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Issues in Addressing the Lifelong Learning Needs of Construction Professionals Using Technology Facilitated Learning – Experiences from an Irish Blended Learning Initiative.

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Abstract

The construction industry is one of the key drivers of any economy. Continuing professional development (CPD) and life-long learning are vital to both individual and organizational success. This need has been recognized by both the construction industry and higher education. In higher education changes that can be identified are the need to become more flexible in the delivery of lifelong learning opportunities to meet the needs of construction professionals and integrating e-learning technology in the delivery of these programmes. Given the work and personal demands of busy construction professionals, accessing CPD opportunities is often difficult. For higher education, the intensive resource requirements required in the development of e-learning content and the challenges in accommodating different learning styles, developing an e-learning programme can be a resource intensive exercise for higher education. Many initiatives in the development of e-learning fall into the trap of “one size fits all” approach, which fails to recognize individuals’ have different learning styles. For staff integrating technology in the deployment of technology facilitated learning presents a number of new challenges including, acquiring new skills and changing the way instruction must be delivered. A blended learning programme has been developed in Ireland in an attempt to address the CPD needs of Irish construction professionals. This initiative attempts to strike a balance between the considerable resources required in the development of an e-learning initiative while addressing staff concerns in integrating technology in the delivery of programmes. How this initiative addresses these challenges are outlined and the experiences to date are highlighted.

Keywords: e-learning, blended learning, CPD, learning, lifelong learning

Introduction

The need for continuing professional development (CPD) in both the UK and Ireland has been recognised by the construction sector (Latham, 1994; Egan, 1998 and Forfas, 2003). A key driver in addressing the issues identified in many of these studies has been the recognition that learning and training are key elements in delivering these projects. This results in greater certainty about the time of completion and a greater likelihood that projects will be completed within budget. However, the intensity of workload that exists within the construction industry means that frequently there is insufficient time available for effective learning to take place to meet deficiencies within the industry (Construction Industry Council, 2004).

CPD and lifelong learning are vital to individual and organisational success (Browell, 2000). Rosenberg (2001) characterised employee-learning needs in three key areas: access, comprehensive approach to access and information. To address employee needs, organisations

also have three requirements: the right information, an open culture and an effective technology (Rosenberg, 2001). All individuals learn in different ways from listening, watching, questioning, doing and helping others to learn (Rogers and Freiberg, 1994). CPD can be considered as the planned acquisition of knowledge, experience and skills and the development of personal qualities necessary for the execution of professional and technical duties throughout a constructional professional life, encompassing both technical and non-technical matters (<http://www.iei.ie/Education/Education.pasp> accessed 19th June 2004). What distinguishes CPD from other forms of learning is that it is self-motivated, self-directed and self-monitored (Bridges and Grierson, 2000).

Due to issues such as professional competency, regulatory requirements and health and safety legislation requirements, most of the professional bodies have persuaded their membership to accept the requirements for CPD programmes (Becher, 1999). It is widely recognised that much of the professional development of a professional in the construction industry takes place through on-the-job training. This can be classified as informal CPD. However, it is very important that this be supplemented by formal CPD, as outlined:

- Training courses, both internal and external
- Post-graduate academic studies such as diplomas and masters
- Attending appropriate technical lectures, as typically organised by professional institutions
- Significant involvement in the work of a learned institution, e.g. presentation of a technical paper or the preparation of a report
- Participation in technical conferences or study visits
- Special exam leave

Typically acceptable CPD learning includes 35 hours of recognised activity or 100 points of CPD learning with a recommendation that 50% of the professional's CPD be structured i.e. classroom or lecture setting (Source: various professional institutions). Thomas (1995) cites earlier work in suggesting that CPD is well supported and regarded by members of a profession when:

- Active and enthusiastic collaboration takes place between the providers, professional bodies, individual professionals and their employers
- The providers act in a professional way
- There is an environment that encourages and facilitates access to CPD.

Lifelong learning programmes aimed at people in the workplace must be suited to their particular needs (Davey et al., 2004). Within the construction industry the difficulty that exists with respect to undertaking post-graduate programmes has been somewhat addressed by the latest evolution/trend among educational providers to broaden access by offering subjects as modules or blocks that can be packaged up as short courses (Cole, 2004). Benefits to universities in becoming involved in providing CPD include; offering the potential for closer links with industry and the professions, opportunity for funding to carry out research and consultancy and information feeds back into undergraduate programmes to ensure relevance to industry requirements (Thomas, 1995; Browell, 2000). In many cases the individual modules on traditional postgraduate taught programmes may be of great value and packaged for students to undertake as part of CPD (Cole, 2004).

