

# Improving co-learner interactions through Web-based online assessments within distance learning settings

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## Abstract

Distance Learning (DL) is an educational model that is fast growing both in the UK as well as in the international education context. It has come into prominence with the advent of the internet technology particularly during the last two decades of the 20<sup>th</sup> century. Due to the nature of delivery of DL programmes, the methodology in which students are assessed varies from one programme to another. One of the major influencing factors for achieving intended learning outcomes in a programme is the assessment strategy adopted. Tutors in DL programmes have adopted various methods of assessments that could broadly be described as formative and summative assessments. A well documented formative and summative feedback for learners, especially early on in a course, will facilitate in their learning and provides opportunities for students to gain insight into their understanding of the course content. Learners often express their need for more empowerment within their modules to enhance their active involvement and interactions within the programmes. This is the main focus of this ongoing research under the Teaching Learning Quality Improvement Scheme (TLQIS) of the University Of Salford, UK.

This paper disseminates the first stage of the research project. The paper first examines literature within the area and explores the various online assessment tools available that can be incorporated to DL. It then sets out the overall methodology and conducts two case studies of DL courses within the School of Built Environment (SOBE), University of Salford. The next stages of this research project will evolve into DL courses conducted in other schools and faculties at University of Salford and other Higher Educational Institutes (HEIs) both in the UK and overseas. It is expected that the final results of this study will lead to recommending of guidelines on improving co-learner interactions within DL settings.

**Keywords:** Distance Learning (DL), co-learner interactions, web-based online assessments

# 1. Introduction

Advances in information technology (IT) is continually evolving; opening up additional channels for today's higher education (Chen *et al*, 2001). Distance education technologies have become more prominent during the last decade of the 20<sup>th</sup> century (Ingirige *et al*, 2005). Moreover, Chen *et al* (2001) noted that the application of IT have allowed universities to deliver multimedia course contents and enable students to communicate with their instructors and fellow students in both synchronous and asynchronous formats; hence making distance learning (DL) possible. DL, an educational model in which the student and the instructor are separated by time and space, is considered the current fastest growing model of domestic and international education (Poley, 2000).

Distance education had been around for more than a century, which according to Belanger and Jordon (2000), the history of technology-based DL was correspondence education, which started in Europe and the United States in the mid 19<sup>th</sup> century. Web-based technologies (WBT) in particular have expanded the interactive capabilities of distance education from solely asynchronous communications with long delays in response to highly interactive class meetings via text, e-mail, video and many more (Murphrey, 2001).

In the domain of higher education (HE) in the construction industry, DL has become a major source by which many HE institutes conduct their courses, particularly at postgraduate level. At the University of Salford, the School of Built Environment (SOBE) itself utilises the distance education technology tools in delivering Masters and PhD programme over the Internet (Ingirige *et al*, 2005). The new developments in technology have impacted the overall delivery process of the DL construction programme. It has been considered that one of the major influencing factors for achieving the intended learning outcomes of these programmes within an overall information and communication technology (ICT) enabled delivery process is the assessment strategy adopted.

Assessments can be considered as a significant way of interaction and providing feedback from the instructor to the learner and a medium for the co-learners to interact with each other. And, due to the significance of this area, SOBE received funding to conduct a one year study to improve the interactions of co-learners through web-based online assessments tools within DL settings through the Teaching and Learning Quality Improvement Scheme (TLQIS) within the University of Salford. This paper reviews literature within the field and examine the shortcomings and the overall utility within the available tools in improving co-learner interactions.

The paper has been designed and structured as follows; first, it will describe the methodology adopted. Then, it will look into research problems and subsequently the literature within the area;

e.g. definitions and characteristics of DL and enlisting available web-based assessment tools within the DL settings. Then, through two case studies of DL courses within the School of Built Environment, University of Salford, it is intended to identify currently used web-based online assessments tools within the DL settings and other issues within the area in improving the co-learner interactions within the DL. Finally, this paper concludes by suggesting the way forward.

