



COVER SHEET

Wall, John and Smit, Debra and Ahmed, Vian (2006) A Collaborative Initiative to Deploy Blended Learning Continuing Professional Development in the Construction Industry. In Martinex, Manuel and Scherer, Raimar, Eds. *Proceedings e-Work and eBusiness in Architecture, Engineering and Construction*, pages pp. 591-596, Valencia, Spain.

Accessed from <http://eprints.qut.edu.au>

Copyright 2006 the authors.

A Collaborative Initiative to Deploy Blended Learning Continuing Professional Development in the Construction Industry

J. Wall

Waterford Institute of Technology, Ireland

D. Smit

Queensland University of Technology, Australia

V. Ahmed

University of Salford, UK

ABSTRACT: The need for continued access and provision to continuing professional development (CPD) has been recognised by the construction sector. However accessing formal CPD opportunities while working full-time in the industry is a challenging undertaking. It is recognised that learning is a complex set of inter-related cognitive processes. 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. A collaborative partnership of educational institutions in Europe has come together to develop a framework focused on the lifelong learning needs of professionals in the construction industry while participants remain in employment. The main objective of this network is to establish a platform where different instructional strategies to accommodate different learning styles and cognitive processes will be developed. Other target groupings include other higher-level institutes outside of the partner institutes and professional and industrial representative bodies in the construction industry who may integrate the lessons learned into their programmes. The major anticipated outputs as a result of this initiative are a database of learning resources that may be integrated into CPD learning programmes delivered in a blended learning format. A methodology to formulate this framework is outlined. Some initial findings are outlined.

1 INTRODUCTION

The construction industry is a key driver in the economic progress and development of the EU and will facilitate the delivery of economic prosperity as Europe grows. The fastest growing group in higher education is working part-time students that are at least 25 years of age who tend to seek education to advance their careers, increase their self development and / or salaries and are ideal candidates for having e-learning delivered to their home or offices (James-Gordon et al., 2003).

Continuing Professional Development (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, however, is that it is self-motivated, self-directed and self-monitored

(Bridges and Grierson, 2000). Recognition exists within professional bodies for both formal and informal methods of learning. It is widely recognised that much of the professional development of professionals 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.

It is universally recognised that there is a need for CPD and lifelong learning opportunities aimed at construction professionals. However, lifelong learn-

ing programmes aimed at people in the workplace must be suited to their particular needs. Thomas (1995) suggested 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.

A study by Brosnan and Burgess (2003) highlighted that 76% of professionals surveyed engaged in using the Internet to support their professional learning. Supporting this Brosnan and Burgess (2003) cite an earlier study, which found that out of 34 professional bodies, 33 anticipated more use of Internet technologies within a 2-year period to support members' CPD requirements. In a situation where construction professionals and professional bodies are open to using technology to address their CPD requirements, one key issue is how can educational providers develop a framework to meet these needs?

Conventional approaches to the design of programmes using technology typically have been based upon instructional design strategies where there is an implicit assumption that the group of learners that the programme has been developed for will display uniformity in the ways in which they process and organise information and in their predispositions towards specific learning situations and media (Sadler-Smith and Smith, 2004). Consideration of the pedagogy is vital when attempting to understand the application of e-learning in practice (Mehanna, 2004). Matching cognitive and learning styles with instructional presentation strategies may have an important role to play in enhancing the learner's learning experience (Ford and Chen, 2001).

2 HOW LEARNING OCCURS

Learning can be defined as the acquisition of knowledge or skill (Oxford English Dictionary, 1991). Learning is not a simple act. The Chinese proverb, attributed to Confucius (450 B.C.), summarises the importance of understanding the pedagogical processes that take place when learning occurs:

"Tell me, and I will forget, show me, and I may remember, involve me, and I will understand."

Key to understanding cognitive processes is an understanding of learning theories. Learning theories have evolved from psychological studies and have changed in response to, and because of, advancing

theories of cognitive development (Ertmer and Newby, 1993). For any type of learning to be effective, whether it is classroom based or computer based, it has to be built on sound pedagogical principles. What has changed considerably in more recent times is the evolution of ICT and how technology can be configured to incorporate the "tell", "show" and "involve" that are prerequisites of effective learning (Sit, 2001).

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; (1) offering the potential for closer links with industry and the professions, (2) opportunity for funding to carry out research and consultancy and (3) 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 part-time learners to undertake as part of CPD (Cole, 2004).

