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Effect of implementation of group investigation model based on recitation method in improving biological learning outcome of student of SMPN 1 Bolano Lambunu

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Abstract

Discussion method in teaching learning process is commonly conducted at SMPN 1 Bolano Lambunu. However, it is still not significant to improve the learning outcomes. Therefore, this study is conducted to determine how an effect of implication of the group investigation model based on the recitation method on the biology learning outcomes of the students of SMPN 1 Bolano Lambunu. The study used an experimental method and applied the Pretest-Posttest Control Group Design. The study performed 122 students consisting of 61 students for the experimental class that applied the group investigation model based on the recitation method and 61 students for the control class using the discussion model. Results of the study showed that the pretest obtained 18.52 and 19.82 in score averages for the experimental and the control classes, successively. Furthermore, the posttest gained 76.78 and 67.79 in score averages for both the classes. The learning outcomes increased significantly in the experimental class (58.26) compared to control class (47.97). As such, the result suggests that the recitation model based on group investigation (Group Investigation) significantly affects in improving the biology learning outcomes of the students of SMPN 1 Bolano Lambunu.

Keywords: Group Investigation Model, Recitation Method, Biology, Learning Outcomes

1. Introduction

SMPN 1 Bolano Lambunu is one of the senior high schools in Parigi Moutong District that has applied a method discussion in the teaching-learning process by the teachers. The method was considered to improve the student learning activities and outcomes, compared to a lecture method that had applied before. However, it was not entirely correct. Based on a result of observations and analyses that have been carried out for several days in several classes, the students were passive in learning activities. Even, the learning outcomes were dropdown. The interesting reason based on our discussion results and reflections that the discussion model improved student activities only for those who had the ability in speaking and argumentation. However, for students who did not have these abilities were keeping in passive learning. Also, discussion learning methods spent much time to finish material learning. Moreover, one important reason was still less creative in exploring, discovering, evaluating learning concepts for the students in applying the discussion method.

Learning is a change in attitude, knowledge, understanding, behavior, skills, and abilities [1, 2]. From the understanding of learning, it can be understood that learning is a process that must be carried out by an individual to be a better character than before. Two factors affect the learning process that are internal factors, factors that originate from within the student, and also external factors, factors that come from outside the student's self [3]. These internal factors include the physical and spiritual condition of students while external factors include the environment of students such as family, community, school, especially teachers [4]. The learning outcomes of a student can be influenced by the ability of a teacher in teaching. Student learning outcomes indicate the ability of a teacher in teaching. Therefore, a teacher plays a significant role in the learning process so that students become successful in learning. As such, teachers must have the ability to innovate and create to apply a model and learning method that is by the material taught to students so that students become happier in learning, more creative in thinking and more improve in learning outcomes.

Based on the observations carried out in SMPN 1 Bolano Lambunu, it can be known that the learning outcomes of the students was still lower. It was caused by the implementation of learning method applied by the teacher. The model and method of the teaching might be unsuitable with the students' character and learning material. The teacher applied a discussion method in the teaching-learning process. The discussion learning method applied must be replaced with other learning methods and models. There are several models and learning methods that can overcome the weaknesses of the discussion learning model applied. A

group investigation is one of the learning models that has been carried out a lot [5-8]. The results of the study concluded that the group investigation model highly improve student outcomes in the learning. Furthermore, the learning model could train students to develop the ability to think independently, be critical, reflective, and productive [9]. Also, this model can train students in developing mutual understanding and respect and can train students to have good skills in communication [5, 10]. This model can train students in designing an experiment, thinking and acting creatively in solving problems, interpreting and evaluating observations, stimulating the development of students' thinking to solve problems [11, 12].

As mention above that the group investigation learning model has been able to improve student outcomes in the learning. However, the group investigation learning model has a weakness. The weakness of the group investigation learning model is that it spent much time to complete the material following the demands of the learning objectives or competencies expected at one meeting. Besides, at the presentation stage, the final report did not take place effectively. Based on the weakness of a group investigation learning model, this learning model needs to be combined with other learning methods being recitation. This recitation learning method is a method that stimulates students in conducting individual or group learning activities and can develop students 'independence beyond the supervision of teachers and develop students' creativity [3]. Based on the facts, we reveal an effect of the implementation of the group investigation models based on a recitation on the biology learning outcomes of SMPN1Bolano Lambunu students.

