An Integrated Model to Implement Contextual Learning with Virtual Learning Environment for Promoting Higher Order Thinking Skills in Malaysian Secondary Schools

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Abstract

One of the important features in developing science curriculum in Malaysia is the emphasis on the education system that allows students to master higher order thinking skills (HOTS). However, the current teaching practice tends to inhibit students' HOTS by which students are given drills and tutorials to perform better in examination. The contextual learning is deem as a suitable approach to develop HOTS, as it enables students to build their knowledge in the context of their minds, then later makes use of linkages and applies it to their real life. Additionally, the advancement of technology offers opportunity for integrated contextual learning with Virtual Learning Environment (VLE) to foster HOTS. This study aims at developing an integrated model to implement contextual learning with VLE for promoting HOTS in Malaysian schools. Using the constant comparison analysis for analyzing the literature, this study analyzed previous literatures to develop the integrated model. Findings show that limited research exists on the integration of contextual learning with VLE to promote HOTS, leaving some vacuum for further study and improvement and the need to formulate an integrated model.

Keywords: higher order thinking skills, contextual learning, virtual learning environments

1. Introduction

Science curriculum strongly emphasizes the mastery of scientific and thinking skills, understanding of basic principles, adoption of scientific attitudes and moral values through learning that applies relevant experience to students (Villalino, 2009). However, traditional teaching remains as the dominant strategy in the Malaysian education system today. Traditional teaching is centered on teachers, where teachers control the learning process entirely. Besides, teachers have the control and responsibility in determining the outcome of the learning, whereas students only receive the knowledge from teachers (Novak & Krajcik, 2006). Traditional teaching is regarded as not in line with one of the education reforms in the Malaysian Education Development Plan (PPPM 2013-2025), which emphasizes that students should be able to master higher-order thinking skills (HOTS). The development of HOTS is prominent to the science classroom in Malaysia in order to fostering the higher order cognitive skills that enable students to think critically in making decisions and solving problem (Miri et al., 2007).

The scenario of traditional teaching renders students ability to apply the knowledge that they had gained in classrooms into their real life (Benneth et al., 2007). According to King (2009), less emphasis on HOTS will cause students to become less proficient in applying their knowledge critically outside the academic context. As stated by Bloom (1956), HOTS is an educational reform based on learning taxonomies according to the order of thinking. The idea in Bloom's taxonomy states that there are several types of learning that requires more cognitive processing as compared to others.

In revised Bloom's taxonomy by Anderson (2001), skills that involve remembering, understanding, and applying are categorized as low-order thinking skills. Meanwhile, analyzing, evaluating and creating are categorized as HOTS. HOTS require complex consideration and judgment such as critical thinking and problem solving skills. Students should be able to apply, relate and describe the knowledge according to their thinking context when they had already posses HOTS. According to King and Ritchie (2012), thinking process that emphasizes HOTS allow students to master various cognitive skills which covers the critical reasoning skills as well as creative

thinking.

Therefore, the main strategy that can be implemented by teachers to increase students' cognitive skills is to use student-based teaching and learning strategy by increasing students' thinking skills with diverse learning background (King, 2009). According to Bruner (1960), learning structure does not solely focus on the teaching and learning about facts, but teachers have to organize their lessons so that students can relate about the knowledge that they have obtained with their ideas.

This skill will encourage students to develop knowledge through meaningful learning (King, 2009). Indirectly, HOTS can be nurtured among students as knowledge development is an active process and it is not artifact (Bruner, 1966). Contextual-based teaching and learning is an approach that allows teachers to carry out meaningful learning to students by giving them opportunity to relate what they have learned with the real world (Crawford, 2001). This approach is suitable to be used for students with different skills, interests, experiences and cultures, where teachers will make an adjustment on how students learn and how they will be evaluated (Nafisah et al., 2011).

Contextual learning approach also encourages students to develop their own constructs, which will then encourage them to discover new ideas and knowledge. Students will explore, make a decision, and consequently will be responsible for their own learning (Crawford, 2001). Through the exploration of contextual learning, not only students will make an amendment on the content of the lessons, but they will also find the evidence of the argument about the content of the lessons across the field of life. According to Broman and Parchmann (2014), through contextual learning approach, students will build knowledge actively through thinking and they will not acquire knowledge passively. Students will adjust new information with their existing knowledge to construct the new knowledge with the help of social interaction with their friends and teachers.