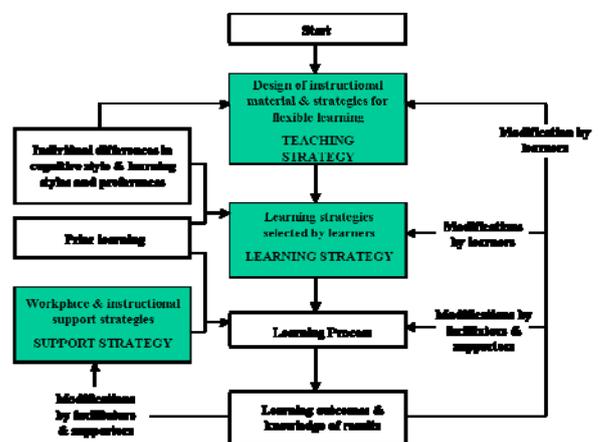


Figure 1 Relationships between teaching, learning and support strategies (source: Sadler-Smith and Smith, 2004, page 400)

There are important challenges to be addressed in the delivery of programmes using technology to deliver the learning if the potential benefits it can offer to individuals and organisations are to be maximised (Sadler-Smith and Smith, 2004). Sadler-Smith and Smith (2004) contend that there are three separate categories of strategy development that are necessary in order to accommodate individual differences in styles and preferences in the design and implementation of flexible learning in the workplace; (i)

teaching strategy, (ii) learning strategy and (iii) support strategy. These are outlined in Figure 1.

Individual differences in the way people learn and the mode of delivery interact to affect the learning process and its outcomes. Prior knowledge is one moderating variable upon the process and therefore on the outcome. The teaching strategy, learning strategy and support strategy are included as potential interventions at different stages of this flexible delivery process. Knowledge of results is considered as operating as feedback to the teaching, learning and support strategies being adjusted contingent upon the efficacy or otherwise of the learning process and its outcomes (Salder-Smith and Smith, 2004).

3 ROLE OF EDUCATOR

The continuous changes in communications and IT infrastructure present higher-level institutions with new opportunities and challenges (Ma and Runyon, 2004). The role of the instructor by necessity must change when one moves to an on-line environment (Wall and Ahmed, 2005). 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 times 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). Instructors on these programmes are faced with steep learning curves (Taylor, 2002).

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, Levine and Sun, 2002).

Tham and Werner (2005) highlight studies that indicate that instructors in an online environment must fulfill 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.

As an instructor, as one moves from a traditional learning environment to an on-line environment the instructor must become much more the facilitator (Wall and Ahmed, 2005). This research will seek to highlight the changing role that must be embraced by the instructor as one moves from a classroom to an on-line environment.

4 PAN EUROPEAN INITIATIVE

Waterford Institute of Technology in Ireland, the Nottingham Trent University in the UK, Fachhochschule Karlsruhe in Germany, Multimedia Instructional Design in Ireland and Istanbul Technical University in Turkey are collaborating in formulating a framework for deploying blended CPD aimed at the construction industry. These partners have secured funding as part of FP6 through the Minerva Action, which aims to promote European cooperation in the field of Information and Communication Technology (ICT) and Open and Distance Learning (ODL) in education. This network is taking up this challenge in a European context focusing on the construction industry.

The rationale behind this project is to create an innovative international learning resource that will be widely accessible to construction management professionals thereby facilitating improved knowledge and skills within the industry.

This network is focused on the management of the learning experience, through implementing well-

sources offers potential advantages in sharing the risk/reward potential and may then be customised by individual institutions as part of 'blended learning programmes' focused on construction managers needs.

6 RESEARCH APPROACH

A case study methodology will be applied as part of an empirical approach to deploying CPD. Case studies research methodologies have few generalisable requirements other than access to the level of data required for the study. As a research strategy the case study approach is used in many situation is to contribute to knowledge of individual, group, organisational, social, political and related phenomena (Yin, 2003). Consistency of depth of access is important to get a coherent picture.

The overriding objectives of this research element are to identify; (i) what is good about the current programmes, (ii) what could be improved in the programme, (iii) how technology can be matched to learners needs as part of a blended learning approach and (iv) how important is the role of the tutor in the delivery of the programme. The lessons learned from this work will be integrated into a separate learning resource that is being developed as part of this European Initiative. A twin evaluation approach will be used to formulate the framework involving; (i) staff evaluation and (ii) participant evaluation.