## **2. Methodology**

The research methodology approach adopted for this paper embraces the distillation of core research material gathered from a detailed literature review. The literature review encompassed concepts and issues surrounding DL. Two DL Master programmes (MSc 1 and MSc 2) within the School of Built Environment, University of Salford were looked into and used as case studies to achieve the following objectives:

- i) To identify the delivery methods currently implemented within the DL settings;
- ii) To identify the methods of assessment currently implemented within DL;
- iii) To identify the available web-based online assessment tools used within DL;
- iv) Identify gaps within the available tools and their capabilities in improving co-learner interactions;
- v) Identify barriers in improving co-learner interactions within DL;

Interviews were conducted with the DL tutors in achieving the above mentioned objectives. The result and conclusion from this paper will recommend the way forward and inform the next stages of this research project.

## **3. Research Problem**

Learners often express their need for more empowerment within some of their modules to enhance their active engagement. With all types of learning, including web-based learning, it is useful for students to receive constructive, timely and relevant feedback on their progress even within DL settings. Therefore, a mix of computer marked and tutor marked essays could be adopted for summative assessments. Online marked assessment is sometimes constrained by the medium in which it is operating. Computer marked assessments alone are not appropriate for marking or giving feedback on assignments such as essays or projects that require more than the mere production of knowledge. With the increase of DL programmes being offered there has been a corresponding increase in both synchronous and asynchronous mechanisms being developed to facilitate these assessments (Dede, 1996; Wilson and Whitelock, 1997).

Despite addressing the needs of the programme in developing a regime of assessment strategies, most learning communities express a feel of isolation. However, barriers in the form of resource constraints, sometimes affect the provision of pedagogic requirements such as maintaining appropriate co-learner interactions within the masters DL programmemes. This paper aims to

address issues within the area in improving the co-learner interactions within the DL (e.g. factors and barriers in improving co-learner interactions, gaps and flaws within the available tools, etc) and proposing a way forward.

## 4. Distance Learning

### 4.1 Definitions and Characteristics

Several definitions have been cited for the term DL; among others; Majdalany and Guiney (1999) define DL as “instruction and learning practice utilising technology and involving students and teachers who are separated by time and space”. Jonassen (1992) defines DL as the volitional control of learning by the student rather than the distant instructor, while Perraton (1988) and Verduin and Clark (1991) define it as the separation of the teacher and the learner in space and / or time during at least a majority of the instructional process.

Hall and Snider (2000) characterised DL with three criteria; (i) a geographical distance that separates the communication between the trainer and the participant, (ii) the communication is two-way and interactive and (iii) some form of technology is used to facilitate the learning process. Keramiyige *et al* (2006) supported this view by considering the two significant characteristics of DL; which is (i) the distance between the tutor and the learner (either geographically or timely) and (ii) the learner centred learning mechanisms as opposed to the teacher centred learning in a traditional classroom based learning environment.

The additional characteristics of DL that has been discussed by Keegan (1986) include:

- The influence of an educational organisation both in planning and preparation of learning materials and in the provision of student support services; which distinguishes DL from the private study and teach-you programme;
- The use of technical media, print, audio, video or computer to unite teaching and learner and carry the content of the course;
- The provision of a two-way communication so that the learner may benefit or even initiate dialogue; a characteristic which distinguishes DL from the other uses of technology in education; and
- The quasi-permanent separation of the learning group throughout the length of the learning so that people are usually taught as individuals and not as groups, with the possibility of occasional meeting for both didactic and socialisation purposes.

There are many terms in relation to distance education and training, defined as follows in Table 1 (Du Mont, 2002):

Table 1: Definitions of Terms(Du Mont, 2002)