The advantages of contextual learning can be greater enhanced with the aid of technology advancement. Zandvliet (2012) stated that students would acquire effective outcome from learning if a suitable integration between technology and pedagogy can be implemented. Voogt (2008) found that using technology in teaching could increase students' motivation in learning. This is due to the success of teachers in diversifying learning materials and activities obtained from various sources. Indirectly, the quality of teaching in the classroom will be greatly enhanced. The use of technology based on Virtual Learning Environment, VLE has the potential to be the suitable pedagogical supporting tool to enhance contextual learning. The use of VLE implementation in teaching can encourage tutorial, exploration, application and communication. Meanwhile, for teaching, this application can be categorized as a tutor and serve as a demonstration tool for the students. Harmonization of technology-related application is a promising maneuver in supporting the contextual teaching and learning strategy.

Although a lot of studies on using technology to support learning were reported, there remains lack of implementation models based on contextual learning, particularly in the school context. Broman and Parchmann (2014), developed a tool for the implementation of contextual learning approach that only emphasizes students to solve problems in real life context. Yet, the developed tool is not integrated with technology which is needed to encourage students become more interested and motivated to learn science (Anton et al., 2010). An integrated model that integrates the contextual approach and VLE to promote HOTS is thus required before a technological learning environment can be developed. The integration will represent a new contextual learning approach, where the technology that will be used involves the process of relating the learning content with the students' learning process in a context that is suitable with the learning content (Vaino et al., 2012).

2. Method

According to Onwuegbuzie et al. (2012), constant comparison analysis can be used as a method to analyze literature and to develop the integrated model. Through the process, constant comparison analysis is used as a tool to assist researcher in understanding multiple meanings from data. The researcher could identify, create, and see the relationships among components of the data when constructing a theme (Strauss & Corbin, 1988).

3. Results

The integration between VLE and contextual learning can increase students' cognitive skills and create opportunities for them to explore the content of contextual learning. These parameter then can be combined with the natural experience in developing knowledge if been applied strategically is believe able to increase students HOTS capabilities.
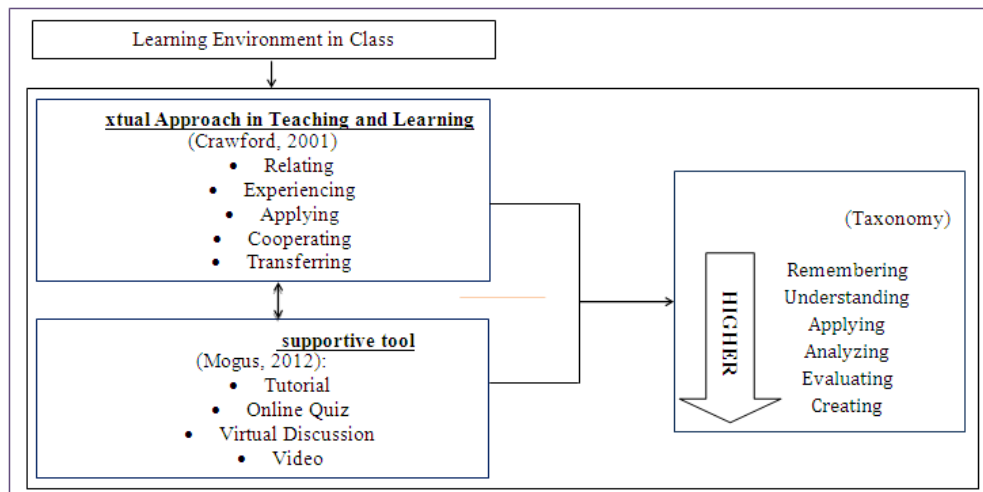
Figure 1. An integrated model to implement contextual learning with VLE

Figure 1 shows the integration model for the application of contextual learning in VLE to increase higher-order thinking skills. We chose the contextual approach in teaching and learning as explained by Crawford (2001) who stated that contextual learning involves 'relating', 'experiencing', 'applying', 'cooperating' and 'transferring'. According to Suryawati et al. (2010), these properties of contextual learning relates to supporting HOTS because it can be a foundation for students to develop strong scientific concepts, as well the complex thinking among students through problem solving process of the various topics and contexts to create meaningful learning. Accordingly, the suggested technological tool to support contextual learning is VLE that covers 'tutorial', 'online quiz', 'virtual discussion', and 'online video'. Online video will serve as a graphic representation of the real context of learning. In traditional teaching and learning, real life situation requires complex explanation hence, the online video on the VLE platform simplify the process. For this, contextually, it is easier for the students to relate and experience learning with the real life problems as demanded by contextual learning approach. Tutorial, online quiz and virtual discussion allow students to apply the knowledge that they have learned contextually. By answering questions related to real-life problems, students will be able to observe and monitor their own performance and increased their self-awareness about their own learning performance. Virtual discussion plays another important role to support contextual learning. Virtual discussion supports 'cooperation' and 'transfer' of knowledge in contextual learning. Through virtual discussion, it is also predicted that social interaction when solving real-life problems will promote students' skills of 'analyzing', 'evaluating' and 'creating'; the most important skills for HOTS. While interacting, information is transferred contextually, individual students analyze information received from peers and before knowledge can be created, evaluation process will occur within the virtual discussions. The advantages of virtual discussion to promote HOTS were also well-documented in many previous studies (Huang, 2011; Yu, Fan, & Lin, 2014). Although there are a lot of other properties of VLEs, we postulate that only several VLE supportive tools would be useful for contextual learning and hence promote HOTS.

