Effectiveness of technology to support work based learning: the stakeholders' perspective

Rebecca Strachan*, Lalith Liyanage, Biddy Casselden and Roger Penlington

School of Computing, Engineering and Information Sciences, Northumbria University, Newcastle upon Tyne, UK

Higher education provision typically requires learners to physically attend sessions on campus. The economic climate has changed significantly over the past few years in the UK and globally. Inevitably changes to student funding and the increased competitive nature of the job market have impacted on university teaching. The use of work based learning (WBL) is an alternative flexible form of learning that attempts to tackle these issues. It enables students to learn whilst they work, addressing the funding issues, and enhancing their employability through the acquisition of higher professional qualifications. Often such WBL programmes are designed, delivered and supported from the view of the student and academic staff with little consideration of other stakeholders such as employers, workplace mentors and professional bodies and the input they can bring to enrich the learning and teaching provision. This paper presents the findings from a survey conducted among stakeholders from all four pillars of WBL, namely the learner, the academic environment, the workplace and the external context. Online questionnaires and interviews were carried out with students, tutors, program leaders, employers and professional bodies from four postgraduate programmes at the university. The results show that while there is a reluctance to embrace technology among some academic staff, students are generally positive about using the technology. The survey also demonstrates that there is a lack of creativity and imagination in the use of technology, where often platforms such as virtual learning environments are used simply as repositories for presentation slides, handouts, etc. The results of the study conclude or rather remind all involving parties to pay more emphasis on quality of online programme delivery by embracing technology and use it in novel and imaginative ways to provide a learning and teaching provision fit for the twenty-first century.

Keywords: work based learning; professional body; e-learning; distance learning; online learning

Introduction

Work based learning (WBL) is the term used to describe a class of university programmes that brings together universities and work organisations to create new learning opportunities in workplaces (Boud and Solomon 2001). Such programmes meet the continuing professional development (CPD) needs of learners, contribute to the longer-term development of the organisation and are formally accredited as university courses.

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*Corresponding author. Email: rebecca.strachan@northumbria.ac.uk

In this context, online WBL has been viewed as a way to increase access to higher and continuing education that attempts to engage seriously with the economic, social and educational demands of our time. Interestingly, it provides a fundamental challenge to existing practices.

This study looks at the technology aspects of WBL from a number of perspectives including the external professional and workplace environments, the academic environment and the student experience. The paper provides an overview of WBL concepts, the context in the UK and in particular that at Northumbria University. The case study research methodology is explained, results are presented as an evaluation of technology and the main findings and conclusions are given in terms of the various stakeholders.

Background

Work based learning has increasingly become an area of interest for the higher education (HE) sector and can support the personal and professional development of students who are already in work. The focus of learning and development tends to be on the student's workplace activities rather than a set curriculum (Brennan and Little 2006; Durrant, Rhodes, and Young 2009).

Deploying technology is one solution used to overcome the issue of increasing access to 'opportunity lost' or 'demand driven' students. How to effectively conduct distance education (DE) has been a key topic for researchers for many years. The primary difference between face-to-face and DE systems is that the former is mainly "teacher-centred" while the latter is "learner-centred" (Liyanage 2010), though this distinction is becoming blurred. Taylor (2001) describes the evolution of technological innovation in DE (see Table 1).

Context of WBL in UK

Evans (2001) explains that WBL for academic credit was developed in the UK in the 1980s to respond to the rapid change in the social and economic and hence educational life of the country and the perceived inadequate skills and knowledge levels of the workforce in general. It challenged the myth that learning at HE level cannot happen in the workplace.

Greater effort was put into expanding HE while urging companies and HE to be more active through collaborations to widen access and challenge previous boundaries. WBL introduced many mutual benefits for both institutions and employers with the main focus on 'learning from experience' and a shift away from the traditional curriculum and institutional structures. Flexible access into WBL was provided through the introduction of Accreditation of Prior Learning (APL) and Accreditation of Prior and Experiential Learning (APEL) (Boud and Solomon 2001).

WBL at Northumbria University

Northumbria University, a pioneering and leading institution for WBL, recognises it as a vital mode of learning for increasing participation and supporting professional development among employers and their staff. Several important endeavours have taken place in the University to support WBL. The Work Related Learning Services

Table 1. Generations of DE.

