ISSUES IN DEVELOPING A BLENDED LEARNING INITIATIVE TO MEET CONTINUING PROFESSIONAL DEVELOPMENT NEEDS OF CONSTRUCTION PROFESSIONALS IN IRELAND

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The need for continuing professional development (CPD) in both the UK and Ireland has been recognised by the construction sector. All individuals learn in different ways from listening, watching, questioning, doing and helping others to learn. Lifelong learning programmes aimed at people in the workplace must be suited to their particular needs. When addressing learning needs using technology, management, staff and technical support in higher-level institutes face new challenges and are required to make new decisions. Higher-level institutes are at different stages of technology deployment in addressing learning needs. A concern for all involved in these undertaking is the cost of deploying content to be delivered online. On-line higher education learning is part of the growing trend in lifelong learning. The academic issues that need to be considered in developing an e–learning environment to promote the learning of construction professionals and bridge the gap between industry and academia are outlined. A proposed blended learning initiative to meet CPD needs in the Irish construction industry is discussed. The structure of this new blended approach is outlined.

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

INTRODUCTION

The demands on professionals such as engineers, architects, quantity surveys and construction managers are considerable in terms of their time and experience. Recent studies in both the UK by Latham (1994) and Egan (1998, 2002), and in Ireland by Forfas (2003) into the construction industry has made recommendations to improve practices and performance within the industry. A key driver in addressing the issues identified in many of these studies has been the recognition that learning and training are a key element in delivering these projects, resulting in more certainty of time of completion and within budget. However, the intensity of workload that exists within the construction industry both in the UK and Ireland means that frequently there is insufficient time available for effective learning to take place to meet deficits within the industry (Construction Industry Council, 2004).

PROFESSIONAL DEVELOPMENT IN CONSTRUCTION

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). Recognition exists within professional bodies for both formal and informal methods of learning. 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

Technological advances and the Internet have opened up new opportunities for educational providers to configure traditional classroom and technology assisted learning to promote and encourage access to CPD learning opportunities (Klein and Ware, 2003). 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).

TECHNOLOGY IN LEARNING

The facilities and capabilities offered by e-learning and technology in the delivery of training are considerable. More and more people are using the Internet to send e-mail, instant messaging, browsing, finding entertainment information and reading news – "… today's students think of the Internet the way their parents and their grandparents – and even their older siblings – viewed electricity: ubiquitous and only noticeable when not available" (Bruce, 2003 page 24).

With the growing acceptance of e-learning technologies and the increasing need of access to distance learning opportunities, administrators of higher-level institutes face, (i) technological, (ii) organisational, (iii) pedagogical and (iv) cultural challenges in helping to integrate these changes (Howell et al., 2004). The prevalence of online distance education courses requires management, technical support and teaching staff to face new challenges and make new decisions.

STAFF CONCERNS WITH E-LEARNING

With the growth of e-learning in education and learning settings, tutors and teachers are required to develop and teach online modules with respect to the areas of, course management and design, delivery method, student communication media, creation of an engaging learning environment, assessment, and use of new technologies (Vrasidas and Zembylas, 2004; Kosak et al., 2004). However, often staff are asked to develop programmes without the skills or support required (Berge, 1998; Vrasidas and Zembylas, 2004). For staff involved in deploying e-learning programmes they must acquire the skills to support the collaborative process between learners and encourage them to work as a team (McFadzean and McKenzie, 2001).

Many staff members of higher level institutions are unwilling or unable to change how they teach to make use of technology or do not have institutional support to deploy technology enabled learning (Sausner, 2004). Delivering distance learning can involve a host of teaching and learning practices that can offer convenience for students but may be far more labour intensive for staff in higher level institutes including, (i) creating courses, (ii) maintaining chat rooms, (iii) responding to students queries by email around the clock, (iv) the new expectations of students on these programmes including "anytime, anyplace learning", "round the clock availability of instructors" and "24/7 advising" (Alexander, 2001).