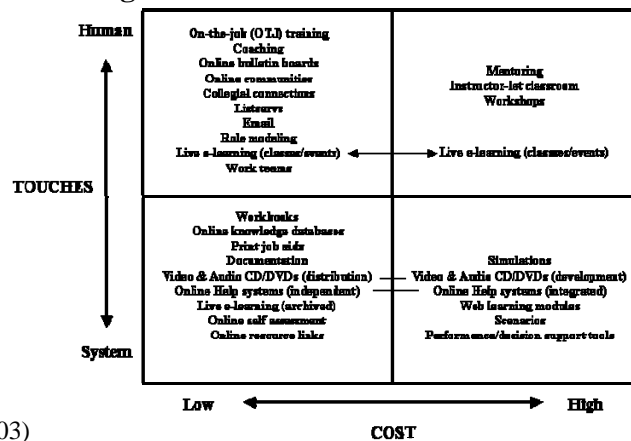
Developing both the infrastructure and content to deploy technology-enabled learning is a time consuming and resource intensive exercise. For many educational institutions the new technologies that are available represent a largely additional expense that is difficult to quantify (Twigg, 2003). What can be observed is the emerging trend extolling the virtues of “blended learning”.

Blended Learning

Blended learning offers institutions the opportunity to engage in using technology in conjunction with traditional delivery to offer learning. Blended learning at its most basic level is “the thoughtful integration of classroom face to face learning experiences with online experiences” (Garrison and Kanuka, 2004 page 96). Blended learning is balanced learning with this balance achieved by the combination of classroom instruction with self-paced instruction that is delivered over the Internet (Voci and Young, 2001).

Depending on the nature of the material to be developed cost influences decisions on what configuration the blended learning should take. Rossett et al. (2003) developed a framework into which cost influences can be acknowledged (see Figure 1).

Figure 1 Cost Influences on the Blend



Source: Rossett et al. (2003)

Rossett et al. (2003) state that if organisations are keen to initiate something that is strategically vital they may be willing to support the higher cost solutions illustrated on the right hand side of Figure 1. The upper right hand quadrant would provide opportunities to learn about, question, appreciate and get comfortable with virtual collaboration. The lower right hand quadrant might be useful as a performance support tool and as an online community that can build exposure and consensus. When integrating traditional with online learning there is a need to recognize that there are many challenges facing higher education institutes.

More programmes are incorporating web sites, more students and staff are using e-mail for in-depth communication and more higher-level institutions are facilitating their students in transacting administrative requirements via the Internet (Johnstone, 2002). Hirshon (2005) suggests that the nature education is changing in terms of; (i) what higher level institutes do and (ii) the financial resources available to do it.

Challenges in Higher Education Institutes in Integrating E-learning

The Internet is facilitating new competition both from profit and non-profit competition to enter the higher education market free of traditional institutions on-going requirements to invest in capital assets and personnel that reduce the capacity to affect and manage change to deliver e-learning programmes (Graves, 2001). According to Steinberg (2004) e-learning is not only an application of technology to teaching, but it is a new business model for higher education. The adoption, diffusion and exploitation of e-learning by educational institutions has been slower than anticipated (Bell et al., 2004). As well as the capital outlay required in establishing a technological infrastructure the costs of personnel in developing and delivering e-learning represent the major budget items (Banas and Emory, 1998). Limited financial resources were found to be a significant barrier to progress in extending the use of ICT and e-learning in European educational institutions (DG Education and Culture European Union, 2004).

Gibson et al. (2001) cites Peter Drucker as stating that the traditional university is destined to change dramatically and that distance learning is the wave of the future. The Internet is facilitating new competition both from profit and non-profit competition to enter the higher education market free of traditional institutions on-going requirements to invest in capital assets and personnel that reduce the capacity to affect and manage change to deliver e-learning programmes (Graves, 2001). However, Lehner et al. (2003) argue that electronic education should not attempt to replace traditional education but to support both staff and students through the provision of services that facilitate teaching, learning and education related administrative tasks. Gibson et al. (2001) identify 10 lessons to making the distance learning programmes more valuable. These are; (i) changing the thinking from a teacher centred to a learner-centred environment, (ii) learning the support technology, (iii) making the website user-friendly, interactive, fun and interesting, (iv) personalising courses and building a sense of community, (v) utilising many methods of communication, (vi) being creative with on-line testing, (vii) breaking work down into smaller elements and establishing absolute deadlines, (viii) providing timely feedback to students, (ix) making participation count and (x) ensuring to establish who owns the course, the instructor or the school.

