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The Use of Discovery Learning in Improving Students' Critical Thinking Ability (A Literature Review)

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ABSTRACT

Critical thinking ability is an essential ability that students need to compete in the 21st century. It is an ability to think carefully using reason and logic and being able to consider all the consequences of decisions taken to solve a problem. By having an ability to think critically, students are able to analyze and find solutions to any problems given by the teacher or problems they face in the real world. Students' critical thinking ability in Indonesia is still categorized as poor. Hence, teachers must find out the appropriate learning methods and models to train and improve students' critical thinking ability. This paper aims at identify the effectiveness of discovery-based learning model in improving students' critical thinking ability. By then, teachers are expected to have an overview of how effective discovery-based learning is in improving students' critical thinking ability.

Keywords: *Critical Thinking, Discovery Learning, Improving, Learning Model*

INTRODUCTION

Critical thinking is one of the 4C skills that students need to compete in a 21st century. According to Wang (2017), critical thinking is one of the 21st century skills that must be possessed by students from an early age. Padmanabha (2018) saw critical thinking as a way of thinking to assess the information that students read, heard, and saw to make the objective and reasonable judgments. Thus, critical thinking is essential for daily life. Through think critically, students can make a good decision in solving the problems. This way of thinking makes the students as the active learners.

Critical thinking ability can ease the students' learning and thinking process. It is a higher order thinking skill that plays an important role in students' cognitive development (Azizah, Mahanal, Zubaidah & Setiawan, 2020). Unfortunately, in the 21st century where the critical thinking ability is most needed, several previous studies showed that Indonesian students' critical thinking ability could be categorized into poor category (Ashadi, Mahanal, Masykuri, Probosari, Saputro, Sari, Sutanto & Utami as cited in Azizah, Mahanal, Zubaidah & Setiawan, 2020). Besides, Martaida, Bukit, and Ginting (2017) explained that the other problems faced in Indonesia is students are not encouraged to discover the knowledge themselves, but they are required to remember what teachers have given them. As a result, students cannot find any solutions to the problems given by the teacher. Based on these issues, it is imperative for teachers, schools, and other educational settings to find and apply the effective methods and models of learning to combat these issues.

Students can achieve the expected learning outcomes by involving them in direct learning. One way to involve students directly in learning is through

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discovery-based learning (Martaida, Bukit & Ginting, 2017). According to Wahyudi, Rukmini, and Bharati (2019), discovery based learning is one of the suggested teaching models in 2013 curriculum where this curriculum emphasizes the scientific approach as well as the 4C skills. This learning model requires the students to understand the information and concepts independently through minimal guidance such as simulations, feedbacks, and examples of problems given by the teacher (Alfieri, Brooks, Aldrich & Tenenbaum as cited in Wahyudi, Rukmini & Bharati, 2019). Through this learning model, students are guided to analyze a problem through findings, where they must find the similar problems in order to think and find solutions of the problems given by the teacher (Efrini, 2016). It will make students learn to analyze, think and try to solve their own problems encountered. In other words, the use of discovery-based learning in teaching will develop the students' critical thinking skill. It is in line with studies were conducted by Rudibyani (2018) and also Martaida, Bukit, and Ginting (2017) on the implementation of discovery learning in improving the students' critical thinking ability.

Some similar studies had shown the implementation of discovery-based learning in improving the students' critical thinking ability. A study conducted by Rudibyani (2018) which investigated the effectiveness of discovery learning in improving critical thinking of the college students. The study showed that discovery learning is effective and have a high effect size in improving critical thinking ability of the college students. Another study was done by Martaida, Bukit, and Ginting (2017). They investigated which one was giving a better effect on critical thinking and cognitive ability of the students applying discovery based learning model or applying conventional learning in junior high school. The result of the study showed that the critical thinking and cognitive ability of the students applying discovery learning model is better than students' critical thinking and cognitive ability with conventional learning.

Discovery based learning is an effective learning model in improving the students' critical thinking. It is a model for developing activeness and critical thinking of students by discovering self-investigation. Hakim, Sariyatun, and Sudiyanto (2018) argued that the results of the learning process will be remembered long lasting in their long-term memory. This learning model will make the students learn to think critically, analyze, and solve their own problems.

METHOD

In the current study, literature review was used in collecting the data. There were four steps in conducting the study. The first step was collecting the data. In this case, there were two resources, namely primary and secondary resources. Primary resources mean the data were collected related to the use of discovery learning in improving students' critical thinking ability, while the secondary resources mean the data were collected from some related books and articles in order to support the current study. The second step was classifying the data related to the use of discovery learning, particularly in improving the students' critical thinking ability. The next step was analyzing the data in order to identify the concept of discovery learning and its effectiveness in improving the students' critical thinking ability. The last step was drawing the conclusion, which was done after analyzing the data.

