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A POSSIBLE MECHANISM FOR ENHANCING THE ADVANCED KNOWLEDGE CONSTRUCTION IN ONLINE LEARNING COMMUNITIES

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ABSTRACT: In recent years, regarding learning, the applications of peer collaborative learning through online learning communities have been progressively developed, applied and explored. Especially after the rise of social networking site--Facebook, the concept of social network service (SNS) has provided innovative reforms in the operations of online learning communities. Peer collaborative learning of online learning communities is often conducted with the discussion teaching method, which serves as a key teaching method in many cooperative learning activities. Literature has suggested that an asynchronous or synchronous online discussion session incorporating different teaching strategies may improve students' cognitive ability and knowledge construction process. However, some studies found that an online discussion activity without any control or interferences from educational instructors would lead to a lack of an advanced knowledge construction. To address this issue, this study treats Facebook as the learning community and attempts to assist students' online discussion activities through adopting the teaching strategy--collaborative problem solving (CPS) and using the concept mapping as cognitive tools. Thus, this study aims to develop a collaborative problem solving (CPS) teaching strategy, and integrate the system of concept mapping.

Keyword: online discussion, collaborative problem solving (CPS),concept, mapping,facebook

INTRODUCTION

With the widespread use of internet technologies and the much-changed pattern of social interactions, the social networking service (SNS) has become an integral part of modern society. Especially in the field of learning, online learning community has become an important field of study for students nowadays (Mazman & Usluel, 2010; Wu, Hou, Hwang, & Liu, 2013).

In online learning communities, collaborative learning via online discussion activities has become the most commonly used learning method (Dawson & Venville, 2009; Vighnarajah, Wong, & Bakar, 2009). The process of online discussion activities not only provides students with the means to develop cognitive abilities and critical thinking skills (Anderson & Krathwohl, 2001), but it also allows the teacher to monitor and supervise the group discussion in real time (Bernard, Abrami, Lou, Borokhovski, Wade , Wozney, Wallet, Fiset, & Huang, 2004).

During the peer collaborative learning, the teacher usually integrates certain interactive teaching strategies in it. In the asynchronous peer assessment online discussion activities based on topic-oriented learning approach proposed by Hou, Chang, and Sung (2007), it was shown that significance was achieved only in the P1 → P1 (sharing, comparing information or proposing similar ideas) and P6 → P6 (messages irrelevant to knowledge construction), indicating that students were not able to reach more advanced discussions during the peer assessment activities, and that the causes for the lack of in-depth discussions may include students' attitudes, individual opinions, and the length of assessment time. The research by Wever, Schellens, Keer, and Valcke (2008) on role-play-based discussion activities reveals that while the students were properly stimulated by role-playing to elicit diverse ways of thinking, their capacity for advanced-level discussions still need to be strengthened. Wu, Hou, and Hwang (2012) also stated in their research that although synchronous peer assessment activities can prompt basic and advanced two-way cognitive interaction, it also acknowledges a lack

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of advanced cognitive discussions and the continuous behavioral patterns of digression. In short, pertinent literature have all pointed out that online discussion activities via different teaching strategies can indeed enhance students' cognitive levels and knowledge construction process. However, these studies have also showed that in a non-controlled and non-intrusive discussion environment, process of advanced knowledge construction is relatively lacking.

Therefore, to solve this problem, this study aimed to develop a Facebook-based online learning community system to assist students' discussions in the hope that it would improve the process of students' advanced knowledge construction in online discussion activities.

THEORY FOR THE SYSTEM DEVELOPMENT

To achieve the above objective, this study set out to design an online discussion system that would improve the advanced knowledge construction process. As a result, a collaborative problem-solving approach was used as the teaching strategy, and concept mapping as the cognitive tool. Regarding online discussion teaching strategies, the collaborative problem-solving (CPS) model proposed by Nelson (1999) is presently a widely used teaching strategy adopted by researchers and educators (e.g., Guimarães, Antunes, García & Fernandes, 2013; Pollastri, Epstein, Heath, & Ablon, 2013). Since CPS approach encourages learners to "learn by doing", emphasizes the authenticity of the collaborative learning environment, and promotes the ability of problem-solving, the learning activities proposed by this study would follow the scheme of the nine stages in collaborative problem-solving approach.

In addition, concept mapping is currently a coveted system tool used by researchers or educators in the application of cognitive development aid. Concept mapping is a technique used to depict relationships between information, ideas, or concepts. A concept map is represented by 'concept nodes' which are connected with 'relation links'. Two concept nodes and its relation link constitute a 'proposition', and the relationship between concepts in a concept map is articulated in 'hierarchy' (Novak & Gowin, 1984). This study regards concept mapping as a cognitive tool in the hope that teachers can use it as the cognitive scaffolding to the intended teaching subject, which in turn should help students recognize the best ways to learn and make their coding process become explicit, thus promoting their understanding in the relationships between concepts.

