Knowledge Construction Process in Online Learning

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Abstract: One of applications in online learning environment is the use of forum or discussion through online communication facilities as a learning activity. This paper focuses on the process of knowledge construction in online discussion designed to be used with mobile technology. The research participants comprised 45 post graduate students enrolled in a research methodology course. These participants were involved in the online discussion as one of the mode of delivery for the course. Data were collected through open ended questionnaire to tap into their perceptions about online learning activity through online discussion. They were also asked to do metacognitive reflections to explain step by step on how do they make conclusion on the meaning of a specific concept from the online discussion. Data were analysed using content analysis as the means of analysis. Result of the study shows majority of respondents agreed that online discussion helps the knowledge construction process through critical examinations of other peoples idea in the discussion. Overcoming psychological barriers is one of the important aspects offered by online environment that facilitate students involvement in constructing knowledge as compared to face to face discussion. Further analysis on the learning process revealed pattern of steps used by the students in constructing the meaning through the discussion process.

Key words: Knowledge construction • Online learning environment • Online discussion • Asynchronous learning

INTRODUCTION

In this new era, educators face new challenges that shape the landscape of how we teach in all levels of education. The vast development of communication technologies over the past decade has provided a rich infrastructure that outstrip the way people learn and teach. In this learning environment, online learning is one of the preferred mode of learning in a number of current educational setting [1]. Many educational institutions began to explore the use of this mode as a complementary learning systems implemented. Some terms used are blended learning and hybrid learning system where an integrated learning that integrate face to face learning system with online learning system. Some educational institutions use this mode as a means of attracting new students, while others view technology as a means of reducing the cost of delivery of a program or a course [2]. Notwithstanding the reasons for selecting this mode, all that needs to be considered is the extent to which these modes can be exploited to improve and enhance students’ learning outcomes.

Online learning refers to the learning environment that uses Internet technology to enable virtual learning session. used There are three inter-related elements used by Oliver in explaining the design of web-based teaching namely: 1) learning resources, 2) learning support and 3) learning task [2]. In the early days, many online learning based on the first form of resource-based learning using information through the online service as a learning resource. The emphasis is on delivering information and educational content online. With the development of interactive function in the internet technology, the form of learning move beyond the resource-based learning which involves more towards learning support and learning task.

There is no doubt that the features of online learning has a great potential to produce a quality learning environment for students. However, most models of learning using online learning will focus on resource-
based design that focuses on providing content and online learning materials together with a set of tasks to be undertaken by students as a learning activity [3]. This approach is the most conventional approach which is a variation of materials in printed form to electronic form. This form of learning is actually limiting the ability of online learning feature that can be used to support the learning theories that emphasize the construction of meaning by students.

One of applications that gain attention in this online learning environment is the use of online discussion which involve how the learning activities are supported by discussion forums and online communication facilities. This involve a web-based and mobile context platform [4]. It was suggested that online learning discussion provides an opportunity for sharing of experience between learners [5]. Current theories of learning emphasizes the idea that students construct their own meaning or knowledge and supported teaching method that give opportunity to students to involve actively in the learning process [6]. The idea of Vygotsky about the importance of social interaction in the learning process provided a framework in this study to delve into how actually students construct knowledge in this new learning environment. Social interaction are said to be one of the essential components for effective learning in online learning environment [7].

Knowledge construction is the heart of the learning process which determines the success of any learning endeavour [6]. Thus, regardless of the nature of any learning environment, the issue of knowledge construction is still relevant. Consequently, the birth of online learning environment invite speculation on how do people construct knowledge in this environment. The implementation of online discussion is said to have great potential to give opportunities to students to intellectually engage in the process of knowledge construction. In the cognitive and constructivism learning tradition, knowledge construction plays an important roles in determining the effectiveness of a learning process. It focusses on how people process information and transform it to become knowledge [6]. With its new features as compared to traditional educational setting, online learning environment need its own model or learning theory. It was suggested that there is a need to re-conceptualize learning for the mobile age [8]. Thus, it is worth to examine the process to find its parallel with the current learning theory.

