Leveraging distance learning tools for broad basing education in construction industry disciplines: The importance of a continuous social disclosure

Keraminiyage, KP, Ingirige, MJB, Amaratunga, RDG and Baldry, D

LEVERAGING DISTANCE LEARNING TOOLS FOR BROADBASING EDUCATION IN CONSTRUCTION INDUSTRY DISCIPLINES: THE IMPORTANCE OF A CONTINUOUS SOCIAL DISCOURSE

Bingunath Ingirige[1], Dilanthi Amaratunga, Kaushal Keraminiyage and David Baldry

School of Construction and Property Management, Research Institute for the Built and Human Environment, University of Salford, Bridgewater Building, Salford M7 1NU, UK

History of distance learning dates back to the late 1960's. However with the advent of the Internet it was repositioned as a major tool for course delivery so that students who are physically prevented from attending class room settings can undertake learning within a setting of their choice aligned with a pace that they can easily cope with.

Marketing of distance learning programmes is a diversified business activity in many universities and the School of Construction and property Management (SCPM) utilises the tool predominantly in delivering Masters Courses and PhD sessions over the Internet. Although structural and organisational aspects of DL courses facilitated by computer mediated communication (CMC) have been dealt with in literature, the degree to which these tools satisfying social aspects of a classroom setting (e.g. guidance and support, body language, feedback, interactions with other learners etc.,) has not received adequate consideration in existing literature.

This paper therefore investigates the extent to which the distant learning tools address the wider aspects of supporting a classroom situation during its operation so that appropriate improvements can be made in utilising these tools to attract more students for the relevant construction disciplines.

The objective of the paper is to disseminate the preliminary findings out of literature review based on a Teaching and Learning Quality Improvement Scheme (TLQIS) project at SCPM.

Keywords: CMC, construction industry, distance learning, social outcomes.

INTRODUCTION

Distance education technologies have come into prominence during the last decade of the 20th century. However, with the advent of the Internet it was repositioned as a major tool for course delivery so that students can undertake learning within a setting of their choice aligned with a pace that they can easily cope with. Marketing of distance learning programmes is a diversified business activity in many universities. At Salford University, the School of Construction and property Management (SCPM) utilises the tool predominantly in delivering Masters and PhD programmes over the Internet. A student satisfaction survey that SCPM has carried out also suggests that a significant number of DL students perceive a gap existing between their experiences compared with experiences of other students who attend full time courses. Due to the

---

[1] M.J.B.Ingirige@salford.ac.uk

importance of this area SCPM received funding to conduct a one year study to improve the social outcomes of CMC mediated DL tools under the Teaching and Learning Quality Improvement Scheme (TLQIS) of Salford University. This paper reviews literature in the field and considers the raising of awareness of a systematic social discourse as a prelude to utilising appropriate DL tools.

The paper is organised as follows. First, it describes the methodology adopted. Then it reviews the historical evolution of distance education. Next, the paper introduces the latest CMC mediated tools for DL, which energises the following section on identification of the research problem. The paper then justifies the research in this area and finally sets out the conclusions and the way forward.

METHODOLOGY

The paper adopts a detail review of literature in the field of distance learning both generally as well as specific to construction. The theoretical underpinnings reinforce the problem that is identified and justification of the research. The outcome of the paper informs the rest of the activities under the TLQIS research project at Salford University. It is proposed to conduct further interviews with DL tutors and learners and detail case studies in the field to compile guidelines for improving social outcomes within CMC mediated DL courses.

EVOLUTION OF DISTANCE LEARNING

DL concept mainly originated with the founding of the Open University in UK in 1969 and the development of a mixed media approach to teaching (Hellman 2003). DL continues to expand because of the growth of the Internet, increased capability and flexibility of web based tools, increased proficiency in basic internet skills and shrinking barriers with respect to accessing and using the Internet (Lindner, 1999).

Garrison (2000) conducted a detail literature review of the historical perspective of distance learning. According to this review, Wedmeyer (1971) changed the 'correspondence study' focus of distance learning and instead attributed an independent study focus for distance learning. The focus on the pedagogical assumptions of independent study was a shift from the world of correspondence study dominated by organisational and administrative concerns to a focus on educational issues concerning learning at a distance. Communication, pacing, convenience and self determination of goals and activities were also associated with independent study.

