A MOVE TOWARDS E-LEARNING IN THE COMMERCIAL ENVIRONMENT

Carole Gould, Thomas M. Connolly
University of the West of Scotland, High St, Paisley, PA1 2BE, U.K.

Stuart Waugh, Brian Boyle
EKGTA Ltd,3 Law Place, Nerston Industrial Estate, East Kilbride, Scotland G74 4PP, U.K.

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Abstract: e-Learning and the use of technologies to support learning are utilised within educational institution, however, this has not always been the case. eLearning can be traced back to World War II with the development of instructional design under the direction of the military. Today, higher educational institutions have invested heavily in educational technologies such as Virtual Learning Environments and ePortfolios and technology is now supplementing and in some cases replacing traditional (face-to-face) approaches to teaching and learning and replacing the traditional paper portfolios. This paper discusses the implementation of eLearning within an employer-led training provider for the engineering industry and provides early feedback from the trainees.

1 INTRODUCTION

To many people, eLearning is regarded as a 'modern day' way of learning that utilises the Internet to deliver customised and often interactive learning material across a diverse and often, distant communities of practice (Nicholson, 2007). However, according to Reiser (2001), instructional design procedures can be traced back as far as World War II, when educators were called in to research and design training material for military personnel. Today, eLearning is an integral part of education and learning and is utilised by educational institutions and companies throughout the world.

The purpose of this paper is to demonstrate that the use of educational technologies is no longer confined to educational institutions. It aims to answer the question "Can VLEs be used effectively in vocational training to supplement or in some instances replace traditional elements of training?" A within case study methodology has been adopted as the authors are actively involved in the implementation of a VLE and ePortfolio into a vocational training company. This study is unique in that although VLEs are being utilised in vocational training colleges and organisations (although less so) they have yet to be popularised within private training companies, hence very little research has been carried out in this field. The author will begin with an introduction into the history of eLearning and educational technologies to help better understand how eLearning has developed over the years. The literature review will demonstrate that early forms of eLearning were not directed towards academia but were in fact designed for more practical applications. The author will conclude with a discussion on how eLearning will contribute to the overall learning of the trainees and the expected gains of the VLE and ePortfolio

2 PREVIOUS RESEARCH

2.1 History of e-Learning

It could be argued that eLearning has evolved from instructional design procedures, first introduced during World War II to help identify those less likely to pass training programmes (Dick, 1987). After the war the American Air Force set up research centres to help in the selection and training

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of pilots cumulating with the setting up of the American Institutes for Research (AIR). AIR continued to research pilot selection, training and human factors engineering. Research continued into the use of media for training with the Navy funding research into the use of films and television for training. Other agencies began to look at utilising tapes/slides, overhead transparencies, simulators and eventually training machines (Dick, 1987). Most of the instructional design research was aimed at the military sector; however, by 1958 there was renewed interest from academics in instructional design. This came about through two important events- the launching of Sputnik, which not only created a space race but also brought about a renewed interest in the quality of mathematics and sciences taught in schools, and the publication of Skinner's paper, "Teaching Machines" in 1958 (Dick, 1987).

In his paper, Skinner (1958) states that it was no longer sufficient to just train more teachers or build more schools – the curriculum had to be revised and simplified and textbooks and classroom techniques had to be improved. He further states that audio visual aids, such as film projectors, television and tape recorders were being utilised within American schools and colleges and could supplement lectures, demonstrations and textbooks and if used successfully, the material is so clear and interesting that the student learns. By the mid 1960's, researchers started to examine the possibility of utilising computers for the delivery of instructional material and a number of self-paced courses were introduced into the curriculum and industry (Dick, 1987: Moore *et al*.,1969). Although Skinners machine was not regarded as a success, it laid the foundations for the concept of self-paced courses.

