

The Comparison of Student Learning Outcomes Using Make a Match and Snowball Throwing Model Learning on Ecosystem Materials in Class X SMA Yayasan Perguruan Keluarga Pematangsiantar Academic Year 2019/2020

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Abstract

This study aims to determine the comparison of student learning outcomes and the magnitude of differences in student learning outcomes by using the Make a Match and Snowball Throwing learning model in Ecosystem material in class X of SMA Perguruan Keluarga in the 2019/2020 Academic Year. The total population is all students of class X are 103 students, consisting of 3 classes. The sample was taken by Cluster Random Sampling, obtained 2 classes, namely the experimental class I (X MS 1) totaling 34 students and the experimental class II (X MS 2) totaling 34 students. Data analysis in this study is to look for the average value (\bar{x}), Standard deviation (S) and hypothesis testing (t test). From the research results obtained the average value of Pre-test Experiment I and Pre-Test Experiment II were 37.79 and 42.64. The average Post-test value of experiment I and experiment II was 91.62 and 85.74 with a difference of 5.88. The standard deviation of the Pre-test and Post-test experiments I were 12.98 and 6.48, the standard deviation of the Pre-test and Post-test experiments II were 14.68 and 4.94. From the results of data analysis with the t test at a significant level $\alpha = 0.05$ and the degree of freedom (dk) = 66 obtained t-count (4,208) > t-table (2.00), then H_0 is rejected H_a is accepted, meaning that there are differences in student learning outcomes using make a match and snowball throwing model learning on ecosystem materials in class x SMA Yayasan Perguruan Keluarga Pematangsiantar Academic Year 2019/2020.

Keywords

comparison, Make a Match, Snowball Throwing, student learning outcomes



I. Introduction

In the teaching and learning process there are interactions or reciprocal relationships between students and teachers, where students receive lessons taught by the teacher. According to Slameto (2003: 2) "Learning is essentially a business process undertaken by someone to obtain changes in new behavior in a way overall, as a result of his own experience in his interactions with the environment".

The teacher teaches by stimulating, guiding students and directing students to learn lesson material according to the objectives to be achieved. Biology is one of the subjects contained in a series of learning activities. In studying Biology many students are found to be bored and fed up with subject matter taught because biology is memorized.

Many ways that teachers do to teach students, ranging from using several learning models. According to Skinner in Isriani and Dewi (2017: 4) states that learning is a process of adaptation or behavior adjustment that takes place progressively.

The teacher's goal is to do a lot of models in learning in order to achieve the desired competencies. Specifically in biology subjects that have a lot of memorization or information that is memorized in the minds of students. In the 2013 curriculum as it has been implemented in SMA Yayasan Perguruan Keluarga Pematangsiantar, teachers are no longer only teach with conventional methods but teachers are required to be able to apply various learning models so that students can easily and not get bored in learning biology.

Biology teacher in SMA Yayasan Perguruan Keluarga Pematangsiantar has implemented several learning models such as discussion, memorization, and lecture models. So that students do not play an active role in learning, the learning model results in a 65% student score fulfilling the Minimum Mastery Criteria where the Minimum Mastery Criteria is 65. In addition, it is also known that the average score of SMA Yayasan Perguruan Keluarga Pematangsiantar for the last 5 years on biology subjects namely in the 2014/2015 academic year were 75.18 in the 2015/2016 academic year were 85.23 in the 2016/2017 school year were 75.23 in the 2017/2018 school year was 82.12 and in the 2018 school year / 2019 is 85.56.

From the results of observations made by the writer with biology teacher of SMA Yayasan Perguruan Keluarga Pematangsiantar, every year students who excel in biology take a City and Provincial Science Olympiad but never win a champion. Therefore it is necessary to develop learning that can increase student learning activities. One effort to improve student learning activities is to choose the right teaching method.

One of the learning models that can be expected to achieve the above objectives is that interesting learning needs to be tried to apply a learning model that can arouse student learning motivation, so as to improve student learning outcomes. The learning model that will be used is the Make A Match and Snowball Throwing learning model.

According to Istarani (2011) Make A Match is an alternative that can be applied to students. The application of this model starts from the technique that students are told to look for pairs of cards which are answers / questions before the deadline, students who can match the cards are given points. One of the advantages of this technique is that students look for partners while learning about a concept or topic in a pleasant atmosphere.

According to Istarani (2011) Snowball Throwing is a series of presentation of teaching material that begins with the delivery of material, then forms groups and group leaders who then each group leader returns to their respective groups, then explains the material delivered by the teacher to his friend and students are given one sheet of paper, to write down any questions regarding the material that has been explained by the group leader.