This study is an exploratory study seek to understand the knowledge construction process in online learning environment from the experience of the learner. Understanding knowledge process in this environment will help content provider and instructional designer to develop module that suit the nature and character of the learning environment as well as the need of the learners. Within this paradigm, this study sought to identify one crucial factors in learning i.e the knowledge construction process. It is hypothesized that students uses different model of knowledge construction in online learning environment as compared to learning in the traditional setting.

MATERIALS AND METHODS

Samples consisted of students involved in online discussion in one post graduate course (N=45). Online discussion were used to help students understand the concept of “research problem” in a Research Methodology course. Students were asked to participate in online discussion on what they understand about “what is a research problem”. At the end of discussion, the students were asked to post their conclusion about the concept. After finishing all the process, the students were invited to fill in an open ended questionaire to tap into their perceptions on how this learning environment help them to construct the meaning of “research problem”. They were also asked to do metacognitive reflections to explain step by step how do they make conclusion on the meaning of “research problem” from the online discussion process. Students responses and thread of interaction in online discussion were analyzed to understand the knowledge construction process. Data were transcribed and coded with the aid of Nvivo V7. Findings were reduced into thematic categories to represent the participants pattern of knowledge construction process in online discussion.

RESULTS AND DISCUSSION

Data from the open ended questionnaire revealed three main themes about students’ perceptions on their experiences about knowledge construction process in online discussion namely: i) learning from others, ii) deep processing and iii) overcoming psychological barriers.

Learning from Others: One of important aspects cited by the respondents is the opportunity to learn from each other. Many of the respondents reported that this learning environment provided opportunity for them to exchange ideas and share information with each other.
Among the responses are: “we can read each other views...”; “...we can exchange ideas virtually...”; “great ways to share each other thought about something...” and “I can get more information through the discussion...”. They also reported that reading other people’s opinion provide insights about many perspectives that enrich their understanding. Among the responses are: “...I learn many ideas and perspectives from other people...”; “...reading responses and comments from others help me to construct meaning about the issue discussed...”. It can be concluded that students acknowledge the benefit of online discussion in providing an avenue for them to interact and exchanging views that give them opportunity to learn from each other. This findings showed that he participants engaged in a relationship oriented discourse of connection [9]. The discussion process also helps them to widen their perspectives and improve their understanding of the constructed meaning.

**Deep Processing:** The respondents responses also showed that online discussion encourages them to do deep processing. They need to give their own opinion and by providing comments to other people ideas drives them to analyse informations and to gather more materials to substantiate their argument. It can be concluded that these processes help them involve in a deep processing strategy that help them to construct a more meaningful knowledge. Among the responses in this category are: “...I have to understand first before giving my opinion...”; “...giving opinion and comments on other people ideas encourages me to be more critical...”; “...the time given to the students give them opportunity to find more information before giving comment in the discussion..... and this gives me a good input in understanding the materials...”

The respondents also agreed that online discussion help them constructing the knowledge through examinations of other peoples ideas in the discussion. They asserted that: “...I have to examine other peoples idea too...”; “...we learn how to evaluate other peoples ideas...”; “...the discussion help me to evaluate my own thinking...”. As a whole, the students were structured to involve in deep processing approach which help them in a more meaningful learning.

**Overcoming Psychological Barrier:** One interesting statement from many respondents is that the online discussion is different as compared to face to face discussion as it gives time to ponder, analyse and find more information before giving their own responses. It helps them be more confident to give responses as compared to face to face discussion.

“It gives chances to students who are less confident to talk in the class...”

“A good way because we can give our opinion and nobody knows who we are.... because sometimes we are shy to give opinion in class...”

The study found that online discussion provide a platform for students who are otherwise will not joint in the face to face discussion.