Models of DE and associated delivery technologies	Characteristics of delivery technologies					
	Flexibility			Highly refined materials	Advanced inter-active delivery	Institutional variable costs approaching zero
	Time	Place	Pace			
1st Generation: *Correspondence*						
Print	Yes	Yes	Yes	Yes	No	No
2nd Generation: *Multimedia* print, audio tape and videotape	Yes	Yes	Yes	Yes	No	No
computer-based learning (e.g. CML/CAL/IMM), and Interactive video (disk and tape)	Yes	Yes	Yes	Yes	Yes	No
3rd Generation: *Telelearning* Audio-teleconferencing, and video-conferencing	No	No	No	No	Yes	No
Audiographic communication, Broadcast TV/Radio and audio-teleconferencing	No	No	No	Yes	Yes	No
4th Generation: *Flexible learning*						
Interactive multimedia (IMM), online	Yes	Yes	Yes	Yes	Yes	Yes
Internet-based access to www resources, computer-mediated communication	Yes	Yes	Yes	Yes	Yes	No
5th Generation: *Intelligent Flexible learning*						
As 4th Generation plus computer-mediated communication using automated response systems, Campus portal access to institutional processes and resources	Yes	Yes	Yes	Yes	Yes	Yes

Source: Adapted from Taylor (2001).

(WRLS) established in 1999, developed a portfolio of innovative and relevant work-related learning products across the institution. The service explores current thinking to identify and advise on strategy, direction and new opportunities and develops and tests curricula, learning products and infrastructure responding to the demands of employers, students, the university and other agencies (Bennett 2010). Its role in WBL has been acknowledged by the Higher Education Academy (Nixon et al. 2006).

In 2005, Northumbria University developed a Work Based Learning Framework (WBLF) allowing organisations to offer their workforce highly relevant professional development programmes designed to fit their specific needs. The WBLF offers awards that can be customised to the learners' requirements and is designed to be flexible and accessible (University of Northumbria 2010). In addition a central university team of learning technologists (LTech) provides a service to academic staff and students on how "*to enable the best use of new and existing technologies to enhance the student learning experience*" (LTech 2011).

These initiatives have enabled Northumbria University to offer alternative modes of study effectively (Liyanage et al. 2010) and about a third of Northumbria's 30,000+ students study in part-time rather than full-time mode (HESA 2011).

Aim and background of the study

WBL endeavours have helped employees and their organisations access HE in a more flexible way. However, one area that needs further attention is the support provided during the learning experience itself, and evaluating to what extent it caters for the needs of all those involved in the WBL programme. Liyanage, Pasqual, and Wright (2010) illustrate that the expectations of various stakeholders in an online learning environment are very different from each other yet are rarely addressed. For example Chong, Martinsons, and Wong (2004) in their study of the factors that influence the learners' perception and adoption of work-based e-training only pay attention to the learner.

The current study builds upon a model of WBL with four pillars: the learner, the academic environment, the workplace and the external context. The key aim is to investigate the perceptions of the various stakeholders on the effectiveness of WBL programmes and their use of technology.

It draws on four contrasting programmes within the University of Northumbria, three being closely linked to their professional body (PB). These programmes are the MA/MSc in Information and Library Management, the MSc in Records Manage-
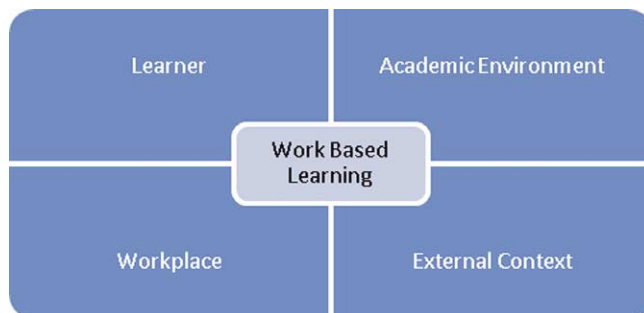

Figure 1. WBL and the stakeholder contexts.

ment, both two years distance learning delivery with supporting study schools, and the MSc Professional Engineering, a three year WBL programme. The fourth programme, MSc Computing and Information Technology (IT) is three years by distance learning and is not linked to a PB. It was initially set up for adult working 'women returners', although it now caters for anyone looking for a postgraduate IT qualification via distance learning.

Method

This research adopts the case study method, appropriate when the purpose of the research requires holistic, in-depth investigation of a phenomenon or a situation from the perspective of all stakeholders involved. Case studies are not intended to produce generalisations, they allow for transferability of findings based on contextual applicability (Pickard 2007, 93). Yin (2002) defines case study research as "empirical enquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident". A case study can be qualitative in nature, quantitative or a mix (Stake 2003). This study takes the latter approach with quantitative and qualitative data obtained via student questionnaires to maximise the numbers of students and qualitative data acquired from the rest of the stakeholders using interviews and documentation.

