



Students' Learning Outcomes Using Problem-Based Learning and Discovery Learning Models in Thematic Integrated Learning

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The aim of this study is to compare students' learning outcomes in thematic integrated learning using problem-based learning and discovery learning models. This was a comparative study. The sample of this research was 43, grade four students in selected elementary schools. A test was used to collect the data. The results of data analysis were produced using a simple statistic and showed that the value of the students' learning results using the problem-based learning model was 89.51, while it was 89.50 using the discovery learning model. It can be concluded that both the problem-based learning and the discovery learning models can improve students' learning outcomes in thematic integrated learning in elementary schools. The difference in the students' learning outcomes and between the learning models was not significant because the models are cooperative learning models.

Keywords: *problem-based learning, discovery learning, model, thematic integrated learning, elementary schools.*



INTRODUCTION

Thematic integrated learning uses the theme to associate subjects to provide meaningful learning experiences to students (Majid, 2014; Karli, 2016). Thematic integrated learning is also defined as an approach to integrated instruction, which is a system of learning that allows students, either individually or in groups, to actively explore and discover concepts using scientific principles in a holistic, meaningful and authentic manner (Anderson et al., 2004; Rusman, 2015). In this study, thematic integrated learning is defined as an integrated learning that is focussed on theme (Kementerian Pendidikan dan Kebudayaan, 2014; Sundahry, Fitria, & Rakimahwati, 2018). The objectives of thematic integrated learning include the following: it is easy to focus on the theme or topic; learn the knowledge and develop subject competencies in the same theme; it creates in-depth and meaningful student interest in learning; students can experience the advantages and meaning of learning; the teacher can save time; and students' character and morals can be built (Barron et al., 2008; Birenbaum et al., 2006; Kementerian Pendidikan dan Kebudayaan, 2014).

A thematic integrated learning process requires teachers to engage learners actively in the learning process. Teachers should be creative in the learning process, so that students do not feel bored in the classroom. Thematic integrated learning provides opportunities to the students to use their skills and time with others to gain learning experience (Kementerian Pendidikan dan Kebudayaan, 2014; Mudiono et al., 2016; Thorburn et al., 2006). Thematic integrated learning has several characteristics, including it is student centered, provides direct experience for students, all subjects are integrated not separated, presents the concept of the various subjects in a learning process, is flexible (Majid, 2014; Rusman, 2015); Kurniawan, 2014; Mohammad, 2014; Lipson, 1993), uses the principle of play and fun learning (Majid, 2014; Hyvonen, 2011), and the learning outcomes can be developed in accordance with the interests and needs of students through the assessment process and results (Kurniawan, 2014; Mohammad, 2014; Rusman, 2015; Harden, 2002).

However, in the implementation of thematic integrated learning, teachers face difficulties in designing lesson plans, assessment of the curriculum 2013, and determining the methods or strategies that influence student's motivation (Upayanto, 2017; Setiadi, 2016). Other problems in thematic integrated learning are that students are less active and creative in the learning process, (Cintia et al., 2018; Zekri et al., 2019) and the school has not completely applied the learning models that encourage students to think creatively (Cintia et al., 2018). Consequently, it has influenced the students' learning outcomes. Students' learning outcomes in thematic integrated learning are still low (Zekri et al., 2019; Hilmi, 2019).

Therefore, efforts are required to improve the learning process so that the students' learning outcomes will increase. One of the solutions that can be undertaken by the teachers is to use appropriate learning models in thematic integrated learning, in order to help students directly



understand concepts, link the learning material with real experience in everyday life or employ contextual learning. A model is a design using systematic steps than can be applied (Ambarawati, 2016; GEMILANG, n.d.). One of learning models that can be used in thematic integrated learning at the elementary school level is the cooperative learning model, such as problem based-learning and discovery learning.