The lessons learned from this empirical research, will be integrated into the development of a separate learning resource being formulated as part of this European initiative.

7 DEVELOPMENT OF A SEPARATE LEARNING RESOURCE

The main objective in developing a separate learning resource is to establish a platform where different instructional strategies will be developed to accommodate different learning styles and cognitive processes. This will build on the knowledge gained as part of the evaluation of the masters' programmes in the University of Salford and Waterford Institute of Technology. A separate web address or URL <http://www.cpd-construction.com> has been registered. It is envisaged that this will be used as the hosting platform for the resources developed. An open source learning management system (LMS) will be used to host the learning resources developed. A schematic of the elements that this will incorporate is outlined in figure 4.



Figure 4 Schematic of Learning Resource Elements

A database of learning material will be developed. A guide on the learning material, outlining circumstances where this material may be integrated effectively into CPD programmes will be formulated. Professional bodies, charged with responsibility for CPD in the construction industry, will be invited to engage with both the development and deployment of this resource. To sustain this initiative in the longer term, the ambition is to grow this online collaborative network.

8 PEDAGOGICAL AND DIDACTICAL APPROACHES

It is anticipated that as part of the online instructional methodologies the pedagogical and didactical approaches that will be tested will include:

- Online tutorials and conferencing
- Online simulations
- Online tests and assessment
- Problem based learning techniques.

This methodology will address the following research questions:

1. How can an understanding of learning theories, learning style analysis and an appreciation of instructional technologies matched to meet the different cognitive processes of learners enhance the learning experience of individuals?
2. What are the barriers that must be overcome within the construction industry and higher education in the use of technology in the delivery of CPD?
3. How can technology be harnessed by higher education to offer a blended learning approach to meet the CPD needs of the construction industry bringing industry and education closer together?

9 CONCLUSION

The emphasis in the past with e-learning has been on the "e" i.e. the electronic technology (Hamid, 2002). Learner attitudes, technological advances and tech-

nological constraints, the skills of instructors in working with technology, the content to be learned, the quality of the instructional material and the interactions that take place between students and the instructor and the students themselves are all factors that need to be considered in developing learning material using technology (Landen, 1997 and Martinez et al., 2004). To promote the use of e-learning the emphasis needs to be less on the technology and more on the “experience”, “engagement” and other high level contexts (Hamid, 2002).

Consideration of the pedagogy is vital when attempting to understand the application of e-learning in practice (Mehanna, 2004). Matching cognitive and learning styles with instructional presentation strategies may have an important role to play in enhancing the learner’s learning experience (Ford and Chen, 2001). In a situation where learning is a complex set of inter-related cognitive processes, where the evolution of ICT continues at a rapid rate and where technological standards continue to evolve to allow for adaptability, interoperability and reusability, developing a framework to address the lifelong learning needs while participants remain in employment is a complex undertaking that this project will address. The major expected outputs are a database of learning material hosted on a dedicated resource that may be integrated into CPD learning programmes delivered in a blended learning format. The primary target group for implementing this development is managers wishing to up-skill in the construction industry. Other target groupings include other higher-level institutes outside of the partner institutes and professional and industrial representative bodies in the construction industry.