2. Method

This research was experimentally carried out at SMPN1Bolano Lambunu using 4 classes. Two classes treated with an experimental class and two others with a control class. The control classes used discussion learning models while the experimental classes used a recitation-based group investigation learning model. The study applied "Randomized-control and experiment group with pretest-posttest design" illustrated in Table 1.

Tabel 1: Randomized-control and experiment group with pretest-posttest design

Class	Pre-test	Treated	Post-test
R-E (Experiment)	O_1	X_1	O_2
R-C (Control)	O_3	-	O_4

Note:

R: Randomized classed
E: Experimental group
C: Control group
X1: Learning model of recitation-based group investigation
O1: Pre-test before being treated in the experimental class
O2: The final test (post-test) after being given treatment in the experimental class
O3: Pre-test before being treated in the control class
O4: The final test (post-test) after being given treatment in the control class

The population of the study was all classes in SMPN1Bolano Lambunu and samples used 4 selected classes consisting of; X-IPA-1, X-IPA-2, XI-IPA-2, and XI-IPA-3, SMPN1 Bolano Lambunu. Class X-IPA-1 and XI-IPA-2 were to be experimental classes while the classes X-IPA-2 and XI-IPA-3 became the control classes. The samples of the study were collected using "Cluster Random Sampling" which was a sampling technique using classes or group sampling, not individuals. The study used two variables consisting of an independent variable and a dependent variable. The independent variable was a learning model based on recitation group learning and the dependent variable was student learning outcomes. Student learning outcomes data were obtained from students who had followed the learning process in biology subjects at SMPN1Bolano Lambunu tested with an essay test. The test consisted of pretest and posttest. Scores gained from the tests were then analyzed using the statistical t-test. The t-test was applied to determine a significant difference of a pair between:

- Learning outcomes in the pretest between the experimental and the control classes
- Learning outcomes between pretest and posttest in the control class
- Learning outcomes between pretest and posttest in the experimental class
- Improved learning outcomes from pretest to posttest between the experimental and the control classes

3. Results and discussion

To gain data on the learning outcomes of the student, the tests were used in an essay form including pretest and posttest. Previously, all of the test items were tested for validity and reliability. The validity of the pretest and posttest were illustrated in table 2.

Table 2: Validity of pretest and posttest

S. No	Item test	$r_{countable}$	r_{table}
1	Number 1	0.549	0,497
2	Number 2	0.542	
3	Number 3	0.499	
4	Number 4	0.591	
5	Number 5	0.515	
6	Number 6	0.611	
7	Number 7	0.707	

The table 2 shows that the $r_{\text{-calculated}}$ was greater than $r_{\text{-table}}$ which means that the seven items of the test were valid. Further, these items were tested for reliability. The reliability test could be seen in table 3.

Table 3: Test Reliability of the Pretest and Posttest

No	Cronbach's Alpha	r_{table}
1	0.734	0.497

Table 3 shows that the alpha value (0.734) was greater than r-table (0.497) which means that the seven items were reliable. Surely, the items of the questions had been valid and reliable, the items were then tested to students. In this study, pretest and posttest were conducted for both the control and the experimental classes. The pretest and posttest were served to see the students 'initial abilities and students' final abilities. The learning outcome of the pretest and posttest were showed in table 4.

Table 4: Learning Outcomes of Pretest and Posttest

Description	Pretest		Posttest	
	Control class	Experiment class	Control class	Experiment class
Sample	61	61	61	61
Lowest scores	10	10	45	45
Highest scores	40	40	95	95
Average scores	19.82	18.52	67.79	76.78
Standard Deviation	8.94	8.39	14.27	10.72

The number of students in the control and the experimental classes totaled 61 people each. The pretest and posttest scores of both the control and the experimental classes were then used for normality test. The normality test was intended to see whether the data were normally distributed or not. The results showed that the pretest and posttest of the experimental and control classes were normal distributed (Table 5).