The problem-based learning model is a learning model with a student-centred approach that uses an authentic problem so that learners can construct their own knowledge, develop higher skills, and it encourages learners to be independent and boosts their confidence (Hosnan, 2014; Nakada et al., 2017). There several steps in the problem-based learning model: 1) orientation of students to the problem; 2) organise the learners to study; 3) guide the investigation of the individual and the group; 4) develop and present the work; and 5) analyse and evaluate the problem-solving process (Hmelo-Silver et al., 2006; Hosnan, 2014; Pepper, 2014). The three main attributes of discovery learning are: 1) exploring and problem solving to create, integrate, and generalise knowledge; 2) student driven, interest-based activities in which the student determines the sequence and frequency; and 3) activities to encourage integration of new knowledge into the learner's existing knowledge base (Bicknell-Holmes & Seth Hoffman, 2000). Problem-based learning is appropriate and effective when used in thematic integrated learning because of several advantages, including that it improves student's motivation and skill in learning (Boud et al., 2013; Handoko, 2018; Hilmi et al., 2019; Mustamilah, 2015). In order to be successful in problem-based learning or project-based learning (PBL), students must take responsibility for the learning process by setting goals, monitoring, reflecting, and sustaining their motivation from the beginning of the project until the end (English et al., 2013).

The discovery learning model is a learning model to develop the way students learn actively through individual discovery and investigation, hence the knowledge obtained by the student will be retained in his or her memory (Hmelo-Silver et al., 2006; Hmelo-Silver et al., 2007; Hosnan, 2014; Setiawan, 2016). Discovery learning approaches, in particular, are designed to engage students in inquiry through which, guided by the teacher and materials, they 'discover' the intended content (Hammer, 1997). The discovery learning model is a learning model that engages the student to discover student's knowledge (Nurdin et al., 2016; Resnani, 2019). There are three main characteristics of discovery learning that relate it to cognitive theory. They are: 1) an emphasis on active learning; 2) the development of meaningful learning; and 3) the capacity to change attitudes and values toward the subject and the self as a problem solver (Svinicki, 1998). According to Syah, the model of discovery learning consists of six steps: 1) stimulation; 2) problem statement; 3) data collection; 4) data processing; 5) verification; and 6) generalisation (Dewi et al., 2018; Kementerian Pendidikan dan Kebudayaan, 2014). There are some advantages to using the discovery learning model in the classroom, which includes among others: the student participates actively in the learning process, students understand the concepts, it stimulates



students' curiosity, and students can transfer their knowledge to other context (Castronova, 2002; GEMILANG, n.d.). Besides that, discovery learning can also improve students' learning outcomes (Zekri et al., 2019). Discovery learning is a learning approach that enhances many positive things in students.

Using an appropriate learning model can improve students' learning outcomes. The learning outcome is the provision of value to what is obtained by the students after receiving a learning experience. Learning outcomes can also be defined as the changes that occur to students, concerning the affective aspect (Ahmad Susanto, 2016). Much research has been focussed on using the problem-based learning model to increase student learning outcomes in thematic integrated learning (Handoko, 2018; Hilmi & Lena, 2019; Mustamilah, 2015). However, little has been known about comparing students learning outcomes using the problem-based learning and the discovery learning models in thematic integrated learning in the elementary school context. Therefore, it is an important topic to be investigated. The purpose of these studies is to compare students' learning outcomes using the problem-based learning and the discovery learning models in thematic integrated learning at the elementary school level.

METHOD

This research was a comparative study. The sample of this research was 43, grade four students from two different elementary schools in Padang. The sample consisted of 21 female students and 22 male students; it can be viewed in Table 1 below. The sample of this study was chosen by using purposive sampling of the following criteria: implement Curriculum 2013; and employed problem-based learning or discovery learning models. However, there were no differences in the teachers' qualification and the students' ability in the two schools, meaning the sample of this research had the same characteristics. The data collection technique used in this research was the test method. Furthermore, the data was analysed using simple statistics to find out the average of the students' learning outcomes in each school.

TABLE 1. DESCRIPTION OF SAMPLE OF THIS RESEARCH

| Name of Elementary School | Number of Students | Female Students | Male Students |
|---------------------------|--------------------|-----------------|---------------|
| A | 22 | 7 | 15 |
| B | 21 | 14 | 7 |
| Total | 43 | 21 | 22 |

RESULT

Based on the results of the data analysis of the students' learning outcomes from the different elementary schools that employed the different learning models in thematic integrated learning, the results of this research were obtained. The description of the students' learning outcomes can be found in Table 2 below.