Newton (2003) in an analysis of funded research by the Learning and Technology Support Network – Information and Computing Studies Group into barriers to using technology in teaching and learning within the academic community in the UK identified, (i) the increased time commitment, (ii) lack of incentives or rewards, (iii) lack of strategic planning and vision, (iv) lack of support, (v) lack of training in use of the technology, (vi) lack of support for pedagogical aspects of developments and (vii) philosophical, epistemological and social objections. Similarly, Newton from a review of the literature cites, (i) increased time commitment (workload) for academic staff in terms of development time and delivery time, (ii) lack of extrinsic incentives/rewards, (iii) lack of strategic planning and visions, (iv) lack of support in terms of a lack of training in technological developments and a lack of support in terms for pedagogical aspects of development, (v) philosophical, epistemological and social objections. The overall situation which emerges from this study was that while there were a range of initiatives taking place in the development of e-learning, in may cases these developments are led by the enthusiasm of individuals with little extrinsic rewards structures to encourage these initiatives. Whereas in the more traditional role in higher education the instructor has control over the pace, place, time and style of presentation and interaction, in an e-learning environment the control of these elements shifts to the learner (Blass and Davis, 2003). 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 the factored into any developments.

Reisman et al., (2001) suggest that in higher-level institutions there are five levels of strategy in the deployment of e-learning. These are summarised in table 1.

Table 1: Summary of Strategy Characteristics

STRATEGY	General description	Overall comments
1	Individual initiative	Low budget and small scale, initial entry into distance learning
2	Individual effort using established professional course development tools	More flexible and greater return on investment, software publisher hosting might be used, site license may be required
3	Group effort using established professional course development tools	Same as strategy 2 with added synergism
4	Institutional commitment to use and support established professional tools	Major institutional information technology infrastructure and budget needed, major acceptance / utilisation, may become burdensome
5	Institutional partnership with outside vendor	End-to end support, unlimited potential, requires careful oversight

Source: from Reisman et al. (2001) pg 249

Research carried out by the DG Education and Culture of EU Commission (2004) illustrates that there are different models that educational institutions are embracing with respect to incorporating e-learning into curriculum. The European Union Final Draft Report (2004) titled "Studies in the Context of the E-learning Initiative: Virtual Modes of European Universities" identified four cluster of educational institutions (i) front runners, (ii) co-operative universities, (iii) self sufficient and (iv) sceptical. The particular traits of each of these models are outlined in table 2.

Table 2: Traits of European Universities Models

Description	Typical characteristics	Percentage of Market
Front Runners	These institutes are well ahead in both integrating ICT in on-campus teaching and in offering a substantial number of e-learning courses. These organisations are significantly involved in strategic co-operation with domestic and foreign universities as well as other suppliers of education (i.e. private organisations)	16%
Co-operative universities	Relatively far ahead in their use of ICT in their development process, although not as far as the front-runners. E-learning courses are offered only to a minor extent for basic academic training and supplementary training. These bodies fund their ICT development with a mixture of government and self-funding.	33%
Self-sufficient universities	Similar to co-operative universities in terms of their ICT integration in both organisational and educational settings. These organisations are much less involved in co-operation with other educational institutions or third party organisations and they do not view partnerships with other educational suppliers as a priority.	36%
Sceptical Universities	Lagging behind the other clusters in all respects. Characterised by limited use of digital services and only offer very limited number of	15%

	courses in both basic academic training and supplementary training.	

Source: Adapted from DG Education and Culture European Union (2004)

This study identified four key obstacles and challenges to higher level institutions in their development and progression towards extending the use of ICT and e-learning in the delivery of programmes. These are outlined in table 3.

Table 3: Obstacles in developing and extending the use of ICT

Obstacle / Challenge	Description
Moving from enthusiastic individuals driving initiatives to the integration of ICT becoming part of the higher-level institute culture.	For most higher level institutes this is inhibited by a combination of the lace of a coherent and comprehensive management approach to integrating ICT coupled with a degree of resistance to change in the higher level institutes.
Lack of knowledge.	Many academic staff lack knowledge concerning the potential of ICT and new ways to use it.
A shortage of ICT resources	The study identified a shortage of high-quality ICT-based teaching material. This is a natural consequence of the generally early stage of development of ICT use in higher-level institutes identified in the study. The report highlighted that the high cost of developing e-learning content is an obstacle in developing these resources. The report called for greater incentives to undertake such developments and for cooperation aimed at spreading these costs.
Regulations should be defined.	The legal issues concerned with intellectual property rights and payment systems focused on increasing the sharing and re-use of learning resources will need to be addressed. This presents a challenge to the traditional values with respect to academic freedom and instruction based on the individual research of the instruction.