4. Discussion

4.1 Promoting Higher Order Thinking Skills Using Contextual Learning

Through the curriculum development in Malaysia, the approach of contextual teaching is regarded as a highly recommended strategy to be implemented to increase HOTS among students (Pusat Perkembangan Kurikulum, 2001). To enhance HOTS, contextual teaching can be implemented using five strategies, which are relating, experiencing, applying, cooperating and transferring (Crawford, 2001). The purpose of using these five strategies is that teachers should emphasize on the relationship between learning concept with a real-life situation. Therefore, teachers are said to have a natural ability to motivate students and engage them in the teaching and learning process actively through the recommended strategy (Nafisah et al., 2011).

Based on the strategy of contextual learning, students will learn to use hands-on and minds-on methods that can enhance HOTS. According to Sugiarti and Patta (2014), hands-on and minds-on activities will allow students to experience concrete learning through real experience. The best way for most of the students to receive

meaningful learning is from the informal contextual learning. Therefore, according to Nafisah and Zulkarnain (2009), through the method, teachers are able to increase students' understanding by relating theories learned in the classroom with their daily life, and also their work compared to memorizing facts from the teaching content.

Using the contextual approach, students will integrate HOTS in creating relation with different angles of teaching content concept with problem solving through investigation activities (Norasiken, 2004). This is supported by the study of (Broman & Parchmann, 2014) who found that through contextual learning, students' involvement in investigation activities based on experience is able to help them to understand, master and apply better learning concept.

Other than that, contextual learning emphasizes real-life situation significantly, where students' cognitive skills are enhanced through the connection between knowledge with real-world learning. Students are driven by high curiosity to interact with science and the real world around them. According to Fensham (2009), real-life activities will enhance students' creativity in solving problems, where not only students understand the content of learning, but they are able to describe real-life learning around them, thus they can better implement on what they have learned. Thus, this approach can also help students to become more independent, as well as more natural in the effort to develop their knowledge and cognitive skills (Johnson, 2002).

4.2 Using VLE to Enhance Contextual Learning

The integration of technology in contextual learning has the potential to help teachers prepare contextual learning experience needed by students. According to Graham and Dziuban (2008), blended learning approach occurs where teaching and learning activities in class is the result of the combination between traditional pedagogy and learning management system supported by technology. Among the characteristics of blended learning is students are able to apply collaborative and cooperative methods that are very suitable for contextual learning approach. Therefore, the combination of learning through contextual strategy and the support of VLE platform is very suitable and relevant to be used as VLE platform does not only exceed the learning activities using the Internet, but there are also several additional features that can help the teaching and learning process (Mogus, 2012).

Mogus (2012) stated that through online teaching and learning, students could check for lecture notes, exercise notes, assignments, quizzes, questionnaires and other learning materials. Besides, students can make earlier preparation for tests and examinations, as well as making projects for certain subjects. For contextual learning, the application on online learning will allow students to expand scientific ideas of the real world through collecting information, interpreting visualization and recording data (King, 2009). Lane (2004) stated that online learning can integrate information through constructive discussion and response from teachers using online forum and produce active learning condition.

Other than that, as mentioned by Mogus (2012), teachers will be able to design learning materials according to the appropriateness for students by understanding their online behavior. This is very important because if the learning materials are effective for students' needs in the learning process, then teachers can encourage students to develop new knowledge and enhance their cognitive skills. Hence, the action of integrating technology with the contextual learning approach is very appropriate. Smith (2001) stated that contextual teaching and learning highly emphasizes higher-order thinking skills, knowledge, transfer of knowledge, choosing suitable learning content and synthesizing information and data from various sources and points of view.

5. Conclusion

The low higher order thinking skills (HOTS) among Malaysian's students receive the nation major attention. Traditional learning that is usually used by teachers in the learning environment in classrooms requires a paradigm shift. Therefore, student-centered teaching strategy should be implemented, and it is considered as a very suitable approach for contextual learning. Through contextual learning approach, students will use hands-on and minds-on processes, which will then increase their higher-order thinking skills. However, the combination of contextual learning strategy and the support of VLE platform is identified as suitable and relevant to be implemented as the VLE platform is not only based on the learning activities using the Internet, but there are also several additional features that can help to enhance the teaching and learning process. Hence, an integrated model for the implementation of contextual learning in VLE to increase higher-order thinking skills will be developed to overcome this problem.

Acknowledgments

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