Based on the result of the study, it is clear that the construction of meaning in the context of the individual can be supported through a collaborative process to promote the reconstruction of knowledge. This includes: learning from others, the opportunity to involve in deep processing and the removal of psychological barriers. This result supported the idea that the construction of meaning can be structured in instructional design that combines face to face teaching with online learning through online discussion. This section will focus on the construction of meaning through online discussion.

The study revealed the steps used by students in the process of construction of meaning through the discussion process. On-line discussion process conducted gives students the opportunity to submit their ideas and revise their ideas through ideas and responses from peers online. This can encourage the process of constructing and reconstructing of meanings among the students. In this setting, students learn through the process to develop and test or review what is built through discussions with others.

**Steps of Knowledge Construction Process:** Analysis on students’s metacognitive reflection revealed few steps used by the students in constructing the meaning through the online discussion process. As a whole, the discussion started with posting responses in the discussion, getting feedback or providing feedback to the discussion before making their own conclusion. The study also found that prior to posting their own opinion, some students read and get information about the subject of the discussion from other sources (n=28) meanwhile, some read responses from other people’s responses (n= 10). Only seven respondents claimed that they post their opinion first to get responses from other people in the discussion. The general steps can be summarized as shown in Fig. 1.
The main aspect in this learning process is the use of “questions or tasks” as a basis to encourage active learning among students. The second aspect involves the social negotiation processes that help students build meaning through interactions with peers during the process of solving a given task. The steps used by students as found in this study can be divided into three phases that reflect the steps of meaning construction process namely: 1) the pre-construction phase, 2) The stage of cognitive imbalances and high-level thinking and 3) Re-construction phase.

In the pre-construction phase, students construct meaning individually on the assignments given. Then followed the process of sharing and comparing meanings built with feedback from peers through online discussions. At this stage, students will experience a state of imbalance in their cognitive structure when feedback received is different from the meaning they built in the early stages. The process of discussion will also be a platform for negotiation of meaning and stimulate the process of reconstruction of meaning with the process of revision and testing of the constructed meaning together.

Phases of this study can be used in models of learning using online forums or discussion. It can also be applied in problem-based learning / case or project or inquiry or discovery learning. In particular, based on self-analysis model proposed by Knowlton [10], the phases can be explained in terms of the following steps:

- Students prepare answers to the tasks given individually and posted to the forum / discussion on the line.
- Students respond to each other as a way to broaden understanding.
- Students make conclusions based on the content of discussions.

In general, the students actually learned through the process of giving and receiving among themselves. In the first phase is when they write individual responses to a given task, they learn to understand the job from their own perspective and at the same time they learn to write what they understand. In the second phase, the response they got from their peers will provide an opportunity to reassess the meaning that has been constructed. When students share their ideas or views in a discussion, they get feedback on their ideas. Feedback will cause the imbalance in their cognitive structure. The situation will lead them to reassess their original idea by comparing the idea of their colleagues.

Interaction of students with different views as compared to their own opinions will lead to a higher level of thinking. In terms of thinking development, we will tend to hold on to the thinking that we challenged ourselves through our interaction with others who have information or have different ways of interpreting the information. This process will take students to the higher level thinking to judge, evaluate and consolidate ideas before moving to the third phase where they were asked to make conclusions based on the content of the discussion. In terms of taxonomy Bloom, students move to higher levels of thinking involves evaluating the responses and ideas received in the online discussions. At the same time the students tried to link new information with knowledge or meaning that was built before that. This is an important phase in which students construct their meaning of the concepts being studied.
CONCLUSION

There is no doubt that the online learning environment has the potential to improve processes and student learning outcomes. This paper discusses the knowledge construction process experience by the students in helping them to construct meaning through online discussion. It can be concluded that by exploiting the online feature in the online learning environment provides a rich resource for students to play an active role in their learning process. Further studies should examine in-depth the psychological aspects that govern students participation in online discussions especially in how it provides scaffolding or support to eliminate the psychological barriers.

REFERENCES