Holmberg (1989) brought in a different perspective by arguing that distance education is a friendly conversation fostered by instructional materials and it is the responsibility of course developers to create this simulated conversation through well-written materials. This definition, however, limits distance learning to a one-way communication as the role of the teacher is largely reduced to a set of written instructions. Contrasting this view, Moore (1990) argued that transactional distance is pedagogic and not geographic and need special organisations and teaching procedures thereby identifying the importance of structure and dialogue. According to Moore (1990) the most distant program has low dialogue and low structure while the least distant has high dialogue and high structure. To this Moore (1990) added the dimension of learner autonomy and teacher control. He defines autonomy of the learners as "the extent to which in a programme the learner determines objectives, implementation procedures and resources and evaluation (Moore, 1990: 13). The polarisation between the two extremes appears to conceptualise autonomy as less a

function of personal responsibility and more a function of structure and the learning materials. Garrison (1989) provided a sustained two way communication as the most important aspect of educational experience thus emphasising a continuous social discourse. By this theory, shared control was seen to be reflective of the transactional nature of an educational experience and reduces learner isolation. Henri (1992) provided his transaction based psychosocial model which specified the collaborative view of teaching and learning by coding the DL tools to enhance the nature and quality of the discourse. Peters (2000) focuses on computer mediated communication (CMC) enabled distance learning as a significant improvement in DL. However, his theory took into account that face-to-face discussion can only be reproduced in part and indeed in a reduced form by mediated means. Here Peters (2000) identifies an important area of needed theory development when he rightly (correctly?) notes the difficulty of replicating face-to-face interaction by mediated means. The theories discussed in this section reflect the progression of a theoretical development of the field of distance education and the evidence suggests that advances in communication technology has rendered the structural constraint of distance a relatively minor design challenge. The next section investigates the various CMC tools that enable DL.

CMC TOOLS FOR DISTANCE LEARNING

The initial literature review suggests that a lot of tools have been developed to facilitate DL courses (Dede, 1996; Wilson and Whitelock, 1997). Several CMC tools are packaged within DL tools for course delivery. 'Blackboard' is a very common tool used for both for online course delivery as well as a portal for distribution of materials. Blackboard is considered a Virtual Learning Environment (VLE) for DL. Some of its functionalities include information services, communication services, assessment services and content management services. The communication services allow tutors to create discussion forums within which conversations can take place between some or all of the students who are registered on the VLE. The 'conversations' can take place asynchronously (i.e. students do not have to be using the VLE simultaneously) through the posting of messages to selected discussion forums. In this way, whole-group or small-group discussion can be supported. The overall facilities provided by blackboard are as follows (Barrett, 2003):

- **Information Services:** A range of documents are available to students via *Blackboard*; these include programme regulations, unit specifications, staff and student information and programme and unit schedules.

- **Communication Services:** Students can use personal and group email facilities from within *Blackboard* and have access to a range of whole and small group discussion forums. These include a chat forum and a range of dedicated programme-focused and task-oriented forums.

- **Content Management:** Students can access course materials (e.g. slides and notes from taught sessions) from *Blackboard* as well as a range of supplementary literature and materials. Assignment specifications and guidance are also available on *Blackboard*, as well as generic study materials (for example concerning writing assignments and conducting literature reviews).

Apart from this videoconferencing is used for DL. Videoconferencing needs extra facilities, therefore most of the time they are carried out between universities and other institutions (other universities or companies who also possess these facilities).

When universities want to deliver courses to students registered as 'split site' students, this mode of course delivery is used.