<b>Term</b>	<b>Definition</b>	<b>Source</b>
Asynchronous learning (sometimes referred to as Networked learning)	“A type of learning in which learners and instructors use computers to exchange messages, engage in dialogue and access resources” at any time and any place.	Commonwealth of Learning (2000) and Schocken (2001).
Distance education	“Planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques and special instructional techniques, and special method of communication by electronic and other technology, as well as special organisational and administrative arrangements.”	Moore and Kearsley (1996)
Distance learning	“Instructional and learning practice utilising technology and involving students and teachers who are separated by time and space.”	Majdalany and Guiney (1999)
Distributed learning	“Learning environment [which] exists among a dispersed student population, is structured according to learner needs, and tends to integrate traditional institutional functions (e.g. classroom and library)...through both synchronous and asynchronous communication.”	Oblinger and Maruyama (1996)
e-Learning	“Can be a subset of distributed learning. Relies on digital content, experiences through a technology interface, and is network-enabled. Collaboration is a desirable feature of e-Learning...”	Lundy, Harris, Igou and Zastrocky (2002)
Open learning	“An arrangement in which learners work primarily from self-instruction, completing courses structured around specially prepared, printed teaching materials, supplemented with face-to-face tutorials and examinations.”	William, Paprock and Covington (1999)

According to Du Mont (2002), definitions of DL exist which emphasise the *process* of educational and structure. Sherry (1996) noted that the terms “distance education” or “distance

learning” have been applied interchangeably by many different researchers to a great variety of programmes, providers, audiences and media. Berge (1998) however note that there is a difference between the term ‘distance education’ and ‘distance learning’. According to Berge (1998), distance education is seen as the formal process of DL, with information being broad in scope; e.g. college courses. DL however is seen as the acquisition of knowledge and skills through mediated information and instruction, encompassing all technologies and other forms of learning at a distance. In addition, Gotschall (2000) described DL as a broadcast of lectures to distant locations, usually through video presentations.

## **5. Distance Learning, Interactivity and Feedback**

Butler and Winne (1995) define feedback as information that a learner receives about his or her learning processes and learning outcomes. Moreover, Gagne (1985) mentioned that learners may find frequent feedbacks useful and feedback to learners may be essential to effective learning (Reiser and Dick, 1996). DL conditions usually constrain when, where and how DL feedback occurs, because feedback is a function of interactivity, and interactivity changes from traditional to DL environments (Wolcott, 1996). According to Ley (1999), an instructor in a traditional classroom can more easily interact with students by easily giving simple knowledge of result feedback with more complex feedback as students require or demand. In DL environments, most distance instructors lack the logistical support or the technology to return papers and answer questions during the same session.

Planning for adequate and useful feedback through web-based online assessments can lessen the DL instructor’s feedback burden, hence, improving co-learner interactions within the DL settings. Moreover, according to Ley (1999), without a feedback system in place, distance students engage in learning under the handicap of inadequate or no feedback at all. In traditional distance education settings, learners are often left to go through the process of learning in isolation with very little contact with tutors and peers, thus are confined to basic, 'static' interaction with material delivered through one-way media in the form of printed text, audio cassettes and/or video (Karaliotas, 1998). In addition, according to Karaliotas (1998), with the advent of new media and technologies, the use of affordable and well integrated two-way communication is now possible in distance learning, which in turn enables dynamic interactions.

According to Moore (1989), interactions take place in the learning environment in three ways; e.g. (i) with contents, (ii) with other co-learners and (iii) with instructors. This particular research concentrates more on the interactivity between co-learners in a DL setting. Karaliotas (1998) mentioned that DL environments offer plenty of opportunities for interaction with other learners, far more likely to be productive and complete than in traditional HE learning environments as they are independent of time and place due to their asynchronous nature, and more in line with the learning to learn process as they can be highly motivated and goal oriented. Interaction with learners takes place within collaborative activities, in threads of sociable exchanges, or philosophical and self-searching discussions. They are generated as; (i) asynchronous, Bulletin Board System (BBS) and email interactions and (ii) real-time moo and chat interactions. Asynchronous, BBS and email interactions seem to offer a more in depth

discourse as responses are spread over time, to the convenience of the participants, while real-time, moo and chat interactions offer a fuller experience and rich content for a later asynchronous follow-up.