In the past large investments in technology based initiatives in education have had less than satisfactory results (Harden, 2002). Harden (2002) cites the UK where there were disappointing results with the Computers in Teaching Initiative and the Teaching and Learning Technology Programme. One reason for this failure has been the overemphasis on the technology without giving proper attention to the educational issues (Harden, 2002). In looking at a model or framework to avoid the lessons of the recent past Zemsky and Massy (2004) refer to one of the myths of e-learning as “if we build it they will come”. However, Chee (2002) refers to this type of approach to e-learning as:

$$\textit{Content + Delivery = Delivered Content}$$

and delivered content on its own is not enough to achieve learning. Often it is in an eagerness to embrace technology that an understanding of the fundamentals of learning and how it occurs is overlooked (Hamid, 2002 and Pailing, 2002). Gilboy (2001) stated that when the focus is taken away from the content but rather the management of the learning experience and pedagogy are considered a more appropriate view of learning is:

$$\textit{Pedagogy+Content+Community = Valued Learning Experience.}$$

To avoid failure with any e-learning project one must ensure that the project is sustainable in a given socio-economic environment or business context as well as recognising the importance of instructional design considerations (Romiszowski, 2004). Hirshon (2005) suggests that with less financial resources available, higher-level educational institutions continue to seek out new and improved methods to capture value out of their e-content expenditure. Having an understanding of the technologies available is a fundamental consideration in embarking on deploying e-learning programmes.

Technologies in E-Learning

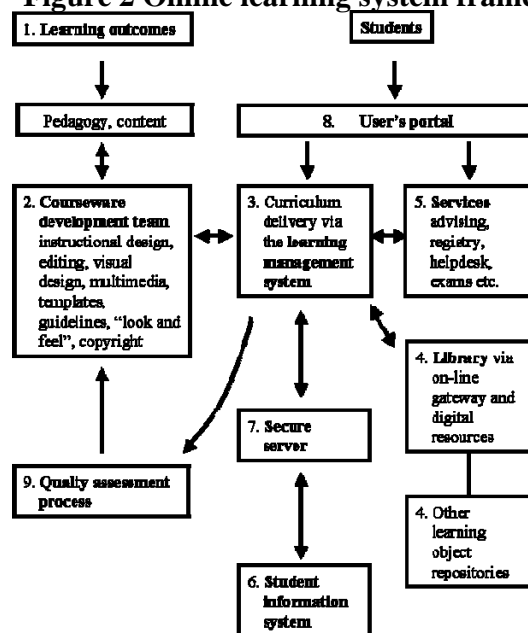
In the economic expansion that has been witnessed since the early 1990s network advances along with advances in technology and the growth in use of the world wide web assisted in the growth of the application of e-learning. Bruce (2003) when discussing the evolution of technology states that there are three scaling laws that apply:

1. Moore's Law – processor capabilities double every eighteen months
2. Saltzer's observation – solid-state and rotating memory double every twelve or so months
3. Metcalfe's Law – the price of commodity bandwidth decreases by 50% every nine months.

While there are a range of learning management systems available in the marketplace, all of them aim to deliver four main features; (i) delivery of learning content, (ii) tracking of participant performance, (iii) management of online learning and (iv) provision of tools for participant collaboration (Watson and Ahmed, 2004).

This makes it difficult to provide a straightforward checklist or recipe to follow in the developing an infrastructure for online learning. Davis (2004) suggests that building the infrastructure for online learning requires that many factors be considered. Davis further suggests that the organisation of the various components of a proposed infrastructure for online development outlined in Figure 2.

Figure 2 Online learning system framework



Source: Davis (2004)

Learning outcomes (1) are translated into course content, resources and an approach to the learning process that will enable the student to achieve those outcomes. The courseware development team (2) will share responsibility of translating the theory and intentions into courseware and online learning functions to be delivered by the LMS (3) which interfaces with the other digital resources, library (4), services (5) and student information services (6) through a secure server (7) which can authenticate participant login. From the participants perspective they will connect to the LMS (3) and related services (5) through a user-friendly users' portal (8) so that with a single login they have access to their courses and related services and resources. To ensure ongoing improvement an evaluation process for the effectiveness of the system based on the achievement of learning outcomes and students' feedback is in place in the form of an independent quality assessment process (9) which, also feeds back into the development cycle.

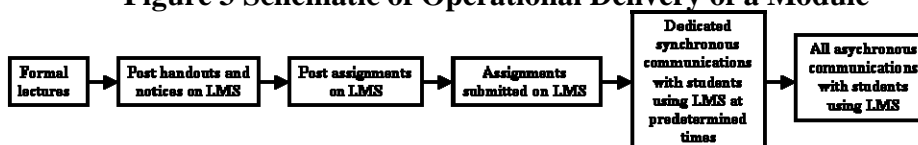
Alexander (2001) states that while much of the focus in e-learning has been around the level of technological delivery strategies, other issues such as staffs' conception of learning and understanding of how students learn, teaching strategies appropriate for use with e-learning and the need staff development opportunities need to be factored into any developments.

