Effect of Example Non Example Method Implementation in Scientific Approach and Discovery Learning Model on VII Grade Students' Cognitive Competence in Learning Natural Science

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Abstract. The 2013 Curriculum emphasizes on active learning pattern, student-centered learning and cooperative learning. Considering this fact, there is an alternative solution to be used by teacher in learning process, which is using example non example method. This method fulfils three learning patterns required by the 2013 Curriculum. Beside that, it can also support the implementation of discovery learning model and scientific approach in learning process. The discovery learning and scientific approach are recommended in the 2013 Curriculum. The purpose of the research was to know about the effect of example non example method in scientific approach and discovery learning model on students' cognitive competence in learning natural science (IPA). It was a quasi-experimental research. It was done in grade VII of Junior High School 18 Padang. Instrument used was written test (multiple-choice and essay). Technique of data analysis used T-test. The Analysis used by assistance of SPSS software. The finding shows that there is effect of example non example method on students' cognitive competence in learning natural science (IPA). From the hypothesis testing, it is known that significant (0.038) < 0.05.

Keywords: Example Non Example, Scientific, Discovery, Cognitive

1. Introduction

The 2013 Curriculum requires some improvements of mindset or pattern in learning process, such as from teacher-centered learning to student-centered learning, from passive learning to active learning, and from classical learning to cooperative learning [1]. In the academic year 2017/2018, the 2013 Curriculum starts being implemented in school. For example, from 95 Junior High School (state or private institution) in Padang, there are 60 Junior High School have implemented the 2013 Curriculum and the others still implement KTSP Curriculum [2]. In other word, 63% of Junior High School in Padang have implemented the 2013 Curriculum.

Based on the requirements of the 2013 Curriculum and its implementation in school, it was conducted a preliminary research done by August 8th, 2018 in Junior High School 18 Padang, as a school which has implemented the 2013 Curriculum. The preliminary research was done to identify problems faced by teachers and students through spreading questionnaires. Result of the
questionnaires showed that teachers have been able to design learning media suitable with 2013 Curriculum conditions. However, there are still some problems faced by teacher in learning process because it does not implement the changing of learning process pattern from classical learning to cooperative one.

The main problem faced by teachers in learning process is the difficulty to make students active during learning process, because they often feel bored during learning process. It is proven from the result of questionnaire, which shows that 74% of students answered “Yes” in 'often smearing or drawing during learning process’ item. Feeling bored during learning process will cause students' cognitive competence decrease. It is in line with students' test score, in which from 66 students, there is only 20% (13 students) who achieve the classical completeness. Minimum Criteria of Mastery Learning (KKM) determined by teacher is 70. Students' test score can be seen in Table 1 below.

Table 1. Distribution of Students' Test Score Completeness.

| Class  | Not Complete | Complete |
|--------|--------------|----------|
|        | Σ            | %        | Σ        | %        |
| VII.6  | 21           | 67%      | 11       | 34%      |
| VII.8  | 28           | 44%      | 4        | 6%       |
| Total  | 51           | 80%      | 13       | 20%      |

Based on problems faced by students and the 2013 Curriculum requirements, there is an alternative solution to solve the problems, which is implementation of example non example method in scientific approach and discovery learning model. The example non example method in discovery learning and scientific approach has never been implemented yet by teacher who taught VII grade of Junior High School 18 Padang. Consequently, its effect on students' cognitive competence is not surely known yet, especially for VII grade students of Junior High School 18 Padang.

The use of scientific approach in learning process is a requirement of the 2013 Curriculum. It is mentioned in Permendikbud No. 103 year 2014. The scientific approach can make students active in learning process [3,4]. Based on the previous research done by [5], it is explained that the scientific approach is excellent for being combined with cooperative learning because it can improve students' competences.

Consideration of choosing discovery learning model is because it is accustomed to be used by teacher. Beside that, students do not need long time to adapt to this model so that it will not disturb learning times planned by teacher in the classroom. Another consideration is it is a suggested model to use in the 2013 Curriculum. Moreover, it can improve students' learning outcomes [6], and their understanding of learning concepts [7].