Another method that is increasingly becoming popular for distance learning is 'web conferencing'. Several web conferencing tools are available to deliver online lectures over the Internet. For instance, SCPM at Salford utilizes 'horizonwimba' (Http://www.horizonwimba.com) as its tool to deliver both masters programmes and PhD sessions over the Internet. Out of the functionalities available in horizonwimba, SCPM uses the voice transfer, application transfer and chatting facilities to 'transact' synchronous lectures. Use of the web cam facility is currently being pursued and its effectiveness is currently being explored in comparison with other DL courses conducted elsewhere. One of the problems both tutors and learners encounter in utilising web conferencing is the time that it takes to learn the various functionalities of the tool. Particularly with blackboard and horizonwimba, the students are invited to participate at free tutorial sessions before their actual online lectures commence to overcome their fears of using the technology. Further, some of the learners find various connectivity problems due to the nature of their connection to the Internet. For example, applications such as Microsoft PowerPoint slides are transferred at a relatively slower pace than voice, so that some students complain that the commentary does not run concurrently with the particular slide in question thereby highlighting problems relating to synchronicity. Some of the application providers have intervened in this instance to find solutions, so that the connectivity problems are addressed to fit in with the lowest common denominator with respect to connectivity problems i.e to tune the applications to suit dial-up connections rather than high speed broad band connections.

Different functionality requirements, available infrastructures and basic individuality of DL courses attract different products for launching internet based DL courses. Two major streams of selections are in practice in today's context. One approach is to purchase off the shelf commercial products which provide extensive technical support in terms of configuration and maintenance. This includes packages like Horizonwimba and Blackboard. However, it is often pointed out that the features available within these commercial packages are generic and have problems to address the specific needs of tutors and students of a particular course. It is arguable whether all the features available within these packages can really add value to DL courses.

On the other hand, there is a recent trend to develop custom VLE applications based on open source projects like Moodle (www.moodle.com) and Bodington (www.bodington.org). Even though these software help in saving on licensing fees, it does not mean that the organization can host an internet based DL course without any expense. Even though often open source projects have support systems based on the user community, those projects lack official support systems. Further, the cost of implementing these open source software based VLEs has to think in connection with the other associated costs like staff training, in house technical expertise, etc.

Recent research supports that CMC promotes autonomy and develops reflective skills as well as reducing feelings of isolation often experienced by distance learners (Lewis et al, 1997; Mason, 1998). A survey done by Rahm (2004) revealed that several computer based tools are heavily relied upon within distance learning courses. This includes use of multi-person computer interactions such as chat rooms or listservs (20 percent of respondents reporting this activity), e-mail interaction with remote students (53 percent), as well as use of the Internet and the World Wide Web for class or

program delivery (43 percent). Use of other technologies for delivery is minimal with 20 percent reporting the use of satellites and 16 percent the use of public television.

The theories discussed in the previous section and the various tools discussed in this section reveal that advances in communication technology has rendered the structural constraint of distance a relatively minor design challenge. For example, some of the students registered for SCPM's DL masters courses are from different parts of the globe belonging to different time zones. Therefore in this instance it is the nature of a sustained educational transaction at a distance that must be described, understood and abstracted in a manner accessible to the broader field of educational practice. The next section identifies the research problem by developing this current thinking of integrating CMC enabled distance learning with the necessity to facilitate a continuous social discourse between tutors and learners.

RESEARCH PROBLEM

The previous section argued the importance of the transactional aspect of distance learning as the biggest challenge as highlighted in evolution of theories in the field. This is mainly due to the advances in computer mediated communications (CMC) and the Internet as a common meeting place (or space) for the tutors and learners. We look at CMC for DL to broaden the research context in this section. According to Carty (1999), CMC tools for DL encompass the modes of synchronous (using same time communications), asynchronous (communications that do not require participants to exchange information at the same time), one way (information delivered from one point to one or many other points), two-way (any communication in which the flow is bi-directional but not limited to synchronous), multi-point (information delivered simultaneously from one place to many other places) and multi-cast (usually consisting of transmission of a video or audio clip to the computers of many users). The advantages of distance learning, utilising either single or a combination of the above modes compared to a physical classroom setting are (Hellman, 2003).

- greater access to education that it offers, mainly to the 'non traditional' student (generally a person who is not able to attend a conventional in-class university course);

- flexibility of scheduling of lectures;

- possibility of proceeding at one's own pace;

- opportunity to study without having to travel and without leaving home and in the best funded programmes; and

- individualised attention from the instructor.

Other advantages of distance learning address savings in physical space such as student housing, parking spaces other physical infrastructure (Mathews, 1999).

