The Different Effect of Inquiry Learning Strategy on the Students’ Environmental Knowledge

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Abstract

This research aims to know the different effect between guided inquiry learning strategy and independent inquiry learning strategy towards students’ environmental knowledge at school. The method used in this research was experimental. The experimental method was used to investigate whether there is different effect by giving treatment to experimental class A (independent inquiry learning strategy) which then the result was compared to experimental class B (guided inquiry learning strategy). Based on the research results and discussion, then the conclusion that can be taken is that there is different effect on the students’ environmental knowledge at grade XI Madrasah Alawiyah Alwathoniyah 43 North Jakarta between the students who were taught by applying independent inquiry and the guided inquiry learning strategy. The result shows better learning improvement by using guided inquiry learning strategy compared to independent inquiry strategy. Therefore, guided inquiry learning strategy can be used as one of the alternative learning strategies for teachers at schools as an effort to improve students’ learning achievement, especially students’ environmental knowledge.

Keywords: Inquiry Learning, Students’ Environmental Knowledge

1. Introduction

Natural resources and environmental damage has reached a very worrying state. Environment damage is not only felt by local and national society but also on a global scale. Many incidents happen nowadays such as floods, air pollution, river polluted by waste, and many more that can cause damage to the environment and ecosystem. In managing natural resources and environment damage, the environment knowledge of students in the school and the direct skills in the implementation of the daily life become the pattern of action and mind for the more specific management to the problem that is faced by Indonesian in common, especially in the society of Jakarta which has urgent issues related to the management of garbage, air pollution, water waste, also the natural conservation as the city lungs and water resources. Including the needs to wastes as the risk of human activity [1].
Students in Madrasah Alawiyah Alwathoniyah 43 North Jakarta are part of the society, the youth generation of a nation who will live in the future and will face the high life challenge with all complex dilemmas. So, the students have to raise their awareness to be more concerned about the environment, so that the attitude and mind also act, comprehension related to the environment can increase.

Bloom classified knowledge aspects in three groups that are detailed in nine aspects which are: 1) comprehension related to specific matters such as terminology and fact, 2) comprehension related to the way to solve specific problems such as habit, intention, classification, category, method, and 3) comprehension related to universal matters such as: principle and structure [2]. The result shows that the essence of cognitive development is the development of formal operational thinking skills which is tended to think in abstract and deductive-hypothetic thinking skills. Individual development in cognitive skills cannot be measured generally, due to the determinant factor which determines cognitive skills such as social culture and environment [3].

The definition of environment based on Constitution No. 32 the year 2009 about The Environment Management and Protection is a space unification of all things, potency, condition, and living being including human and their action, which influences the sustainability of human life and welfare and also other living beings [4]. In the matter of protecting environment, then the motivation that is conceived as encouragement to meet the goals or needs has to be related to the goal of the environment protection [5,6]. The absolute or relative changes of environment factors toward plants will be different depending on plant time, place and condition [7]. Studying is an activity that is done consciously to result a change, related to the knowledge, this matter is caused by giving the environment the attitude and values.

On the other hand, Monolithic learning strategy selection is thought to contribute to the emergence of obstacles in the problem of solving environmental problems [8]. However, Made Wina defines learning strategies as specific actions taken to simplify, accelerate, more enjoyable, understand more directly, more effectively and easily to be transferred into new situations [9]. The inquiry is one of the general processes that is conducted by a human to seek or to understand information [10]. Similar to the elaborated problem, this research aims to find out the difference of influence between guided inquiry and independent inquiry learning strategy to the student's environment knowledge in the school.

2. Research Methodology

The method used in this research was experimental. The experimental method was used to examine whether there were differences in influence by giving treatment to experimental class A (independent inquiry learning strategy) which results were compared to experimental class B (guided inquiry learning strategy). The research design can be seen in Table 1.

