

Developing Self Assessment through the Web-Based Learning Environment and its Effect on Knowledge Construction

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Abstract

In recent years teaching and learning methods and practices have been drastically transformed by rapid developments in Information and Communication Technologies (ICT) in many realms. One of the most effective technology-based possibilities for imparting education is Web-Based Learning Environment (WBLE). On the other hand, in response to the needs of constructivist approaches to learning and learner, and to improve upon the insufficiency and shortcomings of traditional assessment, new forms of assessments need to be explored in technology-based learning environments. Self assessment can be considered as a qualified form of assessment in the WBLE in order to keep learners active in the learning process. However, many researches have been carried out on self assessment but not in WBLE. So, the main purpose of this study is to develop self assessment in the WBLE that would be as a tool for learning instead, of learning to help learners to construct their knowledge effectively.

Introduction

Developments in information and communication technologies (ICT) have influenced the educational methods and activities. The communication revolution offers new and different solutions for delivering instruction and learning outside traditional classes. Educators have emphasised incorporating such technologies to education. With the advancement of ICT and the incorporation of it in teaching and learning, the active role of the learner has been significantly improved. Web-based learning, as a growing acceptable type of delivery instruction, offers many possibilities and opportunities such as; the autonomy of choosing the time to learn anywhere, anytime and the way learners' desire and also a collaborative learning environment. The question is not anymore, whether network based education generally and web-based learning particularly can equate to face-to-face learning, but rather about providing high quality and effective learning. On the other hand, constructivist approaches to learning have an innovative and crucial role in supporting learners' knowledge construction. Learners are no longer viewed as passive recipients of information and not a "*Tabula Rasa*" according to positivist approaches which has to be filled or a container into which new knowledge has to be dropped instead, the learner is seen as an "*active constructor*" in the process of learning and instruction (Gielen, 2004).

How can learners improve the quality of their learning and how can teaching and learning practices be designed and implemented to support them in this process? How can a learner build his knowledge and have a more effective role in forming learning outcomes? What skills/techniques do learners have to acquire and apply to make the learning more effective and deeper in the new learning environments? To what extent learners could individually act in the new approaches to learning and instruction? Through what mechanisms could learners perform their active role in the learning process? These are kinds of questions, from my point of view, which educators and researchers are supposed to try to investigate and find solutions for them.

In order to develop web-based learning, we must pay more attention to learners' characteristics and help learners to be more aware of their learning processes and give assistance as to how to develop strategic learning skills. Technological learning environments and platforms should be '*intelligent*' in supporting students with different abilities to grow as learners (Virtanen, *et al.* 2003, p.5). In response to the needs of learning theories such as constructivism, and to improve upon the inefficiency and defects of traditional assessment, various forms of assessments should be explored. Thus, this study focuses on self assessment as a tool for improving learning in which learners perform an active role in the web-based learning environment (WBLE). A lot of research has been conducted on self assessment and findings showed many advantages for self assessment in the learning process. However, earlier studies have mostly been carried out in the traditional teaching and learning setting but, as far as I am concerned, the number of studies that has particularly focused on self assessment in the WBLE regarding learners' knowledge construction are rare or nonexistent. So, the main purpose of this study is to investigate how self assessment can be developed in the WBLE, which would be in turn a tool for improving learning and helps learners to construct their knowledge effectively.

Theoretical and Conceptual Framework

Some learning theories have particular emphasis on the learner's active role in the learning process to control and manage their learning and construct their knowledge. Constructivism for instance, has had the major role to establish and promote the learners' active roles and their abilities in the learning process. Accordingly, the