By the 1970's there was a significant amount of research into the use of computers in learning and the development of the systems approach (see Banathay, 1968; Heinich, 1970). However, the use of computers in teaching was cost prohibitive until the development of the micro computer in the late 1970s/early 1980s (Dick, 1987; Treat *et al*., 2006). By 1983 the use of micro computers in schools had grown significantly with over 40% of elementary schools and over 75% of secondary schools utilising the micro computer (Reiser, 1987; Treat *et al*., 2006). Reiser (1987) stated that the computer could be programmed to adapt instruction to the needs of an individual learner due to its interactive capabilities and according to Merrill and Li (1989) computers began to be used "*as tools to automate some instructional design tasks".* By the 1990s computer use had grown considerably with almost all students (12:1) in formal education having access to computer (Plotnick, 2000). The development of the Internet with the linking of Local Area Networks (LANs) and Wide Area Networks (WANs) to computers in the 1990s saw the growth of Virtual Learning Environments (VLEs) (Totkov 2003; Dillenbourg *et al*., 2005). Mobile technology developed rapidly in the period 1995 to 2000 with students having the ability to access their courses and communicate with their university whilst travelling (Totkov, 2003). It is suggested that there are three basic models of existing on-line course (see Mason, 1998*)* and that these models are evolving continuously.

2.2 Virtual Learning Environments

e-Learning 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. Schools, colleges and universities are heavy investors in up to date technology, which has recognised that ICT can be used as a medium to support virtual collaborative learning environments. Many developers have designed products to exploit this, known variously as virtual learning environment (VLEs), managed learning environments (MLEs), course management systems, virtual campuses and online learning platforms. 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). Although VLEs are used extensively within educational institutions globally, their use is relatively low within vocational training companies. VLEs are used throughout the world to support learning and consist of various different features.

As with the definitions there are many different VLE software packages available; some at considerable cost and others available as open source. Regardless of which package is decided upon, most VLEs contain similar functionalities as shown in table 1. Universities and colleges are using many of the tools to support student learning. For example, the Virtual Departments for Minority Languages (VDML), a collaborative project between language teachers from University College London, the University of Edinburgh, and the University of

Hull, developed a prototype virtual department using WebCT. An initial survey carried out (400 students and 60 teachers) found that most students believed that the computers were only useful for developing grammar and writing skills, however, those participants that were more computer literate believed that the computer was a useful tool for language learning (Becta, 2003). In another study carried out by Gibbs (1999), undergraduates taking a philosophy module utilised a VLE to provide multi-user discussions online. This incorporated supporting debates, group-work, and resource sharing and learning which resulted in students adopting learning styles that are considered beneficial to learning a theoretical subject.
However, as with most things, there are advantages and disadvantages.

2.3 Advantages & Disadvantages of e-Learning

The research literature cites many advantages of an eLearning, particularly the convenience and flexibility offered by the (asynchronous) 'anytime, anywhere, anypace' 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). In addition, eLearning courses also have the capability to present multiple representations of a concept, which allows learners to store and retrieve information more effectively (Kozma, 1987).

Gunawardena (1993) argues that increased social distance provides a number of distinct advantages to online conferences (synchronous or asynchronous). In written communications anonymity of characteristics such as gender, race, age, or social status can be preserved, which can reduce the feeling of discrimination and provide equality of social interaction among participants. In turn, this can permit the expression of emotion and promote discussion that normally would be inhibited. However, she notes that the social equality factor may not extend to participants who are poor writers but who must communicate primarily in a text-based format.

e-Learning 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 (this is particularly true for e-learning that consists simply of repurposed face-to-face material, with minimal or no interactivity, which can be unengaging);
- some learners lack access to a PC/Internet or have difficulty with the technology;
- 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 e-learning 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. Taking this on board, 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 purely implement the systems but not utilize them to their full potential. Although VLEs are used extensively within educational institutions, their use is relatively low within vocational training companies. One reason for this maybe that vocational trainers may not appreciate that some aspects of vocational training may lend itself well to online delivery.