The example non example method is a learning method which uses pictures as media to deliver learning materials. By using this method, students are encouraged to think critically and analyze from the provided example (observation result). According to [8], the example non example method includes in cooperative learning. Therefore, it is the main consideration to implement this method in this research.

Another consideration in choosing this method is it is appropriate or suitable to be collaborated with discovery learning model and scientific approach. In discovery learning model, students are required to be independent in learning through discovery. The discovery cannot be separated from scientific activity so that it needs scientific approach. Beside that, the discovery needs media in delivering information, such as pictures so that it needs example non example method. It is in line with [9], who state that the contrast pictures are very important to support discovery learning.

Other consideration of choosing example non example method is its suitability with learning materials taught by teacher, which are KD (Basic Competencies) 3.7 (Organism Interaction). The KD 3.7 (Organism Interaction) material focuses more about field observation activity (observing environment). When students cannot observe unaffordable objects, it can be observed by providing pictures as media to facilitate the observation in order to support discovery activities.
Considering problems faced by students and the 2013 Curriculum requirement, example non-example method in discovery learning model and scientific approach can give different and comfortable learning atmosphere. The different learning atmosphere can attract students to pay attention to the learning material and understand it [10]. Therefore, it was interesting to do a research, entitled: “Effect of Example Non-Example Method Implementation in Scientific Approach and Discovery Learning Model on VII Grade Students' Cognitive Competence in Learning Natural Science”.

2. Research Method
It was a quasi-experimental research. It was done in grade VII of SMPN 18 Padang in semester II of academic year 2018/2019. Population of research was all VII grade students in SMPN 18 Padang, who are registered in academic year 2018/2019. They are 228 students from 9 classes. Sample was taken by using purposive sampling technique. The purposive sampling technique means that the sample is purposefully selected based on certain characteristics based on the needs [10].

Criteria of classroom taken as samples are the classes are taught by same teacher and they have similar variance score (in order that the treatment effect can be seen clearly). The first criterion was the classes are taught by same teacher. So, this research was done to two classes taught by Mrs. Deswita, S. Pd., which are VII.6 and VII.8. Next, the second criterion was the classes have similar variance score. To know it, homogeneity test was done to two classes. It was done by using daily test (UH) scores as data. Result of the homogeneity test shows that sig.value of both classes is 0.120, which means that both classes have similar variance (if sig.value > 0.05, the two sample classes have similar variance). In addition, this research used Randomized Control-Group Posttest Only Design.

Research instrument used was written test in form of multiple-choice test and essay test. The test was analyzed its validity first, both from its content and empirically. Technique of data analysis was done by using T-test. According to Subana [11], a T-test is a measurement parameter which requires two conditions to be used. The conditions are data must be homogenous and its distribution must be normal [12]. Therefore, homogeneity test and normality test were done as prerequisite before conducting T-test. The T-test was also used SPSS software to make significant value available. The criteria of T-test are as follow [14].

a. \( H_0 \) is accepted if sig.value > 0.05.
b. \( H_0 \) is rejected if sig.value < 0.05.

Description:
\( H_0 \): there is no effect of example non-example method implementation in scientific approach and discovery learning model on grade VII students' Natural Science (IPA) cognitive competence in SMPN 18 Padang.
\( H_1 \): there is an effect of example non-example method implementation in scientific approach and discovery learning model on grade VII students' Natural Science (IPA) cognitive competence in SMPN 18 Padang.

3. Finding and Discussion
3.1 Finding
3.1.1 Data Description
Data of students' cognitive competence are obtained from final test in form of written test (multiple-choice and essay) done by students at the final meeting of every Basic Competence (KD). Data of students' cognitive competence can be seen in Table 2 below.

| Parameter                        | Treatment  | Control   | Desc.                  |
|----------------------------------|------------|-----------|------------------------|
| Average                          | Experimental | 70.90     | 65.25 | Experimental > Control |
| Classical Completeness           | 66%        | 30%       | Complete               |
Based on Table 2 above, it is known that students' average score of cognitive competence in experimental class is higher than in control class. Students' average score in experimental class is 70.90, while in control class is 65.25. Beside that, classical completeness is also different, in which it is higher in experimental class than in control class. It is 66% (21 students) in experimental class and 30% (9 students) in control class.