With the increase of DL programmes being offered there has been a corresponding increase in both synchronous and asynchronous mechanisms being developed to facilitate course delivery. Also the ability of DL tools to deliver overall learning outcomes has been dealt with to a certain extent by considering student perspectives (Wilson and Whitelock, 1997, 1998; Whatley and Bell, 2003). But, the degree to which these tools satisfying social aspects of a classroom setting (e.g. guidance and support, body language, feedback, interactions with other learners etc.,) particularly addressing synchronous and two way modes has not received adequate consideration

in existing literature [see Diaz and Cartnal (1999) for a comparison of distance learning and a face-to-face classroom setting]. The importance of this is pointed out by Whatley (2004) with the use of Kolb's (Kolb, 1984) stages of experiential learning (concrete experience, reflective observation, conceptualisation and active experimentation). According to Whatley (2004:55)

> "Students undertaking online courses should be given a similar opportunity (Kolb's stages of experiential learning) to experience team working, but where face-to-face contact is not possible, technologies may be able to provide additional resources to make the online experience comparable"

A student satisfaction survey that SCPM carried out also suggests that a significant number of DL students perceive a gap existing between their experiences compared with experiences of other students who attend full time courses. This is reiterated by Whatley (2004) that online learners, who rely on Internet connections to communicate, often feel a 'sense of isolation' from the support of others. This paper seeks to address this research problem of how this 'sense of isolation' is dealt with by appropriate interfacing of the social dimension with DL tools to improve the effectiveness and efficiency of the interactions between the DL facilitator and learners during online DL settings. Further, it attempts to maintain the interconnectedness of the historical evolution of theory emphasising a continuous social discourse between DL tutors and learners and new CMC facilitated DL tools.

JUSTIFICATION OF THE RESEARCH

This research is justified based on several factors. Particularly within the construction industry, emphasis of social aspects of a classroom setting is an important factor which impacts on student numbers registering to undertake DL courses. For example, a significant number of construction workers are site based and need a convenient way of undertaking a course of study at their own pace, time and place. This creates the main source of demand for DL courses within the construction industry. Therefore marketing of DL programs occupy the forefront of activities within many universities in the UK and specifically within construction schools. At SCPM, the marketing of DL courses is fortified and driven mainly by accreditations of various professional bodies on its Masters and PhD programmes. Further, the advantage that students have being able to follow courses from overseas and the overall brand name developed for construction related courses also help in the uptake of DL courses in construction. The study focusing on social aspects of a classroom setting is a major issue that needs appropriate consideration within DL. Psychological attitudes of teachers and learners play a major role within social aspects of a classroom setting. There exist various psychological attitudes for utilising CMC as an instructional approach within DL (Katz, 2000). Research studies have established that psychological attitudes such as independence, creativity, tough-mindedness, sociability, risk-taking, stimulus-and sensation-seeking are key attitudes connected with use of CMC in DL. In a study done on school teachers, Katz (2000) showed that those who possessed the above attitudes were more amenable to the use of CMC in instruction than teachers not typified by the same attitudinal constructs. A similar situation has been found with elementary and high school students. According to Dunn & Ridgway (1991), students who held attitudes such as positive self-image, positive social-image, independence in the learning process, self-confidence in the learning process, satisfaction with learning, internal locus of control, level of control of learning, creativity, and motivation for study were significantly more positive towards the use of CMC than

students not typified by the same traits. This reveals the complexity of the social aspects of a classroom setting as it encapsulates individual attitudinal problems of both teachers and learners.

CONCLUSION AND THE WAY FORWARD

This paper highlights the findings from literature on how to improve the effectiveness and efficiency of CMC mediated DL courses. Until recently most DL theory was dominated by organisational and structural assumptions and not so much by the social aspects of the transaction element. As significant developments have taken place in the development of CMC for DL, the actual physical distance between tutors and learners have lost its importance. CMC for DL can even simulate an actual classroom setting. Therefore improving the effectiveness and efficiency of DL encompasses the social dimension or the transaction element of course delivery as a significant factor. The one year TLQIS project at SCPM focuses on this aspect of theory development and envisages conducting of interviews and case studies to develop this area. This paper dealt with the initial literature review, problem definition and justification for the research on identifying the importance of a continuous social discourse between tutors and learners. As the final outcome of this research it is proposed to develop guidelines to improve social outcomes within CMC mediated DL targeting both tutors and learners.