Table 5: Normality test of the pretest and posttest of the experiment and control classes

S. No	Class	x^2 countable		x^2 Table $(\alpha = 0.05)$	Decision
		Pre-test	Post-test		
1	Experiment	5.66	6.13	9.48	Normal distributed normal
2	Control	6.58	3.36		Normal distributed

Table 5 showed that the x $_{calculated}$ value from the experimental and the control classes were smaller than the X $_{table}$. This means that the pretest and posttest of both the experimental and the control classes were normally distributed. Further, the pretest and posttest were then performed for homogeneity tests. The homogeneity test was intended to see whether the pretest and posttest were homogeneous variances or not. The results showed that the pretest and posttest from both the experimental and the control classes had homogeneous variances (Table 6).

Table 6: Homogeneity tests of the pretest and posttest of the experiment and control classes

Description	Pretest		Posttest	
	Control class	Experiment class	Experiment class	Control class
Variances	68.41	47.00	-197.10	186.08
$F_{Countable}$	1.45		-1.06	
F_{Table}	2.54		2.54	
Decision	Homogeneity		Homogeneity	

The homogeneity test in Table 6, it could be indicated with F $_{countable}$ was smaller than F_{-table}, with a significant level (= 0.05). it means that there were no differences in variance between the experimental and the control classes. In other words, the variances of the student abilities between the experimental and the control classes were the similiar. To see whether there was a significant difference or not between the learning outcomes of the students from the control and the experimental classes, the t-test was then performed. The t-test was carried out on the pretest, posttest, and improvement of learning outcomes. The results of the pretest from both classes were showed in table 7.

Table 7: The t-test of pretest of the control and experimental classes

No	Class	$\overline{X}$	ρ	$\propto$	Decision
1	Experiment	18.52	0.41	0.05	Not significant
2	Control	19.82			

Table 7 presented that *p* (0.41) >0.05 which indicates that there is no significant difference between the outcomes of the student in the control and the experimental classes. This means that the initial abilities of the students from both classes were similar. However, after being treated with different learning between the two classes, namely the control class that was conducted by discussion learning and the experimental class with recitation-based group investigation learning, the learning outcomes were significantly different on the posttest (Table 8).

Table 8: t-test of posttest of the control and experimental classes

S. No	Class	$\overline{X}$	ρ	$\propto$	Decision
1	Experiment	76,78	0.00	0.05	significant
2	Control	67,79			

Table 8 presented a *p*-value (0.00) <0.05, indicating that learning outcomes of the student from the posttest of the classes using recitation-based group investigation learning was significant difference from student learning outcomes of the control classes that used the discussion method.

Once, compared to learning outcomes of the students in the pretest and posttest of each class, it showed that the increase in learning outcomes was very different. Table 9 showed that the increase in learning outcomes of the students from the experimental class (58,26) was higher than the increase in learning outcomes from the control class (47.97). The differences in improvement in learning outcomes of the two classes were very significant in which *p* (0.41) > α (0.05).

Table 9: Comparison of the improvement of learning outcomes of the experimental and the control classes

S. No	Class	Pre-test	Learning	Post-test	Improvement in learning outcomes	ρ	$\propto$	Decision
1	Experiment	18,52	recitation-based group investigation	76,78	58,26	0.00	0.05	significant
2	Control	19,82	discussion	67,79	47.97			

Table 9 showed that learning using the recitation-based group investigation model had a very significant effect on improving the learning outcomes of the student. Thus, this model is very suitable to be applied for learning in high school. These results reinforce the view that the merging of the group investigation model and the recitation method effectively results in student learning [9]. The result supports the view that learning with a group investigation model was considered a learning model that 1) encouraged students to be responsive to a problem [13], 2) design an experiment, thinking and acting creatively in solving problems, interpreting and evaluating observations, stimulating the development of students' thinking to solve problems [11, 12], 3) develop the ability to think independently, be critical, reflective, and productive [14], 4) develop mutual understanding, respect and good skills in communication [5, 10]. Thus, by combining the group investigation model and the recitation method, it can make student learning outcomes improve effectively, compared to a learning discussion method applied in the control class. As such, it can be recommended that the learning model of the recitation-based group investigation can influence the learning outcomes of the student in SMPN 1 Bolano Lambunu.

4. Conclusion

The recitation-based group investigative learning model affect significantly on improving student' learning outcomes at SMPN 1 Bolano Lambunu.

5. Suggestion

Based on the research conducted, the researchers suggest that the teacher particularly Biology teacher applies a learning model based on group recitation investigation as an alternative to improve student' learning outcomes.

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