Triangulation is achieved within the case study by using multiple data collection techniques 'to pick triangulation sources that have different biases, different strengths, so they can "compliment" each other' (Miles and Huberman 1994). The design of the case study research is an iterative process which gives flexibility for discovery and exploration in the field as it goes.

Sample size in the case is representative of the human population that are involved in WBL at postgraduate Masters Level in the School of Computing, Engineering and Information Sciences of Northumbria University. All current students were asked to complete the online questionnaire while interviews were conducted with the four programme leaders, a representative sample of the module tutors and workplace mentors and relevant officials of the professional bodies.

Contribution

The significant difference between this study and others is the addition of both the workplace and the external context, to give a model with four pillars (see Figure 1). This four-way dialogue does not suit standard online learning platforms as the mentor and PB do not have the same contract with the university that exists between the academic staff and the learner. The results from the survey support this. When members of the PB were questioned about the type of communications that happen with the universities/employers' associations with regard to WBL, one answered "*As Head of the Accreditation Team, I will visit the programmes every five years, for the accreditation visit. All programme directors are free to contact the Team at any point between accreditation visits, although no formal meetings are arranged*". Yet it is also clear they want better communication as demonstrated by the following comment: "*Partnership, rotation, and proximity (or at least lack of barriers generally) between "academia" and "work" is much to be desired*".

Employers saw remoteness, lack of feedback and lack of student contact as a major disadvantage of WBL for their employees while students and academic staff

both indicated they would like to be able to communicate with each other and employers in an effective and easily accessible manner.

The significant contribution from this study stems from the efforts taken to understand and evaluate the link between the profession and workplace and the traditional learner-tutor academic environment. In the short-term this should aid understanding of these relationships, the support they require and determine to what extent technology can be an enabling factor. In the longer term this study should help improve the quality and effectiveness of WBL by catering for all the stakeholders involved and drawing on technology in more creative and valuable ways, leading ultimately to a more appropriately educated and developed workforce.

Results and evaluation

The collected data were analysed using *narrative* and *statistical analysis* using NVivo (QSR 2011) and SPSS (IBM 2011) software tools respectively. One hundred and fifty-five students were asked to take part in the online questionnaire and 60 responses were received giving an overall response rate of 38.7%. Fourteen interviews were conducted with programme leaders, tutors and professional bodies. The following presents the main findings in terms of five main areas of technology:

(1) eLearning portal (eLP)
(2) Communication
(3) Assessment
(4) Content
(5) Technological support to students

eLearning portal

The eLP is the main mechanism for supporting the delivery of learning and teaching and is used to replace the physical classroom environment for these learners. This has been customised from the 'Blackboard' virtual learning environment (VLE). Students and tutors had contradicting views on the user friendliness of the eLP. Among students 61.7% of students were happy about the user-friendliness of the eLP while a further 26.7% were neutral. Only 11.7% of students disagreed and found the eLP not user friendly. This contrasts with the results of the interviews held with academic staff (both module tutors and programme leaders) that generally held quite negative views on using the eLP. Typical academic staff comments included: "I wouldn't say it's perfect it's clunky and too many functionalities, which is frustrating which takes a lot of time. You have no other option you've got to live with it" and "It's tedious to upload content especially attachments because you cannot upload more than one at a time.... Formatting is a big problem in the ELP having to re-do documents/copy-paste content. Formatting is very poor and tedious".

One reason for this is that students primarily access the eLP as users to contribute to online activities and study content. Academic staff accesses the eLP to set up modules and populate and manipulate them to provide online content and activities for the students. Therefore their views reflect the difficulties in using the eLP from a control and management viewpoint rather than as a learner. Other than the eLP,

some academics and students prefer to use the PebblePad e-Portfolio for their teaching and learning activities.

Communication

The main communication channel among learners, tutors and programme leaders is email while telephone, eLP discussion areas and occasionally skype/video are also used. The main issue raised with regard to using skype was timing and issues with access at the university as noted in the following comments: "I want to do VC from my PC but the problem is due to the fact that as my students are working in other roles – they would not be able to sit at their desks and Skype about something not to do with work".