conceptual framework is based on Constructivism. This theory encourages learners to take responsibility for their learning. Vygotsky's social constructivism emphasises collaborative learning. His perspective on learning and knowledge construction has inspired educators to define, design and establish learning environments integrated with technology to have learners more active in their interpretation of the environment and building their knowledge. Deep learning can only be realised by totally engaging the learners in knowledge construction as opposed to knowledge transfer. Constructivism and also semiotics guide us in devising a model for an e-learning environment and instructional design principles for courseware in this environment. Constructivism claims that learners construct their own reality, or at least interpret it based upon their perceptions or experiences. According to constructivism knowledge is our interactions with the environment. The learners act and interact within the flux of events and actions. Through these acts, they build their world and construct their knowledge (Sun, *et al.* 2003). The basic and most fundamental assumption of constructivism is that knowledge does not exist independent of the learner rather, knowledge is constructed personally and focuses on learner as an active constructor. Constructivist approaches eliminate grade and standardised testing, instead assessment becomes part of leaning process so that learners play a larger role in judging their own progress. In constructivist learning environments, evaluation is constant and part of learning experience and it is used to provide feedback to both the instructors and learners. Constructivist assessment and evaluation do not look for whether the learner obtained the one and only correct truth, instead its focus is on the ability of the learner to solve problems (Vrasidas, 2000).

As Sun, *et al.* (2003) mentioned, Semiotics on the other hand, as a discipline of the study of signs, has a strong influence on the way we understand the world which we live in and the way we conduct our work. The subjects of study of semiotics are all kind of signs. A sign is "something which stands for something else in some respect or capacity". Signs can be a verbal language, pictures, literature, motion pictures, theatre, body language, sound and more. Understanding is a subjective process where prior knowledge affects the interpretation of a given sign, and vice versa. Understanding the process of knowledge construction based on these two theories enables us to identify some important features of learning:

- Learning is a process of knowledge construction, rather than knowledge transfer or injection. Within semiotics the process of semiosis is deemed as a knowledge construction process whereby what we experience as reality is really prior cultural and personal coding. Knowledge, in semiotics, does not consist of objects or entities that we "obtain" but is better thought of as knowing or a process. We build ways of knowing – abilities of understanding and interpreting, which is seen as an affordance.
- Learning is subjective and personal as there is no single objective reality; knowledge construction is a process of personal interpretation of the perceived world and the negotiation of meaning. The process of semiosis enables us to structure our experiences and reveal the nature and culture of our understanding.

Adopting a semiotic organisational perspective and constructivist approach to affording opportunities for forms of assessment is deemed to be a useful combination. This approach affords learners the opportunity to interpret the multiple perspectives of domain context, guide learners to conduct and manage their personalised learning activities, and encourage collaborative and cooperative learning for critical thinking and problem solving. The combination of semiotics for understanding the organisational aspects of educational systems and constructivism that informs the development of WBLE assessment tools will underpin the study. A course should be designed in such way that participants can be facilitated and guided for their learning activities and empowered to mediate and control their knowledge construction to achieve their learning goals.

Another issue in the framework is metacognition. Metacognition has also been developed on learners' abilities to monitor their cognition and learning. Metacognition consists of both metacognitive knowledge and metacognitive skills or strategies. Metacognition involves active monitoring and consequent regulation and orchestration of cognitive process to achieve cognitive goals (Flavell, 1976). Metacognition refers to learners' conscious awareness of their own knowledge and their ability to understand, control, and manipulate their own cognition process (Peters, 2000). A key attribute of an effective learner is the ability to critically analyse one's achievement and progress. Metacognitive knowledge refers to acquired knowledge about cognitive processes, knowledge that can be used to control cognitive processes. And it includes the awareness of one's own personality, feelings, motivation, attitudes and cognitive styles (Tella, 2000) A subset of the trend of developing metacognitive skills is the relationship between metacognition and constructivist learning theory. Constructivist teaching and learning theory is an approach to learning that

locates cognition and understanding within the individual (Daley, 2002). Daley (2002) and Peters (2000) point out that how use of constructivist learning with its emphasis on self-reflection and knowledge construction can contribute to the development of skills in metacognition. Rivers (2001) states that metacognitive skills are generally divided into two types: self assessment (the ability to assess one's own cognition) and self-management (the ability to manage one's further cognitive development" (Imel, 2002). literature of self-assessment deals with the importance of learners being able to assess their knowledge and abilities. Researches indicate that learners who are skilled in metacognitive self assessment and therefore aware of their abilities are more strategic and perform better than those who are unaware (Rivers,2001)

The type of metacognitive skill that is considered in this study is Self assessment. Self assessment as a metacognitive skill, gives opportunities to learners to perform an effective role in the learning process; in fact, through the self-assessment they would apply mechanism/skills to control their learning and construct their knowledge. There has been an upsurge of interest in self assessment, as the role of self assessment both in learning generally, and in the development of professional competence has gained increased importance. The literature on self assessment deals with the importance of learners being able to assess their knowledge and ability. Self assessment is formative in that it contributes to the learning process and assists learners to direct their energies to areas for improvement.

