USING ONLINE COLLABORATIVE LEARNING ENVIRONMENT TO PROMOTE REASONING SKILLS

Ana Haziqah A Rashid, Nurbiha A Shukor, Zaidatun Tasir

INTRODUCTION

Reasoning well is important to human beings, since it promotes sound beliefs and also improves the development of the reasoner's mind (Hitchcock, 2012). In learning, reasoning skills are also important to students in helping them to develop what they have been taught. According to Ates and Cataloglu (2007), students' reasoning skills are positively correlated with course achievement. Students' reasoning skills are also evident in their problem-solving (Lin et al, 2014). Additionally, reasoning skills help in the development of reasoning critical thinking and higher order thinking while the students are seeking additional knowledge.

Thus, it is essential to investigate the reasoning skills students employ in their learning, particularly in the online collaborative learning environment. In this study, we briefly describe what is the importance of reasoning skills in student learning. Next, we will explain the challanges for students in developing reasoning skills. Finally, we will suggest a potential method for promoting reasoning skills in students.

REASONING SKILLS IN STUDENT

Reasoning consists of complex skills that must be taught. It helps people to create new beliefs, generate knowledge and make better decisions. Researchers have shown that reasoning involves important skills for student learning such as problem solving (Lin et al, 2014; Ates and Cataloglu, 2007), decision making (Lohman and Lakin, 2009), critical thinking (Ates and Cataloglu, 2007), metacognition (Lin et al, 2014) and knowledge acquisition (Lin et al, 2014). In addition, reasoning skills will encourage students to consider experiences, review choices, explain answers and apply what is learned to real-life situations. It is important for students to develop their reasoning skills in order to be able to resolve complex issues.

In relation to that, lack of reasoning skills can affect a student's understanding and learning process. High achieving students with will usually have good reasoning skills (Johnson and Lawson, 1998; Shayer and Adey 1993). A study by Jensen et al (2014) about the relation between reasoning skills and conceptual knowledge. Found that students with higher reasoning skills have a greater ability to answer the question related to procedural skills. Students' academic achievement can be affected if they do not have good reasoning skills. This might be due to the fact that students who do not have reasoning skills tend to simply answer questions without thinking further about the reasons behind the answers.

Student Challenges In Gaining Reasoning Skills

Many students are incapable of providing reasons to justify their opinions. Reasoning requires students to go beyond the information that is given. This can be a problem for students if they are dependent on their teachers for information and do not independently seek it out. They have no desire to further explore the information given and tend to blindly accept information.

Students need the self-motivation to explore, thus enriching their knowledge. This will allow them to explain facts rather than just accepting them. Ryan and Deci (2000) have stated that self-motivation is important in learning because it helps students to obtain positive results and can improve active learning (Pintrich, 2003).

Other than that reluctance to seek additional knowledge can indirectly inhibit the students' development of reasoning critical thinking and higher order thinking. According to Dwyer, Hogan and Stewart (2014), students who can justify and argue their material are thinking critically. This is because students who can argue will usually think deeply while learning (Lin et al, 2014). A study by Lin, Hong and Lawrenz (2012) states that students who are able to use rebuttals to justify their positions are thinking more deeply and critically compared to others.

Additionally, lack of reasoning skills may also lead to difficulty in learning other subjects. For example, many students face difficulty in writing formal proofs which require them to have good reasoning skills (Wong and Bukalov, 2013). This is supported by Kidder, (2008) who argues that students often have difficulty expressing and sharing what they have learned. This happens when students do not have good reasoning skills and cannot express what they have learned critically. Research by Blanton and Stylianou (2014) points out that reasoning skill enable the student to express critically what they have learned in term of writing proofs. While writing proofs, students also gain the ability to critique, clarify, justify, explain and elaborate, which are important skills in reasoning.