2.4 Vocational Training

Vocational training can be described as training that prepares learners for jobs that are based in manual or practical activities, is traditionally non-academic and related to a specific trade, occupation or vocation (South Thames College, 2009). However, in most instances the training is delivered via a college that specialises in vocational training. For example, Australia has heavily invested (up to $20 million per annum) in the vocational education and training (VET) sector since 2001 (Robertson, 2006). However, 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. It should be noted, that some funding is still available although perhaps not to the same degree, for example, one work-based provider was awarded with funds to provide each apprentice with £100 worth of multimedia 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. Further to this, the report also commented that the VLE was most commonly used to:

- Include reference material that had been shown in class
- Present supplementary quizzes and tests
- Submit assignments
- Receive feedback

The above demonstrates that VLEs are now moving towards the commercial sector, albeit slowly. This is reinforced with the development of smaller scale VLEs, such as Blackboard's ProSites VLE which has been developed for organisations (http://www.blackboardprosites.com/) and IBM's eLearning training programmes and software (http://www-304.ibm.com/jct03001c/services/learning/). When discussing VLEs and educational technologies, it should also be considered that the use of ePortfolios is also growing in popularity, particularly within vocational training.

Many VLEs (Blackboard, Moodle, etc) are designed with compatible ePortfolios and designed to promote lifelong learning. A portfolio can be defined as "*a collection of documents relating to a learner's progress, development, and achievements"*. An ePortfolio simply indicates that some or all of the evidence is collected in digital form (Beetham, 2009). Portfolio's (paper format) have been utilised for many years: 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 education, training and employment (Dorninger and Schrack, 2007: Richardson and Ward, 2005: Berlanga *et al*., 2008). 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). It should be noted that according to Berlanga *et al*. (2008), although ePortfolios are designed for life long learning, they are rarely used in this manner.

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. If a standard approach was adopted for ePortfolios, institutions and organisations could share and exchange ePortfolio data which 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, it should be considered that an ePortfolio tends to be chosen on a 'fit-for-purpose' basis and often vendors may customise their ePortfolios to suit a particular customer, as is the experience of the author.

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, etc but in some environments, as in the company under investigation, this may not be desirable. Some aspects of vocational training need to be driven, as in this case, 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, in principle; the assessment material must be locked from the trainee once it has been assessed. In this instance, the company under investigation required a measure of customisation of the ePortfolio which included allowing multiple assessors and the instructors having overall control of the ePortfolio. The next section will give background on the company under investigation and will give details on the chosen VLE and ePortfolio and the reason for those choices.

2.5 EKGTA

East Kilbride & District Engineering Group Training Association (EKGTA as will be referred to throughout this paper) is an employer-led training provider for the engineering industry with charitable status. Established in 1966 and recognised as one of the premier training groups throughout Scotland, aims to serve the needs of the employer, whilst ensuring candidates have the opportunity to develop the knowledge and skills necessary in employment (EKGTA, 2009). The Association specialises in training Modern Apprentices at craft and technician levels, and in basic engineering skills training to national standards. EKGTA are approved under the Scottish Quality Management System (SQMS), has Investor in People status and conducts it training to meet nationally recognised standards, for example, the Scottish Qualifications Authority (SQA), Sector Skills Council for Science, Engineering and Manufacturing Technologies (SEMTA), City & Guilds, etc. EKGTA provides training in other disciplines, such as, Health & Safety, Computer Based Training, Professional Development but apprentice engineering training is EKGTA's 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 On the other hand, 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 onsite by Langside 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.

Although a very successful company, its management and staff appreciate that in today's dynamic and ever changing environment, the Association must keep ahead of its competitors to ensure longevity. One of the Associations main competitors, Motherwell College, has invested £70million on a new college facility (Mitchell, 2009), with a further allocation of £975,000 to help meet demand for additional places at the College (Wilson, 2009). At present technology within EKGTA is used primarily for the recording of completed assignments (ePortfolio) and the storing of lecture material, and is therefore used far below its potential. EKGTA realise that one way to stay ahead is to invest in technology that can help them compete in the wider market place and streamline the training process, resulting in increased throughput and reduced costs.