Learners' abilities to interact with the instructor, the peers, and the content can affect their performance in DL. Acker and McCain (1993) mentioned that "interaction is central to the social expectations of education in the broadest sense and is in itself a primary goal of the larger educational process and that feedback between learner and teacher is necessary for education to develop and improve" (p. 11). Online interactions take into consideration the characteristics of the learners as well as the communication technology. The interactive features of the current computer-mediated communication (CMC) systems, such as two-way video and instant feedback, have provided more options for learner interactions. Moreover, Gunawardena *et al* (1998, pp. 141) have interpreted interaction as "the process through which negotiation of meaning and co-creation of knowledge occurs in a constructivist learning environment". Wagner (1998) however argues that interaction can serve as a means to an end of enhancing learning and performance. Learner interactions require planning and structure in order to achieve the goal of active learning. According to Rohfeld and Hiemstra (1995), tasks such as debates, guest lecturers/discussants, polling, brainstorming, or student moderated discussions via CMC networks can help to increase student interactions for learning. The principles of student-centered discussion accord the students the responsibilities of facilitating online conversations. When the activities and tasks become an integral part of the learning process, learner interactions can be conducive to learning (Chou, 2000). This is where this research emphasises that web-based online assessment would be able to help enhance co-learners interactions within a DL setting.

## 6. Assessment

In addition to interaction and feedback, assessment is also considered an indispensable part of teaching and learning (Govindasamy, 2002). It can be considered as a way of interaction and providing feedback from the instructor to the learner and a medium for the co-learners to interact with each other. Basically, assessment supports the learning approach a student adopts. According to Marcus (2006), a varied combination of assessment activities provides sufficient opportunity for the student to demonstrate learning, while several assessment options allow learners to respond to different evaluation strategies. The choice of assessment methods is an important decision in instructional design (Stephen *et al*, 2007). This is especially more important in a DL programme, in which students often focus heavily on formal assessment requirements. In addition, assessment choices should support intended learning outcomes and also consistent with the desired learning approaches (Stephen *et al*, 2007).

According to Govindasamy (2002), assessment is typically divided into two types, namely the summative assessment and formative assessment. While summative assessment is used to grade students to demonstrate students' achievement and involves in making a final judgment of the students' achievement relative to the predetermined objectives; formative assessment is used as a diagnostic tool for students and teachers to identify and improve areas of weakness (Williams,

2000). In short, the purpose of a summative assessment is to justify students' grades and a formative assessment help to gather information on what students know and what they can do.

Many researchers (Brown and Knight, 1994; Buchanan, 2000; Henly, 2003) have emphasised the importance of formative assessment in student learning achievement. A learning environment with formative assessment has numerous benefits for learners. Many studies indicate that integrating the DL environment with web-based assessment have positive results (Velan *et al*, 2002; Henly, 2003). Formative assessments refer to activities that are used to help students learn, e.g. short tests and quizzes, question and answer in a lesson, assignments, homework and so on. Buchanan (2000) showed that a web-based formative assessment strategy is able to improve student learning interest and scores. Formative assessment is often done at the beginning or during a programme, thus providing the opportunity for immediate evidence for student learning in a particular course or at a particular point in a programme.

Summative assessment is what students tend to focus on. It is the assessment, usually on completion of a course or module, which says whether or not you have "passed". It is usually undertaken with reference to all the objectives or outcomes of the course, and is usually fairly formal (<http://www.dmu.ac.uk/~jamesa/teaching/assessment.htm>) and comprehensive in nature which provides accountability and is used to check the level of learning at the end of the programme (<http://www.provost.cmich.edu/assessment/toolkit/formativesummative.htm>). For example, if upon completion of a programme, students will have the knowledge to pass an accreditation test, taking the test would be summative in nature since it is based on the cumulative learning experience. Programme goals and objectives often reflect the cumulative nature of the learning that takes place in a programme. Thus the programme would conduct summative assessment at the end of the programme to ensure students have met the programme goals and objectives and attention should be given to using various methods and measures in order to have a comprehensive plan. Summative assessments can be seen as necessary for accountability and guiding instructions, whereas formative assessments are necessary for learning.