With regard to emails, tutors raised concerns about the response time and the overall time taken for each and every student's email queries: "My standard response time for student queries is 48 hours although I normally respond within 2 hours. But I do not access office mail after 5 pm on weekdays and entire weekends because do not want to become a slave to emails. I do appreciate that WBL/DL students' work style is different (after work hours and weekends) but I work full time during the week!"

Tutors also recognise that asynchronous chats and discussion boards (DB) are useful although they are not always used. "I have only discussions and asynchronous chats because we cannot synchronise with everybody's time schedules" and "My students don't make use of the Discussion Board even though it is available on most modules. They prefer to engage on an individual email discussion with the relevant tutor".

Only 23% of students indicate that they would prefer a physical community environment for learning. However 48% of students indicate they would prefer blended learning where distance online learning is supported by some physical classroom sessions compared to 'pure' distance learning with a further 27% being neutral on this issue. As one student comments "Although DB are helpful they cannot replace the classroom atmosphere with its spontaneous interaction".

Communication between the university, professional bodies and employers mainly happens via phone or email or in the occasional face to face meeting. This communication focuses on strategy and high level elements such as accreditation rather than operational issues or direct support for students. For example, one PB comments "We held a meeting of employers... to inform them how WBL might be incorporated in professional development" and another commented "Universities have a good relationship with the PB through the work of the Accreditation team and we are in regular contact".

The latest trend for communication is the use of social networking media like Twitter, Facebook, and Blogs and also for collaboration tools like YouTube, bookmarking and wikis. The university has a system that links the student information system to a texting system which enables the university to text students on their mobile phones. Currently used primarily to inform students of late changes to their timetables, etc. the system has been welcomed by staff and students alike although care has to be taken not to 'overload' students with too many texts, so use is restricted to a small subset of staff to control the overall number being sent.

Assessment

Tutors can choose the form of assignment submission from a physical hard copy to electronic submission via the eLP, email or a mix of these. Even within the eLP there are different methods of submission available. This causes confusion among the students. With last minute stress as the assignment deadline looms, students submit assignments using the method they find most easy or can remember and this sometimes leads to assignments being misplaced/not received by tutors for marking. Some tutors still prefer hard copy submission for two reasons: it avoids any technical issues (both with tutor set-up and student submission) and tutors prefer marking physical copies rather than online versions.

Providing marks and feedback is another area where technology could help but tutors have different views on this:

> I don't use the assessment facility – I do post up percentage grades – but not all module tutors do this, and my style of marking means I do not use the other facilities offered in Grade Center – it doesn't suit my marking approach – and would take me longer. I need to mark as efficiently as I can in a way that suits me.

> For assessments, I do not use any online facilities because I mark on the go in the train, at home, in the evenings etc so I mark on the paper by pen

> "Digital plagiarism is a problem for educators all over the world" (Butakov and Vladislav 2009) and (Rowe 2004). Online assessment submission raises serious security issues as methods of cheating are facilitated, some quite new, and it is inevitable that plagiarism will increasingly be automated and distributed as software packages. While there are countermeasures, online assessment in distance-learning programs should be done with caution, make use of the software tools available to uncover digital plagiarism and be continually reviewed. Tutors were aware of the dangers and commented "I have found one incident where collusion was established between home and distant students. I use video conferencing in assessments of projects where students have to demonstrate the project kind of a viva" and "We put suspicious papers through Turnitin software. Rather than creating them opportunities to cheat, if we can design assessments tactfully it would be better".

The main criticism against online learning is that students are more inclined to plagiarise than in face-to-face situation due to the fact that distance makes it hard for tutors to distinguish between genuine and plagiarised work, but the following tutor quote also held by other tutors, provides an alternative view: "DL students seem less inclined to plagiarise than face-to-face students".

Content

Unlike face to face, where tutor-student contact happens through lectures and seminars, online WBL students mainly rely on online content.

Questioned about their four most recent modules, the survey showed that for their most recent module, 78% (plus 18% neutral) of students agreed that the online learning material was of a high quality (and for their second module there was a 75% (plus 10% neutral) agreement rate. When questioned about the format of the content 67% of students prefer multimedia elements to aid learning/understanding, with a further 13% being neutral on this issue. One student comments "The learning materials could have been more varied (e.g. video casts or lectures, live chats)". Surprisingly, 18% of students either do not like the inclusion of them or can see no difference in having them.

Quality is subjective and for students, this could be their first online learning experience and thus they may have little to compare their experience against. The professional bodies are also satisfied with the quality of the online learning materials stating "... the Accreditation Teams are happy with the materials in terms of relevance, interactivity and currency".