Table 1. Research Design

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Treatment</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>O₁</td>
<td>X₁</td>
<td>O₂</td>
</tr>
<tr>
<td>E2</td>
<td>O₁</td>
<td>X₂</td>
<td>O₂</td>
</tr>
</tbody>
</table>

Description:
E1: Experimental Group A,
E2: Experimental Group B,
X1: Learning with independent inquiry strategy,
X2: Learning with guided inquiry strategy,
O1: Pre-test,
O2: Post-test

This research was conducted in the environment of Alawiyah Al Wathoniyah 43 Madrasah Students North Jakarta Academic Year 2018/2019. The study was conducted in December 2018. The population of this research was students of Science Class XI Madarasah Alawiyah Al Wathoniyah 43 North Jakarta registered in Academic Year 2018/2019 consisting of 2 classes with a total of 30 students each. The sampling technique used simple random sampling technique. The two sample classes were given the different method of treatments, which were Class A with independent inquiry learning strategy and Class B with guided inquiry learning strategy.

The analysed data in this research was the standard gain of students Achievement. The analysis was conducted to find out the difference of Achievement improvement in the experimental and controlled class. The pre-requirement test that has to be fulfilled before t-test was normality test and homogeneity test [11]. Normality test was conducted by using the Kolmogorov-Smirnov test with SPSS 16 for Windows. Homogeneity test was conducted by using the Levene test with a significant rate of 5% with the support from SPSS 16 for windows. Independent t-test was used to compare the average improvement of achievement in the experimental and controlled class. T-test was done with the support from SPSS 16 for windows with a significant rate of 5%. The decision criteria used was rejected H₀ if the significance value was lesser than 0.05.

3. Result and Discussion

This section is going to elaborate on the results of the research that is related to the difference of influence between the guided inquiry and independent inquiry learning strategy of students environmental knowledge in the school. To see the difference, the learning achievement test is used. The analysis of the calculation of cognitive learning outcomes uses gain score. The gain score is used to determine the increase in pre-test and post-test scores on cognitive learning outcomes. According to the calculation of the standard gain is presented in Table 2.

<table>
<thead>
<tr>
<th>No</th>
<th>Class</th>
<th>Gain Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Experimental Class A (free inquiry learning strategy)</td>
<td>0,34</td>
</tr>
<tr>
<td>2</td>
<td>Experimental Class B (guided inquiry learning strategy)</td>
<td>0,53</td>
</tr>
</tbody>
</table>

According to table 2, it can be seen if the gain score from experimental class B (guided inquiry learning strategy) is higher than experimental class A (independent inquiry learning strategy). This proves that the use of guided inquiry learning strategy can improve cognitive learning outcomes higher than the independent inquiry learning strategy.

The next analysis is to find out whether the difference between the two experimental classes is significant or not. The hypothesis test uses t-test. The pre-requirement tests that have to be fulfilled before the t-test are the normality and homogeneity tests. The normality test is conducted with Kolmogorov-Smirnov SPSS 16 for Windows test. Homogeneity test is conducted using the Levene test with significance rate of 5% with the support of SPSS 16 program for windows. The normality test results are shown in Table 3 below;
According to Table 3, the normality test calculation results on the pre-test data of experimental class A (independent inquiry learning strategy) has been obtained the significance of 0.200 and significance post-test of 0.156. Whereas in the experimental class B (guided inquiry learning strategy), the significance of the pre-test data is 0.142, and the significance of the post-test data is 0.200. Data is distributed normally if \( p > 0.05 \). Because all data have significance of more than 0.05, then Ho is accepted. Pre-test and post-test data of controlled and experimental class are normal.

After all the normality of the cognitive learning outcome data is tested, the cognitive learning outcome test data is tested for homogeneity to find out whether the data has the same variant or not. The following are the results of the pre-test and post-test of the homogeneity test of experimental group A and experimental group B.