REFERENCES

Barrett, E. (2003), "Spirit, Trust, Interaction and Learning: A Case Study of an Online Community of Doctoral Students", *British Educational Research Association Annual Conference, Heriot-Watt University, Edinburgh,11-13 September 2003*

Carty, W. (1999), "Distance education in the developing world", *The advising quarterly for professionals in international education*, Summer 1999.

Dede, C. "Emerging Technologies in Distance Education for Business." *Journal Of Education For Business*, Volume 71.4, pp197-204.

Diaz, D.P. and Cartnal, R.B. (1999), "Students' learning styles in two classes: online distance learning and equivalent on-campus", *College teaching*, Volume 47 (4), pp 130 – 135.

Dunn, S. & Ridgway, J. (1991) Computer use during primary school teaching practice: a survey. *Journal of Computer Assisted Learning*, Volume **7**, pp 7–17.

Garrison, G. (2000), "Theoretical challenges for distance education in the 21st century: A shift from structural to transactional issues", *International review of research in open and distance learning*, Volume 1.1, pp 1 -17

Hellman, J.A. (2003), "The riddle of distance education: promise, problems and applications for development", *Technology, business and society programme paper series*, No. 9, United Nations Research Institute for Social Development.

Henri, F. (1992), "Computer conferencing and content analysis", In A. R. Kaye (ed.) *Collaborative learning through computer conferencing: The Najaden papers,* Berlin: Springer - Verlag

Holmberg, B. (1989), *Theory and practice of distance education*, London: Routledge

Http://www.horizonwimba.com (accessed on 3/04/2005)

Http://www.moodle.com (accessed on 25/05/05)

Http://www.bodington.org (accessed on 25/05/05)

Ingirige, M.J.B. (2004), "A study of knowledge sharing in construction alliances", Unpublished PhD thesis, University of Salford (November 2004)

Katz, Y.J. (2000), "Attitudes affecting college students' preferences for distance learning", *Journal of computer assisted learning*, Vol. 18, pp 2-9.

Kolb, D. (1984), "*Experiential learning*", London: Prentice Hall.

Lee, J.S, Cho, H., Gay, G., Davidson, B. and Ingraffea, A. (2003), "Technology acceptance and social networking in distance learning, *Educational technology and society*, Vol. 6.2, pp 50-61.

Lewis, T., Gould, M. et al (1997), "Computer conferencing and the continuing professional development of teachers in the post – 16 sector", in Field, J. (Ed.) *Electronic pathways: adult learning and the new communication technologies*, England: NIACE.

Lindner, J.R. (1999), "Usage and impact of the Internet for Appalachian chambers of commerce", *Journal of applied communications*, Vol. 83.1, pp 42-52.

Mason, R. (1994), "Using communications media in open and flexible learning", London: Kogan page.

Mathews, D. (1999), "The origins of distance education and its use in the United States", *T.H.E Journal*, September 1999.

Moore, M. (1990), "Recent contributions to the theory of distance education", *Open learning*, Volume 5.3, pp 10 - 15

Peters, O. (2000), "The transformation of the university into an institution of independent learning. In T. Evans and D. nation (Eds.), *Changing University teaching: Reflections on creating educational technologies*, PP 10 – 23.

Rahm, D. and Reid, B. J. (2004), "Tangled webs in public administration: organizational issues in distance learning", PAMIJ

Wedmeyer, C. A. (1971), "Independent study. In R. Deighton (Ed.), *Encyclopedia of Education IV*, New York, McMillan, pp 7 - 22

Whatley, J. (2004), "An agent system to support student teams working online", *Journal of information technology education*, Vol. 3, pp 53 – 63.

Whatley, J. and Bell, F. (2003), "Discussion across borders: benefits for collaborative learning", *Education media international*, Vol 40.1, pp 139-152.

Wilson, T. and Whitelock, D. (1997), "Monitoring a CMC environment created for distance learning", *Journal of Computer Assisted Learning*, Vol. 13.4, pp 253 – 260.

Wilson, T. and Whitelock, D. (1998), "Monitoring the online behaviour of online learning students", *Journal of computer assisted learning*, volume 14, pp 91-99.