3.1.2 Testing of Analysis Requirements

3.1.2.1 Normality Test

Data are normal if the sig.value > 0.05. The result of normality test can be seen in Table 3 below.

| Class   | Sig.  | Students' Cognitive Competence Description |
|---------|-------|-------------------------------------------|
| Experimental | 0.145 | Normal                                    |
| Control  | 0.057 | Normal                                    |

Based on Table 3 above, it is known that the sig.value of normality test is > 0.05, which means that distribution of data is normal.

3.1.2.2 Homogeneity Test

Data are homogenous if the sig.value > 0.05. The result of homogeneity test can be seen in Table 4 below.

| Class   | Sig.  | Students' Cognitive Competence Description |
|---------|-------|-------------------------------------------|
| Experimental | 0.619 | Homogenous                                |
| Control  |       |                                            |

Based on Table 4 above, it is known that the sig.value of the homogeneity test is 0.619, which means that the sig.value > 0.05). It shows that variance of data are homogenous.

3.1.3 Hypothesis Testing

Based on the testing of analysis requirements done previously, it is known that data distribution of students' cognitive competence is normal and homogenous. So, hypothesis testing used T-test. The result of hypothesis testing of students' cognitive competence can be seen in Table 5 below.

| Class   | Sig.  | A  | Desc.          |
|---------|-------|----|----------------|
| Experimental | 0.038 | 0.05 | $H_0$ is rejected |
| Control  |       |    |                |

Based on Table 7 above, it is known that the sig.value of students' cognitive competence is 0.038, which means that sig.value < 0.05. It shows that $H_0$ is rejected. Thus, it is concluded that there is an effect of example non example method in discovery learning model and scientific approach on VII grade students' cognitive competence in learning IPA of Junior High School 18 Padang.

3.2 Discussion

Based on the hypothesis testing, it is known that the sig.value is 0.038, which means that $H_0$ is rejected and $H_1$ is accepted. It shows that there is an effect of example non example method in discovery learning model and scientific approach on students' cognitive competence. It is a positive effect because it improves students' cognitive competence. It is obvious from students' average score of both experimental and control classes. Students' average score in experimental class is higher than in control class.

The effect cannot be independent of learning method, model and approach used during learning process. By using example non example method, students are required to have deeper understanding on abstract learning materials, such as cells, tissues, etc through pictures (examples) observation activity. A picture gives brief information about something and it is easy to remember [13]. Beside that, through visualizing (pictures), it is easier to remember than through reading or listening.
According to [3], learning through seeing affects 30% in recalling materials. It proves that example non example method give enough effects in students' learning.

Furthermore, by using example non example method, students are facilitated to learn to prove and discover knowledge [14]. In other word, example non example method can support or facilitate discovery learning model, while the discovery learning model needs scientific approach in discovering process through scientific stages. Considering this fact, method, model, and approach used are related and support each other to create effective learning process.

Being seen from the difference between the average score of students' cognitive competence from both experimental and control classes, the effect of the treatment is 5.56%. It shows that students' comprehension level improves after giving the treatment. It is in line with [15], who state that example non example method can improve students' comprehension in learning a material. If students' comprehension improves, their cognitive competence also improves.

Percentage of the effect should be 19.4%, like what is said by [16]. However, in this research, it is only 5.65%. It is caused by each student has various learning styles and intelligence in each school so that the data of this research is only valid in grade VII of Junior High School 18 Padang. It cannot be generalized for other schools.

Moreover, example non example method sharpens students to be more critical in analyzing something, especially pictures. Analyzing is in C4 cognitive competence level. In other word, through example non example method, students are sharpened to master cognitive competence in C4 level. Yet, they can also understand the concept they learn, like what [17] state that through example non example method, students can deepen their comprehension about the concept they learn.

4. Conclusion

Based on the finding of the research, it is concluded that there is an effect of example non example method implementation in scientific approach and discovery learning model on VII grade students' cognitive competence in learning Natural Science in Junior High School 18 Padang.

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