According to Table 4, it is obtained the pre-test and post-test data from experimental class A (independent inquiry learning strategy), and experimental B (guided inquiry learning strategy). On the pre-test of the homogeneity test of cognitive learning outcomes have significance of 0.291, while on the post-test of homogeneity test of cognitive learning outcomes have significance of 0.703. According to the results of the significant value obtained in each type of data and exceeds 0.05 then Ho is accepted and the data is homogeneous.

To find out the difference in the improvement of cognitive learning outcomes in experimental class A and B, then the t-test is performed using the Independent Sample t-test. The testing is conducted by analysing the increase of student learning outcomes (gain) in the experimental class A and experimental class B. This is conducted to determine whether there are significant differences in the student's ability to improve between the two classes. The following t-test results of student learning outcomes are presented in Table 5.

According to Table 5, the results of the independent sample t-test on the student ability improvement (gain), it is obtained results between experimental class A (independent inquiry learning strategy) and experimental class B (guided inquiry learning strategy) present significance of 0.002. Thus it can be interpreted if the ability improvement (gain)
in the experimental class A and experimental class B has the different significance because Ha is accepted and Ho is rejected. According to these cognitive learning outcomes, it can be concluded if there is a significant difference between students cognitive learning outcomes which use guided inquiry learning strategy and students which use independent inquiry learning strategy. This proves that the use of guided inquiry learning strategy can improve cognitive learning outcomes higher in significance than independent inquiry learning strategy.

The difference in the average value of learning outcomes in each experimental class related to the learning process of the two classes. Overall the learning process in the two experimental classes is different, the difference is in the process, where the experimental class A uses independent inquiry method and the experimental class B uses the guided inquiry method. The fundamental difference that becomes the main factor of the cause of the higher average on student learning outcomes of the class with the guided inquiry method than the class with the independent inquiry method is due to the learning experience received by the student. In the guided inquiry class the teacher guides students in the problem-solving stage. The guided inquiry method makes students learn to be more oriented to the guidance of the teacher, making it more demanding for active students who automatically make students increase in knowledge and understanding where this component is an important part in achieving learning outcomes in the cognitive domain.

As revealed by Bloom in Dimyati [12], cognitive domain goals are classified into six classes which are: knowledge, comprehension, application, analysis, synthesis, and evaluation. In addition, the guided inquiry method provides the opportunity for students to solve problems that have been submitted previously by the teacher through pictures, demonstrations, or real situations, and to experience themselves in following the process, even students are required to analyse, prove, and draw their conclusions regarding to the object, so students are motivated to learn to be more confident and has impacted on student learning outcomes that are improving. Whereas in the independent inquiry method, the teacher gives a problem and students try to solve the problem by doing scientific activities such as analysing data and drawing conclusions. In the independent inquiry method the problem solving is done by students on their initiative and way. The teacher only acts as a facilitator and guides students a little by giving questions that are directed to solving problems. With these techniques during the learning process, it is not enough to make students understand and form the comprehension well, so the learning outcomes obtained by students using the independent inquiry method cannot outperform the learning outcomes of guided inquiry methods.

4. Conclusion

According to the results of research and discussion, the conclusion that can be taken is: there are differences in the influence on the environmental knowledge of students of class XI Madrasah Alawiyah Alwathoniyah 43 North Jakarta that are taught with independent inquiry and guided inquiry learning strategy. The result shows that improved learning outcomes are better in using guided inquiry learning strategy than independent inquiry learning strategy. The fundamental difference that becomes the main factor of the cause of the higher student learning outcomes of the class with guided inquiry method than the class with independent inquiry method is due to the learning experience received by students in the guided inquiry class the teacher guides the students in the problem-solving level. Through guided inquiry method, the students’ learning orientation is more on the guidance and instruction from the teachers, until it requires the students to be more active which automatically makes the students’ knowledge and understanding increase in which this component is the important part of achieving the learning result in the cognitive domain. Therefore, guided inquiry learning strategy can be chosen as one of alternatives for teachers at schools as an effort to grow the students’ learning achievement, especially students’ environmental knowledge.
References