Source: Adapted from DG Education and Culture European Union (2004)

Tham and Werner (2005) highlight studies that indicate that instructors in an online environment must fulfil many roles or "hats". These hats include:

➢ A technological hat – educators must understand the application software and also the implications of technology for adopting different strategies in teaching. Using the available technology to enhance student learning is not an easy undertaking.

➢ A pedagogical hat – with a virtual classroom the tool/applications used to monitor or raise the intellectual skills of students requires the instructor to adopt the right tools and not simply use the tools that are available. Creativity is key to design of a course that brings students closer in an online environment.

➢ A social hat – in an online environment for the instructor to establish a rapport with students the technical communication tools should be used to establish a friendly cohesive and comfortable learning environment.

For many institutions the new technologies that are available represent a largely additional expense that is difficult to quantify (Twigg, 2003).

COSTS IN DEPLOYING E-LEARNING

The range of estimates for development of e-learning content varies, from small financial resources required to huge financial commitment (Mayer, 2003). Blomeyer (2002) estimates that the effort required to develop material typically ranges from 50 to 150 man hours of development for one hour of instruction with in some cases up to 2000 hours of development for one hour of instruction. Baker (2002) explored the cost of development of e-learning content and found that times range from 200 hours to 700 hours of development for one hour of finished development. Cost conscious managers in higher-level institutes can enhance the utilisation of resources by using a variety of distance learning technologies ranging from low cost print to more expensive leading edge technology (Banas and Emory, 1998). In moving from a scenario where there is little interactivity to a situation where there is quite a degree of sophistication in the material developed for an online environment there are obviously cost considerations.

Blended learning may bring about major changes in the way educational material is designed, developed and delivered to people who want to access learning but have other constraints that affect the process of learning (Pailing, 2002). Depending on the nature of the material to be developed cost influences decisions on what the nature of the blended learning should take. Bersin (2003), a well established provider of research and consulting services in e-learning technology and implementation, developed a media guide sheet that may help organisations identify the possible media solutions that are available for a given problem. This is outlined in table 4.

Table 4: Media Guide Sheet for designing a Blended Learning Programme

Media Type	Instructional Value	Scalability	Time to Develop	Cost to Develop	Cost to Deploy	Assessment Capable	Trackable
Classroom based training	High	Low	3 - 6 weeks	Medium	High	Medium	Low
WBT Courseware	High	High	4 - 20 weeks	High	Low	High	High
CD ROM Courseware	High	High	6 – 20 weeks	High	Medium	High	Low
Conference Calls	Low	Medium	0 – 2 weeks	Low	Low	No	No
Webinars	Medium	Medium	3 - 6 weeks	Low	Medium	Low	Low
Software / Online Simulations	Very High	Medium	8 - 20 weeks	High	Medium	High	High
Lab-based Simulation	Very High	Low	0 - 3 weeks	High	High	Medium	Medium
Job aids	Low	High	0 - 3 weeks	Low	Low	None	None
Web pages	Low	High	1 - 8 weeks	Low	Low	None	None
Mentors	Medium	Low	2 – 3 weeks	High	High	Low	Low
Chat – Discussion – Community Services	Medium	Low Medium	4 – 6 weeks	Medium	Medium	None	Low
Video (VCR or Online)	High	Medium	8 – 20 weeks	High	High	None	Low
EPSS	Medium	Medium	8 – 20 weeks	Medium	Medium	None	Medium

Source: Adopted from Bersin (2003)

Any initiative involving the development of e-learning represents a significant increase in staff time and commitment. Coupled with this is an increased requirement

for technical support to deliver programmes completely online. Invariably the resources are not available and it takes a pioneering staff member to push the process along. It is difficult to see a scenario where institutions can progress from traditional to online without progressing in a series of steps. The approach taken in Waterford Institute of Technology (WIT) is detailed.