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FINDINGS & DISCUSSIONS

According to Sugiyanto (as cited in Rubio, 2016), the learning model is a conceptual framework that describes systematic learning procedures to achieve certain learning objectives. Furthermore, he also argued that the learning model serves as a guide in learning process. There are several types of learning media, as he stated, namely: contextual learning model that is a learning model that encourages teachers to connect the material being taught with the real world. This model encourages students to connect problems given by the teacher with problems they face in the real world; cooperative learning model which focuses on the use of small groups of students to work together in maximizing the learning conditions for achieving learning objectives; quantum learning model that is a collection of various theories or views on cognitive psychology and neurology; integrated learning model which allows students both individually and in groups of actively searching, digging, and found the concepts and principles. Learning models are all forms of learning new skills and information (Ho, 2020). These learning models are categorized into several sub-categories, which are then divided into various learning styles.

According to Hammer (1997), discovery learning is a learning model where students engage in investigations about material guided by the teacher. Discovery learning firstly gives students a structured experience so that they can find the definitions, concepts, and structures for a material. Discovery learning is a learning strategy that allows students to gather the information and find as well as solve the problems by their own. Discovery learning is a learning model, where students build their own knowledge by conducting experiment to find a principle from such experiment (Rahman, 2017). Furthermore, Martaida, Bukit, and Ginting (2017) said that discovery learning model is a series of learning activities that emphasize the critical thinking process and analysis to achieve and find their own answers to the problems asked. The essence of discovery learning is to give students a lesson to deal with the problems facing by students in the real world.

Padmanabha (2018) explained that critical thinking is a way of thinking to assess the information that students read, heard, and saw to make the objective and reasonable judgments. According to Ennis (as cited in Martaida, Bukit, and Ginting, 2017), critical thinking is a reflective and reasoned way of thinking that focuses on making decision to solve problems. It is a higher order thinking skill that plays an important role in students' cognitive development (Azizah, Mahanal, Zubaidah & Setiawan, 2020). Ennis (2015) believes that critical thinkers have the ability to clarify, seek, and assess the basis of a view properly to conclude wisely, imagine and integrate a problem properly and correctly. Moreover, Hader in Karakoc (2016) argued that critical thinking will boost creativity and enhance the way students use and manage the time.

In addition, critical thinking has important roles in language learning. It involves the reflective and independent thinking that will leads the critical thinker becomes an active learner rather than a passive recipient of information (Gandimathi & Zarei, 2018). Furthermore, the role of critical thinking is important to make the students able to compete and solve the problems in the 21st century. Some similar studies that support this paper are already conducted. A study that was conducted by Rudibyani (2018). It is a study about the effectiveness of discovery-based learning in improving the college students' critical thinking. The objective of this study is to describe the effectiveness of discovery learning to

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improve critical thinking skills of the college students. The subjects of the study were Class A 31 students and Class B as control class was 30 students. This research used quasi-experiment with pretest- posttest non-equivalent control group design. The result of the study showed that discovery learning model is effective in improving students' critical thinking skill. Moreover, it also has a great effect size in improving students' critical thinking skills.

A study entitled “The Effect of Discovery Learning Model on Student’s Critical Thinking and Cognitive Ability in Junior High School” was conducted by Martaida, Bukit, and Ginting (2017). They investigated which one was giving a better effect on critical thinking and cognitive ability of the students applying discovery-based learning model or applying conventional learning in junior high school. The objective of the study is to know the effect of discovery learning model on the critical thinking and cognitive ability of the students in SMP Negeri 5 Kisaran. The subjects of the study were class VII-1 as experiment class applied discovery learning model and class VII-3 as control class applied conventional learning. The instruments used was in the form of essays each of 5 questions that have been declared valid by the expert team. This research used quasi-experimental research with two group pre-test post-test design. The result of the study indicated that critical thinking ability of students applying discovery learning model is better than students' critical thinking ability with conventional learning. Furthermore, the cognitive ability of the students applying discovery learning model is better than cognitive ability of students with conventional learning.

Fatma, Andalia, and Zulfajri (2019) investigated the progress in students' critical thinking skills and motivation based on the implementation of discovery learning modified with think pair share learning model. The aimed of this study is to understand the effect of Discovery Learning modified with Think Pair Share (DL/TPS) learning model for upper secondary school student's critical thinking skills and their motivation in learning the human circulatory system. A quantitative descriptive approach with research design of pre-test/post-test control group was used in this study. The research instruments were pre-test and post-test questions to evaluate the students' critical thinking skills and a questionnaire to assess the students' motivation in learning. The subjects of the study were the upper secondary school students. The result of the study showed that there was a significant difference between the evaluation score for students' critical thinking skills from the control and DL/TPS and control classes. Thus, DL/TPS learning model can enhance the critical thinking skills and motivation of students in science subjects.

CONCLUSION

From the research result, it can be concluded that the teacher can encourage and train the students to think critically by using discovery-based learning model. This model is believed to be able to train and improve students' thinking ability effectively since discovery-based learning requires students to find the information and solve the problems by their own self. It will train and foster students' critical thinking ability. The use of discovery-based learning model can improve or stimulate or encourage the students’ critical thinking ability effectively. There was a great and significant effect of the use of discovery-based learning in improving students’ critical thinking ability.

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