3 SELECTING LEARNING PLATFORMS FOR EKGTA

3.1 VLE

In discussion with the company, a number of features were identified that the chosen VLE had to support. Existing students were also consulted. Two informal group forums were set up with ten participants in each. This helped to identify those features that students believed would enhance learning. Almost all students agreed that 24/7 access to learning material would be advantageous, more use of multi-media, such as video demonstrations, and interactive quizzes with immediate feedback to reinforce learning. To identify a suitable VLE, it was first necessary to carry out desk research on a number of different VLEs to identify the functionalities that each one supported and to match these against the company's criteria. It was not possible to investigate all VLEs resulting in a short list being drawn up. This included Blackboard ProSites, Learnwise, Frog and Moodle, Moodle being the only open source option. The outcome of the research demonstrated that there was very little difference in the functionalities of each as shown in Table 1.

Table 1: Summary of VLE Features.

Features/Tools	VLE			
	Blackboard ProSites	**Moodle**	**Learnwise**	**Frog**
E-portfolio	N	Y	Y	Y
File up-load	Y	Y	Y	Y
Notice/bulletin board	Y	Y	Y	Y
Course outlines	Y	Y	Y	Y
Assignments	Y	Y	Y	Y
Assessments	Y	Y	Y	Y
Multi-media resources	Y	Y	Optional extra	Y
Evidence gathering	Y	Y	Y	Y
Calendar	Y	Y	Y	Y
Administration tools	Y	Y	Y	
Synchronous collaboration tools (video conferencing)	Y	Y	Optional extra	N
Forum/discussion board	Y	Y	Y	Y
Email	Y (Internal)	Y (Internal)	Y (Internal)	Y (Internal)
External links	Y	Y	Y	Y
Student home page	Y	Y	Y	Y
Real-time chat	N	Y	Y	Y
Quiz design	Y	Y	Y	Y
Costs	£6,655 per annum (200 users/licences) £3,152 per annum (100 additional users/licences)	Open source Additional costs if hosting required	Ranges from £3,300 per annum for 1,000 users to £27,500 per annum for 50,000 users	Bespoke system - £26,000 Yearly support - £4,500 Standard package - £22,500 Yearly support - £4,500

After extensive analysis and consultation with management and staff, Moodle was chosen as the VLE as it was highly modular and provided the same features as the commercial systems but at no cost to the company. Moodle is an open source (free) VLE which is modular in format allowing it to be built and customised to the users requirements. It has many additional modules, such as the questionnaire module, allowing the VLE to grow with the needs of the company. Moodle was developed by Martin Dougiamas, who continues to lead the project. It was launched on the 20th August 2002 and continues to grow with 29,403,110 users worldwide (Moodle, 2009). The next stage of the project was to research a number of ePortfolio systems.

3.2 ePortfolio

Again it was not practical to investigate all ePortfolio systems so a short list was drawn up. This included Learning Assistant, One File, Pebble Pad and Mahara, which is open source and an add-on module for Moodle. It was then necessary to discuss primarily with instructors, the requirements of the ePortfolio system. EKGTA use two ePortfolios, one at level 2 and one at level 3 and are not integrated.

The ePortfolio at level 2 gives on-site candidates access to all lecture material, standard assessment documentation, and in some instances multi-media. For level 3 candidates, advisors use Modern Apprentice (MAs) online ePortfolio system. At level 3, candidates are not a captured audience; therefore regular remote communication between advisors and candidates needs to be undertaken. The advisors do not utilise MAs online for all candidates and as a result not all level 3 and above candidates are on the system. Those candidates that do use the system upload evidence for the advisor to evaluate, however, the system does not assign the evidence to a particular unit. This can be time consuming for the advisors, as they need to spend time, firstly looking for the evidence and then assigning it to the appropriate unit. The system does not track communication between the advisors and the candidates; therefore there is no paper trail to follow. The candidates do not have access to lecture or supplementary material to help with the completion

of knowledge based assessment papers, which must be completed as part of their qualification.