Efforts to implement DL will eventually move towards total automation of administrating the teaching and learning processes by means of a software known as Learning Management Systems (LMS). According to Govindasamy (2002), generally LMS include test builder tools that automate the process of authoring questions. In addition, most of these tools offer easy-to-use templates for authoring automatically scored questions; e.g. multiple-choice questions (MCQ), true/false questions (TFQ), matching questions (MQ), or short answer questions (SAQ). However, essay questions, projects, assignments, and case studies have been totally omitted, yet this should not be taken to mean that these forms of assessment are not needed to perform valid and reliable assessment, as computer marked assessments alone are not appropriate for marking or giving feedback.

Having additional developers of current LMS were probably driven by technology in choosing the question builders to be included in the system (Govindasamy, 2002). Creating quiz questions, possible answer options, assigning weights to the answers, automatically scoring the

answers, and programme appropriate feedback for different answers provided by learners require a working knowledge of HTML, Java Script, and other programming languages. This is definitely too much to expect of instructors, therefore, the developers of the LMS probably felt it was necessary to provide instructors with these tools. In order to assess students by means of projects, case studies, assignments, and other artefacts of learning, what the instructor would normally do is to post the message on the bulletin board. Students would then be able to complete their assignments and submit their work to the instructor via e-mail or upload it as a web page for the instructor to assess manually (Govindasamy, 2002).

Upon receiving 'non-standardised' comments from tutors, students would then be encouraged to discuss the comments made with other co-learners within the DL community through discussion board participations and other medium of interactions. This is considered as a way to encourage co-learner interactions within the DL settings. Even while in the process of completing the projects, case studies, assignments and other forms of assessments, students are encouraged to discuss and interact with other co-learners within the DL community.

## **7. Web-Based Assessment Tools Available For DL**

Educators usually spend a lot of time in creating assessments to measure students' knowledge and comprehension. Among the advantages of educational technologies are the web-based assessment tools made available to provide feed-back and improve co-learner interactions listed as follows (Ley, 1999):

- *Discussion board participation*  
According to Savage (1999), students seem to perform better when the discussion boards (or asynchronous communication) are required, where participation is 'rewarded' by a grade. This incentive of a grade brings a higher level of participation to the discussion, where students engage in dialogue begun by the instructor but often taking off on its own soon after (Greenlaw and DeLoach, 2003). Moreover, students then become co-constructors of the materials, examine alternative viewpoints and reach a consensus on a topic together (Greenlaw and DeLoach, 2003). Hence, discussion board participations can be seen as a mechanism in improving the interactions between co-learners within the distance learning settings.
- *Online quizzes*  
Online quizzes enables the instructor to regularly assess student understanding of the materials presented (Martyn, 2003), thus keeping the instructor on track of the students' performance.
- *Electronic paper and project submissions*  
Paper and project submissions can be performed using the Digital Drop Box, or file sharing. By submitting the paper electronically, students do not have to make physical contact with a

particular location in order to submit, and, there is less chance of the instructor losing the paper (Ley, 1999). In addition, an electronic receipt is automatically generated when the instructor receives the submission, enabling accurate records to be kept of who submitted the assignment and when (Thomas *et al*, 2002).

- *Reading outside of the assigned textbook (including hyperlinks and electronic formatted documents)*

By posting hyperlinks to sources of information, and labelling them as required or recommended, the instructor can share these sources of information with students very quickly and easily at any point during the course (Horton, 2000; Palloff and Pratt, 2001). This therefore also encourages discussions and interactions between co-learners on the topics and information shared by the instructor.

The internet also offers helpful resources that can be used to reduce the time it takes to create rubrics for projects, experiments, portfolios, and other performance-based items. There are also online resources to generate traditional, formative and summative assessments such as True/False and multiple choice questions.

## **8. Web-Based Assessment Tools within the School of Built Environment, University of Salford.**

Based on the case studies conducted on the two DL Master programmes within SOBE, the following results have been achieved:

### **8.1 MSc 1**

This programme delivers lectures through “Horizonwimba” and corresponds with the distance learners through emails generally. “Horizonwimba” is being used to accommodate for the need of using audio and visual modes of communication between the tutor and the learner. The visual and audio communication is accomplished through a web conferencing based system capable of establishing video and audio based communications between the tutor and the learner. It uses the voice transfer, application transfer and chatting facilities to deliver synchronous lectures. 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 (Keraminiyage *et al*, 2006).