IRISH CPD PROGRAM

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). These construction project managers are charged with the responsibility to deliver projects to the required quality within agreed budget and schedules. A Forfas study (2003) identified four major areas of emerging skill needs in the construction industry, (i) project management, (ii) construction demolition and waste disposal, (iii) environmental management and (iv) safety. However, many professionals in the construction industry wish to undertake CPD programmes that do not necessitate having to leave full-time employment.

The proposed new Masters in Science in Construction Project Management (MScCPM) is building upon the expertise gained within the Department of Building Technology in WIT delivering an existing full time Master of Science in International Construction Management (MScICM) programme in collaborative with Nottingham Trent University (NTU) and Fachhochshcule Karlsruhe (FH KA). The Department of Building Technology carried out a survey of approximately 600 graduates from 1996–2000 in conjunction with the WIT Alumni Office. The results highlighted a very high level of interest in such a programme with 80% of the 120 replies received asking for further CPD opportunities in 'management' utilising 'distance learning technologies'.

An industry survey was also carried out. This survey, which was sent to 50 of the leading construction companies in Ireland in early November 2004, included questions relating to the employer's existing CPD activities (internal and external) and whether they would support the proposed MScCPM programme. All responses received indicated that the companies would be interested in such programme and that they would encourage staff participation. The majority of the responses also indicated that the companies would pay all/part of the fees for their staff. A further interesting point to note is that the majority of the responses also indicated that less than 10% of professional staff employed in these companies had post-graduate qualifications. Feedback was also requested in this survey concerning the modules and syllabi of the proposed programme that assisted in formulating the programme.

This post-graduate programme has been designed to facilitate professionals in the Irish construction industry (including engineers, construction managers, quantity surveyors and architects) who wish to enhance their education and gain an additional qualification. 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. The main teaching and learning methods will be by lectures, workshops, seminars, tutorials and projects, with the material delivered using the Institute's LMS and through real time online interaction. The teaching of some modules will be supplemented by problem-based material that will enable a more flexible and bespoke teaching and learning experience.

It is anticipated the programme will be delivered in the format outlined diagrammatically in figure 1. Students will 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 will be uploaded on the Institute Learning Management System (LMS) WebCT. All assignments and other relevant discussions will also be posted on the LMS. In order to keep formal records and structure the programme appropriately all written assignment work will be 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. In order to ensure that students are meeting deadlines and remain motivated, dedicated times will be established in advance and posted by lecturers on the LMS where on-line real-time synchronous discussions on relevant issues will take place.

Figure1 : Schematic of Operation of a module
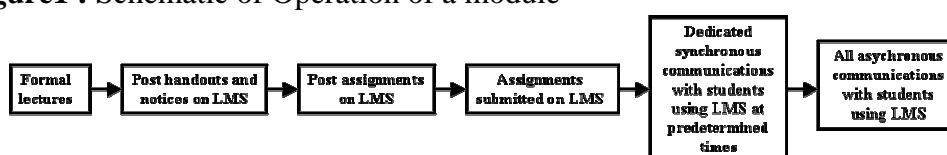
The programme structure itself is as outlined in table 5.

Table 5: Schedule of module contact and on-line teaching

Module Year	1	1	1	1	1	2	2	2	2	1	1+2	
Module Title	Management of Projects 1	Procurement and Marketing	Economics	Finance	Management of ICT	Construction Law	Strategic Management	HRM and Ind. Relations	Management of Projects 2	Research Methodology	Dissertation	Totals
Credit Points	10	10	5	5	5	10	10	5	10	10	40	120
Contact Time	30	30	15	15	15	30	30	15	30	15		225
On-line Teaching	30	30	15	15	15	30	30	15	30	15		225

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 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

CONCLUSIONS

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). 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. This post-graduate programme has been designed to facilitate professionals in the Irish construction industry (including engineers, construction managers, quantity surveyors and architects) who wish to enhance their education and gain an additional qualification.

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