Blended CPD Program for Irish Construction Professionals

The phenomenal growth of the Irish construction industry over the past decade, coupled with the increasing complexity and scale of projects has fuelled the demand for project managers with specific knowledge and skills (Forfas, 2003). The new Masters in Science in Construction Project Management (MScCPM) is building upon the expertise gained within the Department of Building Technology in Waterford Institute of Technology (WIT) delivering an existing Master of Science in International Construction Management (MScICM) programme involving WIT, Nottingham Trent University (NTU) and Fachhochschule Karlsruhe (FH KA). This is a one-year full time programme with participants spending one semester in each of the partner institutions and has run since 1993. However, many professionals in the construction industry wish to undertake CPD programmes that do not necessitate having to leave full-time employment.

The programme is currently being delivered in the format outlined diagrammatically in figure 3. Students attend for a specific period of formal lectures in Waterford for the relevant modules. Prior to / after or both prior to and after, handouts, other relevant material and websites are uploaded on the Institute Learning Management System (LMS) WebCT. All assignments and other relevant discussions will be posted on the LMS. In order to keep formal records and structure the programme appropriately all written assignment work are submitted for the individual modules using the LMS. Individual lecturers may require participants separately to submit a hard copy of the assignment. To encourage student participation between lectures on campus, lecturers to generate discussion in the LMS in an asynchronous format may post topics for discussion.

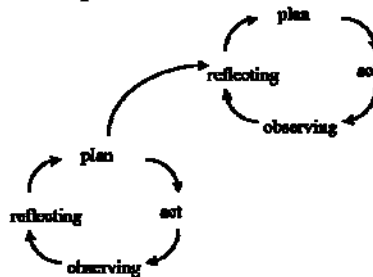
Figure 3 Schematic of Operational Delivery of a Module



Whilst offering many advantages to students, a major consideration in delivering training through distance learning modes is maintaining a high level of motivation and commitment, avoiding the sense of isolation, and returning to the requirements and rigours of further education, especially for those who are returning to education after a number of years in industry. Through the use of this blended learning approach outlined earlier, it is anticipated that the use of both classroom and distance learning modes should maintain a high level of commitment and remove the sense of isolation that students can often experience in traditional distance learning approaches. The ultimate objective for this postgraduate programme is to use “blended learning”, where technology and traditional modes of delivery are effectively merged. The structure of the new programme is unique to construction related post-graduate education in Ireland in that it involves a mixture of ‘distance learning’ and ‘traditional learning’ techniques in the completion of the various subject modules. As the programme develops and lecturers/tutors increase the module content being delivered on-line the programme will become a truly blended learning programme.

The development and refinement of the programme will take an action research methodology approach. This development will use a sequence of action-reflection cycles in refining the programme and developing a framework for deploying blended learning CPD, as outlined in figure 4.

Figure 4 Sequence of Action-Reflection Cycles



Source: Adapted from McNiff and Whitehead (2002)

Action research is more than traditional interpretative research in the sense that the researcher is directly involved in the research setting and the experience itself (Nunes and McPherson, 2002). Action research involves learning in and through action and reflection and it is often conducted in educational contexts (McNiff and Whitehead, 2002).

Conclusions

Many commentators in the recent past anticipated that the Internet would radically change the way learning would be delivered.

“The next big killer application for the Internet is going to be education. Education over the Internet is going to be so big it is going to make e-mail look like a rounding error” (Chambers, 1999).

This statement by Cisco’s John Chambers at COMDEX 1999 was typical of the perception of e-learning that permeated the corporate and educational world in the late 1990s. However, experiences since this statement was made illustrate that this has not been the case. Successful e-learning participants are highly motivated and self-directed, intellectually more mature, self-

disciplined, older, serious and interested in coursework from which they will materially benefit (Schweizer, 2004). This post-graduate programme has been designed to facilitate professionals in the Irish construction industry who wish to enhance their education and gain an additional qualification. While issues around the technology will always need to be considered, it is important to bear in mind that technology is only a tool by which the learning will be delivered. Studies conducted alongside e-learning initiatives have indicated varying levels of success (Packham et al., 2004). However, one of the most important prerequisites for successful implementation of e-learning is the need for consideration of the underlining pedagogy or how learning takes place (Govindasamy, 2002). This ongoing research work proposes looking at blended learning as the appropriate method of addressing CPD needs using an action research approach. It will endeavour to propose a strategic framework for deploying blended learning CPD.

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