments: An evaluation of their development in a sample of educational settings, URL: (<http://www.ofsted.gov.uk>), [Accessed 1st November 2009].
- Richardson, H.C. and Ward, R. (2005). *Developing and Implementing a Methodology for reviewing E-Portfolio Products*, Joint Information Systems Committee (JISC).
- Social Informatics Research Unit. (2003). *Virtual learning environment activity in further education in the UK*, Joint Information Systems Committee.
- Strivens, J. (2007). *A survey of e-pdp and ePortfolio practice in UK higher education*, Higher Education Academy.
- Teare, R. and Dealtry, R. (1998). Building and sustaining a learning organisation, *The Learning Organisation*, 5(1), 47-60.
- Tsang, M. (1999). The cost of vocational training, *Education and Training*, 41(2), 79-97.