At level 2, the candidates are based at EKGTA, either in the workshop or undergoing the knowledge based (academic) aspect of their qualification delivered by Langside College. All instructors (min. 6) need to be able to access all candidate ePortfolios as internal verifiers, therefore whatever system is utilised, it must have the capability to assign as many internal verifiers as required. When candidates enter level three, they return to their company. The advisors have regular contact with their candidates and visit them on-site approximately every 12 weeks. For level 3 there is only the need for one/two internal advisors. Advisors spend time assigning evidence to relevant scope items – a system that facilitated mapping of evidence with scope would free up advisor time. A means whereby, video evidence could be uploaded to the system could potentially reduce the number of visits undertaken by the advisors. Increased communication (via email/notice board) could also result in less 'wasted' visits. Instructors and advisors also appreciate the necessity for an integrated ePortfolio system.

Taking the above into consideration it was concluded that Learning Assistant best suited the needs of EKGTA. Learning Assistant is marketed as an ePortfolio and e-assessment solution for training centres that deliver vocational qualifications. It has been designed specifically to meet the needs of the vocational training environment. Learning Assistant is designed to replace paper-based portfolios with all activity carried out on-line (Learning Assistant, 2008). Learning Assistant customised the system to allow multiple assessors and facilitated the automatic mapping of evidence to required scope items.

3.3 Identifying Priority Features

After researching a variety of VLEs and ePortfolio systems to identify their generic features and the system(s) that is more suited to the vocational training environment, it was then necessary to survey the six workshop instructors and the three training advisors to identify those features that would be regarded as a priority for implementation. This gave an indication of where the end-users see technology enhancing learning and to help in the delivery of training. Table 2 provides details of this survey. The lower the number assigned, the higher importance assigned. The data demonstrates that the top five priority features are:

- ability to automatically map assessments to scope/criteria;
- a suitable ePortfolio system;
- evidence gathering;
- uploading of assignments;
- a file upload capability.

It should be considered however; at the time of the survey most end-users were unfamiliar with the capabilities and advantages that a VLE could bring to supplement learning, therefore did not consider those features that they were unfamiliar with.

4 EVALUATION

In the early stages of the project the pilot of Moodle was to be rolled out within the electrical area of the work shop, but on further discussion it was decided that this would not be an inclusive approach. The decision was taken to implement Moodle throughout the entire workshop, thus including all instructors. All trainees go through a week long induction programme- a general induction and a workshop induction. A course was developed (induction) and was populated with two units – general induction and workshop induction. All lecture material and presentation were uploaded to Moodle and self-assessment quizzes designed to reinforce learning. Figure 1 shows an example page in the EKGTA Moodle system.

Empirical data is currently being analysed and will be included in the final draft, however, early discussions with both instructors and trainees has been positive. When surveyed initially, instructors did not place much value on the use of self-assessment quizzes but this view has since changed. All instructors have commented on the added value gained through the use of self-assessment quizzes and now appreciate how more interactive learning material can benefit the trainee. The reporting system within Moodle allows instructors to monitor trainee progress and can easily identify those trainees who have not completed the quizzes or those who are struggling with the material.

The trainees have commented that it will be advantageous when Moodle is available externally, as currently Moodle is being hosted internally with no external access, and therefore trainees can only gain access whilst on site at EKGTA. They have also stated that more interactive material and extended access to Moodle would aid learning.

The selected ePortfolio system, Learning Assistant, is also being actively used by students and

Table 2: Survey Results for Priority Features.

ePortfolio	Student home page	Course outlines	Assignments	Assessments	Multi-media
1	6	4	7	2	2
4	13	16	3	2	14
1	13	8	6	2	10
6	16	4	5	3	1
5	12	13	8	1	7
1	12	3	5	2	4
4	10	5	1	2	8
22	82	53	35	14	46

File up-load	Evidence gathering	Notice board	External links	Quiz design	Forum
3	3	5	8	14	15
7	1	12	11	15	8
9	3	7	12	11	14
2	7	12	8	13	14
4	2	14	11	16	9
6	11	14	7	8	13
7	3	9	12	13	11
38	30	73	69	90	84

Real time chat	Calendar	Email	Admin tools
16	2	6	3
9	10	5	6
15	16	4	5
15	11	10	9
15	10	3	6
15	9	16	10
16	14	15	6
101	72	59	45