Another problem faced by students who lack reasoning skills is difficulty in integrating the information they receive in the learning context (Hester et al., 2014). This could lead to difficulties in making connections between what they have learned, and a need for more instructional guidance (Chiu and Linn, 2013). Students often have restricted ideas which demonstrate a lack of critical thinking, leading to a low level of reasoning skills. Because of this,

students will not be able to translate evidence and empirical data into ideas and theories (Choi, Klein and Hershberger, 2014).

Reasoning skills can be improved through a proper, structured instructional approach. There are many instructional approaches that can be useful to promote reasoning skills. For example, Acar (2014) used argumentation-based guided inquiry to foster reasoning skills, including a scientific reasoning test and a conceptual knowledge test. However, the conceptual knowledge test used did not have well established reliability, even though students' reasoning skills were increasing.

The Scientific Heuristic Writing approach another argument-based inquiry approach has also been used to foster reasoning skills among students. Choi, Klein and Hershberger (2014) have used this approach to investigate student reasoning skills and found that it helps in stimulating students' excitement, enthusiasm and engagement in the classroom; increases students' progress and builds confidence with inquiry; fosters students' creativity and engagement in negotiating ideas. Nevertheless, while the approach has advantages, it also has limitations. Students still have difficulties in making decisions in relation to generating questions, designing procedures, proposing claims and providing evidence. In addition, students also have difficulty in expressing their thoughts and ideas in written form although they can express them orally (Choi, Klein and Hershberger, 2014).

REASONING SKILLS AND COLLABORATIVE LEARNING

Many studies have been done to investigate reasoning skills using collaborative learning. They consistently demonstrate that collaborative learning helps in enhancing students' reasoning skills (Clark et al, 2003; Kidder, 2008; Jadallah 2009; Kim, 2014). This may be due to the features of collaborative learning where it encourages fair participatory opportunities (Ngeow, 1998). In addition, collaborative learning also encourages the use of high-

level cognitive strategies, critical thinking, deep learning, deep understanding and positive attitudes towards learning. It also provides learners with a more open and flexible means of working collaboratively with their peers (Wang and Lin, 2007). Collaborative learning also enables learners to share alternative viewpoints, support each other's process of inquiry and develop critical thinking skills, including the ability to reflect (Ngeow, 1998), which is an important aspect of reasoning.

The purpose of collaborative learning is to enable students to learn by working together to solve learning tasks. By working together, students have the chance to express their ideas and opinions, developing their reasoning skills by critically discussing a certain topic. However, collaborative learning can only be effective when the core aspects interdependence, individual accountability and interaction have been taken into account and implemented (De Hei et al, 2014). Collaborative learning also has several limitations including the assessment of the collaboration process (De Hei et al, 2014). Hence, by using collaborative reasoning, we can solve the assessment issue by measuring the collaboration process by looking at students reasoning skills. This is because collaborative reasoning has been designed with clearly defined procedures and guidelines by previous researchers.

COLLABORATIVE REASONING IN ONLINE LEARNING

Although collaborative reasoning may be the best method for enhancing students' reasoning skills, it must involve technology to make it more effective. This is because using technology such as online learning discussion to perform collaborative reasoning is more time consuming compared to face-to-face discussion. In this way, the collaborative reasoning discussion will not disrupt teaching and learning in the classroom. Moreover, online learning discussion is more practical because the student and teacher do not have to be in the same place to conduct the discussion. Another advantage of using the online learning environment is that students

can express their opinions and ideas without being interrupted by others as in face-to-face discussions (Kim, 2014). In the online learning environment, students can take turns to offer ideas. It also allows time for students to think critically before expressing their thoughts.

CONCLUSION

There is a need to carry out research to investigate the reasoning skills used by students engaging in discussions in the online collaborative learning environment. It is also interesting to know if the online collaborative learning environment can influence students' performance and collaborative reasoning skills. In addition, it is also significant to study the effect of scaffolding in the development of students' reasoning skills in the online collaborative learning environment.

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