Information and communication technologies offer a vast series of such opportunities that support learners to have an active role in the process of learning and assessing themselves. Technology provides essential tools with which to accomplish the goals of constructivist setting. Over the past decades there has been increasing interest in strategies that focus on providing high quality feedback to student on their own work and in relating this to getting learners to take a more active role in the management of their own learning. These developments have been taking place across the educational spectrum from primary to higher and professional education. This has led to a renewed interest in the idea of formative assessment that is assessment focused on the improvement of learning rather than on the judging of final achievements for purpose of credentialing (McDonald &Boud, 2003). Formative online assessment, however, is a possibility for learners to assess their knowledge and get immediate feedback. Can we use ICT to support teachers and learners to benefit from an effective and immediate feedback upon their work? "The use of online assessment has the advantage of enabling student responses to be marked and analysed with relative ease and speed. Online assessment (developed in accordance with the insights from the above theoretical discussion) would allow students to test their knowledge of a topic and get immediate feedback.

Important questions remain, however, about how and whether students organise, structure, and use this information in context to solve more complex problems" (Roos, 2002, P. 14) . Summative assessment on the other hand, doesn't lead to improving higher order thinking skills and is just used as a tool for assessing learning not for learning. As Dochy and Moerkerke (1997) pointed out traditional testing methods do not fit well with such goals as lifelong learning, reflective thinking, being critical, the capacity to evaluate one, and problem solving. There is a large body of literature championing the potential of student's self assessment for effective learning. Sullivan (1997) and Entwistle (1998) link self assessment to the adaptation of deep approaches to learning. Somervall (1993) goes a step further, suggesting that self assessment hones the student's ability to develop skills that will enhance further academic and professional practices. In addition, student self assessment has the potential to enhance learning in very wide range of contexts. Because metacognitive skills play a critical role in successful learning, it is important to study metacognitive self assessment to determine how learners can be taught to apply their cognitive resources through metacognitive skills (Livingstone, 2003). The existing evidences driven from relevant research indicates the need to set more out studies to discover many unexplored important features of the research area; although research on self assessment has increasingly been done, but research on self assessment in the web-based leaning environments, at present, is not adequate. Therefore developing self assessment in WBLE and its impact on knowledge construction needs to be investigated.

Research Objectives

The main objectives of the present study are:

- To investigate, recognise, define, and design pedagogical and technological aspects/factors/principles that should be considered in designing and implementing a WBLE for an effective self assessment.

- To investigate whether self assessment could be promoted through the WBLE.
- To determine whether self assessment has impact on learners' knowledge construction in the WBLE.

Research Questions

- What are the pedagogical aspects/factors/principles in designing and implementing a WBLE for effective self assessment?
- What are the technological aspects/factors/principles in designing and implementing a WBLE for effective self assessment?
- What potentials does WBLE have for improving learners' self assessment in compare with self assessment in traditional learning setting?
- How can self assessment affect learners' knowledge construction in the WBLE?

Methodology and Procedure

The study is currently in the phase of reviewing of the literature, producing a theoretical model and conceptual framework and also preparing a design for the empirical part of the study. I presume the following process for the study:

- Up to the end of 2007: completing reviewing of the literature, producing theoretical model, design, materials and required activities.
- Spring 2008: implementation of the empirical part of the study and collecting data by appropriate means and then analyses by qualitative and quantitative methods. Data will be collected through the questionnaires, semi-structured interviews, and also other appropriate online means: email lists, logs, forums, discussion boards, e-portfolios and observations. Of course it should be mentioned that in order to find or provide suitable means of gathering data it needs to be studied and explored more. As a specific task of the study it would be considered producing a model including pedagogical and technological aspects/ principles/factors which could be applicable in designing and implementing self assessment in WBLE.

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