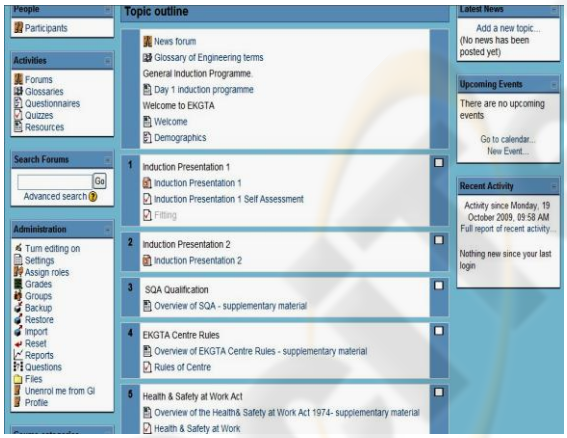

Figure 1: Example screen from Moodle.

staff (see Figure 2). Empirical data is still being gathered on Learning Assistant, but again, early feedback is positive. Both instructors and advisors have commented on the time saved due to the automatic mapping of evidence but the advisors are unsure as yet if there is a reduction on 'wasted' visits, that is when an advisors meets with a trainee but knowledge based assessments are incomplete. Advisors have also commented that the automatic generation of a message to inform that evidence from a trainee has been uploaded has reduced the time they need to spend looking for any evidence that has been submitted.

4.1 Next Stages

The next stage of the pilot will involve utilising Moodle to deliver the group project which is undertaken by all trainees. Trainees are divided into groups of six/seven and set up a virtual company. The main objective of the project is to encourage collaborative working with each group constructing a truck. Each group is given a nominal budget and must build the truck within that budget. All team members must participate in the project and each member must take on the role of project manager. To allow assessment of each member's contribution a wiki will be set up for each group and a forum will be enabled to follow communication between group members. An assessment activity has also been created within Moodle: when the project is completed, all documentation will be uploaded to Moodle, instructors will be informed that the

assessment has been uploaded and is ready for marking.

During the project instructors take on the role of mentor and will have to monitor the content of the wiki and the forum. This will encourage use of other features of the VLE and make both instructors and trainees more familiar with the use of Moodle. It is also important at this stage to maintain enthusiasm for Moodle and hopefully instructors will appreciate the added value of the VLE to the delivery of the group project.

5 CONCLUSIONS

This project has come with its difficulties, not least the traditional nature of vocational engineering training which has made it difficult at times to make instructors realise the advantages a VLE could bring to the learning of trainees. But the tide does appear to be changing. Through the pilot programme, instructors now appreciate the benefits that can be gained from using interactive learning material such as self-assessment quizzes and the reporting system that clearly shows quiz results and trainees access to learning material. Learning Assistant also appears to be an initial success. This can be contributed to the automatic mapping of evidence to scope items, the automatic messaging facility that informs instructors and advisors that evidence has been uploaded for assessment and the 'at a glance' progress reports.

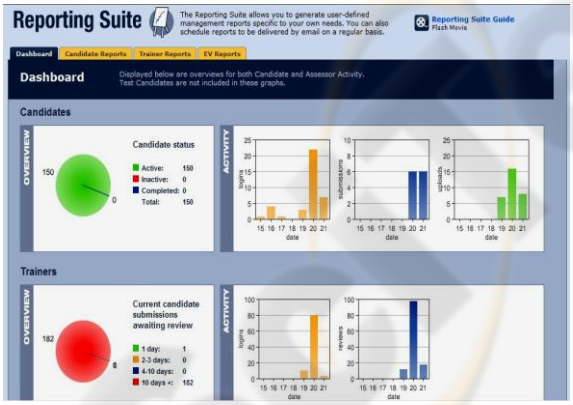

Figure 2: Example screen from Learning Assistant.

It is hoped that this project will give EKGTA advantage over its immediate competitors but in the long term will improve and streamline the training and delivery of learning. If implemented successfully and utilised to its full potential, the author would conclude that a VLE could supplement some elements of vocational training, however, further research will need to be carried out in other vocational training environments to establish if this is the case. At the termination of the project, it should be possible to develop a model for the implementation of a VLE and ePortfolio into a vocational training environment, which may be of use to practitioners.

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