As mentioned in the previous heading, electronic paper and project submissions are seen to be one of the web-based assessment tools made available to provide feed-back and improve co-learner interactions. This programme has adopted written coursework comprising legal scenarios as a method of assessment which students will then submit via Blackboard (Bb) once completed. Any questions or enquiries regarding the coursework can be discussed with the DL tutor through email. There was no emphasis on co-learners interactions when deciding on the method of assessment to be implemented for this programme. Although this type of assessment is considered to be one of the web-based assessment tool available; it does not really encourage

co-learners interactions unless if the DL tutors promotes the students to discuss and interact with co-learners by starting up a discussion forum in conjunction with the coursework in a discussion board or any other means of communication medium.

According to the DL tutor, no other web-based assessment tools have been used within this programme. There have been reports from students regarding the late feedback that they get back from the DL tutors. From the interview conducted, the DL tutor suggested that co-learners interactions through web-based assessment tools could be improved by conducting more group work assignments, support more interactions and discussions through discussion boards, emails and chat rooms.

## **8.2 MSc 2**

This programme is taught via the internet with support that takes the form of an induction and other events such as networks that are all optional, plus a summer school that has a compulsory attendance requirement. Lecture materials are presented in accessible format which comprise text, diagrams and drawings (for which descriptor alternatives are available) and video presentations (for which audio and text captioning are available). Tutor support is provided via online tutorials, group discussions and individual communication (i.e. through email). Learners not only can engage with other co-learners formally through tutorials and email based group discussions but also informally through the student common room. The discussions and tutorial support is given both synchronously (time tabled online discussion forum) and asynchronously.

The method of assessment for this programme is designed to evaluate the student's abilities in achieving the intended learning outcomes for the module. During the start of the module, students are provided with details of learning activities and assessment dates. Students then participate in learning activities and non-assessed formative feedback is provided to them during the module to assist with motivational reinforcement. For each module, students are required to complete a piece of end assessment and the nature of this varies according to the module. In one of the modules, students' work was authenticated by practical assessment through an access appraisal and audit. The end assessment is considered as an electronic paper and project submission.

Based on the information given by the DL tutor, although it is found that no specific web-based assessment tools have been used for this programme, interactions between co-learners is basically encouraged through tutorials and email based online discussion forum as mentioned before, as well as interacting through the student common room. This is in line with the web-based assessment tool made available to provide feed-back and improve co-learner interactions as mentioned by Ley (1999).

## 9. Conclusion and Way Forward

The literature review along with the findings from the initial interviews done on DL programmes within the School of Built Environment, University of Salford, UK have provided the methodological basis for this paper.

Most of the DL programmes within SOBE delivers lecture materials in accessible format which comprise text, diagrams and drawings (for which descriptor alternatives are available) and video presentations (for which audio and text captioning are available) through online environments such as the “Horizonwimba”. The delivery methods currently used within the programmes are both synchronous and asynchronous. The result from this study identifies that there is a lack of implementation of specific web-based assessments tools within the DL settings as per the various online tools available for online learning. However, several structural considerations of using some of the DL tools such as the nature of the student community (students with various disabilities) imposes constraints on the use of some of the tools although they provide opportunities for improving interactions among the co-learners.

Based on the in depth literature, web-based assessments tools have been found to help improve co-learners interactions within DL settings. Most DL programmes have just gone for the traditional assessment method, which is the written coursework due to lack of emphasis on co-learners interactions when deciding on the method of assessment to be implemented. Co-learners interactions within this method of assessment could be improvised by encouraging learners’ interactions and discussions through discussion boards, chat rooms, etc. Written coursework could also be done as a group work instead of individual.

Further interviews will be conducted within SOBE for all the other DL Master programmes, which will enhance the guidelines on improving co-learner interactions within DL settings. The next phase will concentrate on other schools, faculties at University of Salford and finally on other HEIs in the UK and overseas.

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