10 REFERENCES

- Alexander S., *E-Learning developments and experiences*, Education and Training, Volume 43, Number 4/5, 2001, pp 240-248
- Berge Z. L. *Barriers to online teaching in post-secondary institutions: can policy changes fix it?*, Online Journal of Distance Learning Administration, Volume 2, No. 1, available at <http://www.westga.edu/~distance/Berge12.html> accessed 3rd November 2004
- Bridges A. and Grierson H., *The use of Internet Technologies in Delivering Architectural CPD*, Construction Information Technology 2000 taking the industry into the 21st Century, Volume 1, 2000, pp 136 – 144
- Browell S., *Staff development and professional education: a cooperative model*, Journal of Workplace Learning, Bradford, 2000, Volume 12, Issue 2, pp 57-65
- Brosnan K. and Burgess R. C., *Web based continuing professional development – a learning architecture approach*, Journal of Workplace Learning, Volume 15, Number 1, 2003, pp 24- 33
- Cole M., *Opening University*, New Civil Engineer, 11th March 2004, pp 38 – 40
- Davey C., Powell J., Cooper I. and Powell J., *Innovation, construction SMEs and action learning*, Engineering, Construction and Architectural Management, Volume 11, No. 4, pp 230-237
- Ertmer P.A. and Newby, T.J., *Behaviorism, Cognitivism, Constructivism: Comparing Critical Features from an Instructional Design Perspective*, Performance Improvement Quarterly, Volume 6, Issue 4, 1993, pp 50-72
- Ford N. and Chen S. Y., *Matching/mismatching revisited: an empirical study of learning and teaching styles*, British Journal of Educational Technology, Vol. 32, No. 1, 2001, pp5 – 22
- Hamid A. A., *e-learning Is it the “e” or the Learning that matters?*, The Internet and Higher Education, Volume 4, 2002, pp311-316
- James-Gordon Y., Young A. and Bal J., *External environmental forces affecting e-learning providers*, Marketing Intelligence and Planning, Volume 21, Issue 3, 2003, pp 168-172
- Kosak L., Manning D., Dobson E., Rogerson L., Cotnam S., Colaric S., and McFadden C., *Prepared to Teach Online? Perspectives of Faculty in the University of North Carolina System*, Online Journal of Distance Learning Administration, Volume VII, Number III, Fall 2004, available to download at <http://www.westga.edu/%7Edistance/ojdl/fall73/kosak73.html> accessed 3rd November 2004
- Landen M., *The role of technology in education and training*, Industrial and Commercial Training, Volume 29, Number 7, 1997, pp 230-235
- Levine Arthur and Sun Jeffrey C. *Barriers to Distance Education*, American Council on Education Center for Policy Analysis, 2002, available to download at <http://acenet.edu/bookstore> accessed 17th January 2005
- Ma Y. and Runyon L. R., *Academic Synergy in the Age of Technology – A New Instructional Paradigm*, Journal of Education for Business Jul/Aug 2004, Vol. 79, Iss 6, pp 367-372
- Martinez R. del Bosch M. Herrero M. & Nuno A., *Psychopedagogical components and processes in e-learning, Lessons from an unsuccessful on-line course*, Computers in Human Behavior, 2004 in press available online 1st June 2004
- McFadzean E. and McKenzie J., *Facilitating virtual learning groups A practical approach*, Journal of Management Development, Vol 20., No. 6, 2001, pp470-494
- Mehanna W. N., *e-Pedagogy: the pedagogies of e-learning*, Association for Learning Technology Journal, Vol.12, No. 3, September 2004, pp279-293
- Oxford English Dictionary, 1991, Third Edition
- Sadler-Smith E. and Smith P. J., *Strategies for accommodating individuals’ styles and preferences in flexible learning programmes*, British Journal of Educational Technology, Volume 35, No 4, 2004 pp 395 – 412
- Sausner R., *What happened to e-Learning and why? A critical report on e-learning innovation has sparked debate on both sides of the issue*, University Business, November 2004, Vol. 7, No. 2, pp 60-65
- Sit K. H., *Facilitating the Shift from 'Tell Me' to 'Involve me' in GER* 2001, Article available at URL: <http://www.cdtl.nus.edu.sg/link/nov2001/teach2.htm> access date: 24th April 2004
- Taylor Robert W., *Pros and cons of online learning – a faculty perspective*, Journal of European Industrial Training, Vol. 26, No. 1, 2002, pp 24-37
- Tham C. M. and Werner J. M., *Designing and Evaluating E-Learning in Higher Education: A Review and Recommendations*, Journal of Leadership and Organizational Studies, 2005, Vol. 11, Issue 2, pp15-26

- Thomas E. J., *Developing continuing education and training in European universities*, Journal of European Industrial Training, Bradford, Volume 19, Issue 4, 1995, pp 11-16
- Vrasidas C. and Zembylas M., *Online professional development: lessons from the field*, Education and Training, Volume 46, Number 6/7, pp 326-334
- Wall J. and Ahmed V., *Issues in Developing a Blended Learning Initiative to meet Continuing Professional Development needs of Construction Professionals in Ireland*, 21st Annual Conference Association of Researchers in Construction Management ARCOM, pp 1289 – 1299, September 2005
- Yin R., *Case Study Research – Design and Methods*, Third Edition, 2003