TABLE 2. DESCRIPTION OF STUDENTS' LEARNING OUTCOMES

| Name of Elementary School | Learning Model | Value | | | Number of Students |
|---------------------------|------------------------|-------|-------|-----------|--------------------|
| | | Max | Min | Rata-rata | |
| A | Problem-based learning | 100 | 77.77 | 89.51 | 22 |
| B | Discovery learning | 100 | 66.66 | 89.50 | 21 |

From the table above it can be seen that the maximum value of the learning outcomes of the students in thematic integrated learning using the problem-based learning model was 100, the minimum value was 77.77, the average value was 89.51, and the number of students was 22 students. While the results of the student learning outcomes using the discovery learning model in thematic integrated learning included that the maximum value was the same as using the problem-based learning model, i.e. 100, and the minimum value was 66.66 — it was lower than using problem-based learning model — and the average value was 89.50, with the number of students being 21 students.

DISCUSSION

Elementary school A employed the problem-based learning model, and adapted the steps recommended by Hosnan, namely: 1) reviewed based on students to the problem; 2) managing the learners to study; 3) help explore students in individual or group settings; 4) exploring and presenting the work of the student; and 5) elaborate and evaluate the problem solving process (Hosnan, 2014; Kirschner et al., 2006). The average value of the students' learning outcomes using the problem-based learning model was 89.51, because this learning model boosted student motivation in the learning process (Handoko, 2018; Hilmi et al., 2019; Kementerian Pendidikan dan Kebudayaan, 2014; Mustamilah, 2015). Furthermore, this model also encouraged students to be active and independent learners. The research emphasises that problem-based learning can improve student learning outcomes in thematic integrated learning in elementary school. The



study corroborates the results of research on the same topic (Cintia et al., 2018; Grant, 2011; Handoko, 2018; Hilmi et al., 2019; Ruben et al., 2019).

Meanwhile, Elementary school B used the discovery learning model in thematic integrated learning. As suggested by Syah, the discovery learning model consists of six steps: 1) stimulation; 2) problem statement; 3) data collection; 4) data processing; 5) verification; and 6) generalisation (Kementerian Pendidikan dan Kebudayaan, 2014). The result of the learning process using the discovery learning method was 89.50, because students were actively involved in learning so that they could develop an understanding of the material well. This result is in line with the advantages of the discovery learning model proposed by literature, namely, encouraging the learner to be active in the learning process, and the learner understands the concepts that they learned (GEMILANG, n.d.). Besides this, using the discovery learning model made the students independent in the learning process.

Based on the average values of the learning outcomes from the different elementary schools using the problem-based learning and the discovery learning models, it showed that the students' learning outcomes of the two models did not have significant differences. This was because the two learning models are cooperative learning models which share the same characteristics, such as both provide students with individual or group assignments and encourage students to be independent in the learning process. It occurs because students interact with each other in the same group to obtain and practice elements of a subject to solve a problem, complete a task or achieve a goal (Lie, 2002).

Vygotsky studied the growth of children from their environment and through their interaction with others and he found that what is given and what happens in the social environment (e.g., dialogues, actions, and activities) helps children learn, develop, and grow (Johnson, et al., 2014; Lie, 2002). By asking group members to identify what behaviours help them work together and by asking individuals to reflect on their contribution to the group's success or failure, students are made aware of the need for healthy, positive, helping interactions when they work in groups (Cohen, 1994). Developing ways to manage conflict before conflict arises is an important part of this process. The use of problem-based learning and discovery learning that is based on cooperative learning, makes learning more effective. On the other hand, students develop in terms of their social abilities, such as conducting dialogue, building teamwork and achieving group goals.



CONCLUSIONS

Problem-based learning and discovery learning are learning models that can improve the results of the learning process in thematic integrated learning in elementary schools. The implementation of these learning models made no significant difference on students' learning outcomes. This was because both problem-based learning and discovery learning models are cooperative learning models. In the context of cooperative learning based on social construction, students learn by interacting with various factors around them.



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