This study established the online learning community based on a social network environment (i.e., Facebook), applied the CPS model as the teaching strategy, and concept mapping as the cognitive tool. Teachers can pre-set different concept maps based on different subjects, and guide the students to solve the problems arisen in the online discussions using the CPS model. Such system, equipped with these two mechanisms, is expected to motivate the students to engage in sequential thinking and more in-depth issues, thus enhancing their advanced knowledge construction process; furthermore, the Q&A mechanism of concept mapping allows students to attain prior knowledge on the subject before problems and solutions are discussed and thus the students can conduct more in-depth online discussions.

SYSTEM PLAINNING

The system designs a situational problem based on individual teaching subjects and curriculum goals set by the teachers and conducts pretesting and grouping based on learning objectives. After students are assigned to the preset Facebook groups, teachers then announce the procedures of nine-step CPS model in accordance with the prior plan or students' discussion performance (i.e., content can be displayed in Facebook Group after the backend announcement). Students will then enact the discussions according to the published content. Diagram of the conceptual system is shown in Figure 1. During the discussions, students in each group are to work independently, and they cannot view the content of other group discussions via Facebook. In addition, all behaviors involving discussions and concept mapping are chronologically recorded and stored in backend database to facilitate future analysis.

In step 5 (collaborative exploration and concept formation), teachers need to formulate a backend concept map to facilitate the process of guiding students in online discussions (Figure 2). When completed, students from each group are required to answer the questions within the concept map. This approach is to provide clues to students' thought and discussions, thus forming relevant concepts. After their discussions, students, need to answer every assigned question to determine whether the formation of the concept is properly understood, and their answers would also serve as a guide and clues to assist the students in the discussions and online information gathering.

1. Task statements and learning objectives	Teachers stating the set learning objectives, designs, and task descriptions.
2. Group List	Presenting the group list (the list must be compiled in advance).
3. Problem defining	Describing and defining potential problems.
4. Leader(s) electing	Nominating and electing leader(s).
5.Collaborative exploration and concept formation	Teachers formulating an apt concept map to facilitate the process of guiding students in online discussions.
6. Problems and solutions	Proposing solutions based on the problems raised.
7. Ideas exchange and reflections	Sharing ideas on the whole process through online discussions and reflecting on whether the proposed solutions meet the raised problems.
8. Testing	Implementing learning assessments.
9. Summary and Feedback	Giving final feedbacks.

Figure 1. Diagram Of A Conceptual System

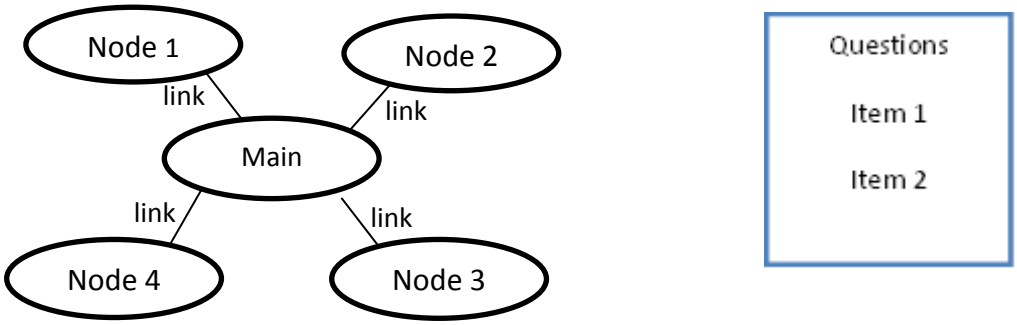

Figure 2. Interface Diagram Of A Concept Map

CONCLUSION

Previous studies have explored an online discussion environment without guidelines or the intervention of teachers, and determined that it was very difficult to achieve the process of advanced knowledge construction. Therefore, it was the goal of this study to build an online learning community based on a social network environment (i.e. Facebook), applying CPS model as the teaching strategy, and concept mapping as a cognitive tool. Teachers can pre-set different concept maps based on different subjects, and guide the students to tackle the problems arisen in the online discussions using the CPS model. This study believes that the CPS approach can prompt the students to engage in sequential thinking and in-depth issues, and that the Q&A mechanism in concept mapping allows students to gain prior knowledge on the subject before problems and solutions are raised and thus the students can conduct more in-depth online discussions. Once the system is completed, this study will explore the said mechanism through empirical studies as to validate its effectiveness.

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