The tutors' view on the quality and interactivity of the learning materials is valuable: "A lot of DL students like to have materials with interactions embedded into it through self-assessment activities and DBs but not necessarily have to be online to do them. Especially, they don't like to have online activities with deadlines which could become hectic with their other commitments" and importantly "I believe in "technology should not drive pedagogy but pedagogy should drive technology"". Interestingly the tutors recognise the university support provided in this area via the central learning technology support team, LTech but as two tutors comment: "University provides loads of training but I don't have time. Would like to use Podcasts and video clips in my materials but the time is the constraint again" And the content is "... essentially word documents – and not that innovative electronically – but at least they can be printed out in full, and contain exercises for checking understanding etc. They are updated – but the task is a mammoth one – and there never seems enough time to fully update materials".

Some of the tools being used for online content development are Flash, Wimbacreate, Podcasts, TurningPoint and SmartBoard.

Technological support to students

Universities must recognise the importance of this mode of education and provide due recognition and technical support wherever possible. There are two main ways that students can access university resources: firstly is via the university website and eLP, and secondly via a virtual tunnel and a thin client application called 'Desktop Anywhere'. This acts as a remote access facility to allow students to access specialised software and the shared drive similar to logging onto one of the campus PCs. Students find 'Desktop Anywhere' cumbersome to use due to technical incompatibilities. In the online survey, almost 50% of the students failed to access the questionnaire which was hosted on one of the servers through 'Desktop Anywhere'. Subsequently, a Microsoft Office version of the questionnaire had to be sent to students. Students' comments on this included:

> "'Desktop Anywhere' should be clearly explained as it allows non UK users to access the library in a timely manner" and "My computer doesn't like 'Desktop Anywhere' at all-have had real problems trying to use it- so it wasn't just your questionnaire.

Online learning mainly depends on technical support provided by the delivery institution therefore the IT services and online library fall into the category of 'vital' in this sense.

Students have assessed them as follows:

(1) IT – 70% satisfied
(2) Library – 75% satisfied

142

But academics were less favourable in their comments "I would prefer to have direct contact with eLP rather than going through IT helpline first. This would save time and effort".

The other concern regarding online learning is the challenges faced by students and tutors when coping with technology. When asked about the ease of adapting to online learning, 33% of students agree it was easy with 53% disagreeing. This response reflects the distribution of students across the disciplines and their individual backgrounds in terms of IT literacy and previous online learning experience. Academic tutors commented: "Students require appropriate equipment to access courses (PC+Internet) whereas F2F students can access or learn from university facilities" and it is "... costlier for students in some countries where communication infrastructure is less developed (3rd world countries)". They also commented on the challenges of keeping up with the technologies and the incompatibilities between different equipment and systems that students may have access to. Interestingly 'keeping up with technological developments' is seen by both employees and employers as one of the core benefits of WBL (Glass, Higgins and McGregor 2002). Currently there is no access to university IT systems for employers or professional bodies. Any information they need is communicated via email or in hard copy.

Limitations of using technology observed in the survey are

- eLP does not work on some mobiles due to embedded Flash content in learning materials or special software is needed.
- Students' and staff digital literacy plays a major role when implementing new media tools.
- Use of synchronous video conferencing is often not practical with distance learning students due to work commitments and time differences across different geographical locations.
- Sustainability over time is another problem with the rapid development of technology.
- Compatibility among different software/hardware systems and networks. As one tutor commented "Cannot update content with the rapid development of technology and evolution of Web 2.0 technologies which young 18+ under graduate students like to explore. Technical incompatibilities with different systems like Mac/Windows/Apple etc with different specifications".

The management of the university has taken several steps to address the issues identified in the research as follows:

(1) Appreciate and allocate WBL/DL time in the staff time table
(2) Enhance LTech support by allocating individual representatives/coordinators to each school
(3) Improve ease and speed of online access through DTA
(4) Provide better awareness about university facilities for WBL/DL students
(5) Create more friendly and efficient IT, library, finance and student services for DL/WBL students

Conclusion

There is previous research on technology-enabled WBL, but so far there has been limited consideration of all the various stakeholders. This study looks at four pillars of WBL: the learner, the academic environment, the workplace and the external context through a questionnaire survey of students and interviews with other stakeholders. The results show that a number of factors facilitate and/or obstruct the effective implementation of technology to support WBL and there are still a number of barriers to using technology in novel and imaginative ways to provide learning and teaching provision fit for the twenty-first century.

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