From the observations, the writer found that the teacher had never done the Make A Match and Snowball Throwing models. The Make A Match and Snowball Throwing learning model is very different from the conventional learning model conducted by teachers in schools. This difference can be seen from the syntax and methods used in the learning process.

Based on the description above, the authors conducted a study with the title: " The Comparison of Student Learning Outcomes Using Make a Match and Snowball Throwing Model Learning on Ecosystem Materials in Class X SMA Yayasan Perguruan Keluarga Pematangsiantar Academic Year 2019/2020".

II. Research Method

2.1 Location and Time

This research was conducted in class X in SMA Yayasan Perguruan Keluarga Pematangsiantar Seram Street No.15, Pematangsiantar in March 2019/2020 Academic Year.

2.2 Population and Samples

- a. The population taken in this study were all students of class X MS in SMA Yayasan Perguruan Keluarga Pematangsiantar consisting of 3 classes with a total of 103 people.
- b. The sample taken in the study is by Cluser Random Sampling, which is random sampling. So that the chosen class X MS 1 and X MS 2 where both classes as the Experiment class (treated), each class totaling 34 students.

2.3 Research Design

This type of research is an experimental study using quasi-experiments, namely Quasi Experiments. The sample in this study was grouped into two classes namely X MS 1 (experimental class I) was to use the Make a Match learning model and class X MS 2 (experimental class II) was a Snowball Throwing learning model. Before learning began, both sample classes were given Pre- test to determine the initial abilities of students.

Then the experimental class I was taught using the Make a Match learning model and in experimental class II was taught using the Snowball Throwing learning model, then after the lesson was given a Post-test to find out the learning outcomes of each sample class.

2.4 Research Instruments

The data needed in this study is the data from the written test results which are student learning outcomes in the Ecosystem material in Experiment I class namely X class 1 MS and Experiment II class X class MS 2, the instrument used in collecting the data is the learning achievement test in the form of Pre-Test and Post-Test as follows:

- a. Measuring instruments in the form of items in the form of multiple choice with 4 kinds of answer choices (a, b, c, and d) with a total of 20 questions.
- b. Each correct score is given a score of 1 and a wrong score is given 0. With the following formula:

$$N = \frac{\text{true number} \times 100}{\text{Number of questions}}$$

2.5 Research Procedure

The research procedure consisted of three stages:

- a. Preparation phase
 - Arrange research schedules.
 - Develop a learning plan program.
- b. Implementation Stage
 - Determine the sample of experiment class I and experiment class II.
 - Give pre-test to the experimental class I and experimental class II.
 - In class X MS 1 presents ecosystem material using the Make a Match learning model.
 - In class X MS 1 presents ecosystem material using the Snowball Throwing learning model.
 - Give a post-test in the experimental class I and experimental class II.

c. Final Stage

- Analyze data.
- Draw a conclusion
- Make a research report.

2.6 Data Analysis Techniques

a. Normality Test

Normality test is calculated using SPSS 21, used to determine whether the research data is normally distributed or not. According to Sudjana (2016: 249) can be calculated using the formula Chi squared (X^2):

$$\chi^2 = \sum_i^k = 1 \frac{(f_o - f_e)^2}{f_e}$$

Information :

X^2 = Chi Squared

f_o = Legal frequency

f_e = Expected frequency

With testing criteria $\text{sig} > 0.05$. And declared normal if the value of $\text{sig} > 0.05$ and vice versa the data are said to be abnormal if $\text{sig} < 0.05$.

b. Homogeneity Test

Homogeneity test is used to see whether the two classes tested have the same variance or not. According to Sudjana (2016: 250), homogeneity can be calculated using the formula:

$$F = \frac{\text{Varians Terbesar}}{\text{Biggest variant}}$$

Smallest variant taking criteria that is $\text{sig} > .05$, it can be said that the variance is the same and if $\text{sig} < 0.05$, it can be said that the variance is not the same.

c. Calculating Averages

To calculate the average (\bar{x}) using SPSS 21. According to Sudjana (2016: 67) to calculate the average value, the formula can be used:

$$\bar{x} = \frac{\sum \text{fixi}}{\sum \text{fi}}$$

Information :

(\bar{x}) = Average value

$\sum \text{fixi}$ = Total value

fi = Number of samples

d. Calculate the Standard Deviation

To determine the standard deviation (S), SPSS 21 is used. According to Sudjana (2016: 93) it can be calculated using the formula:

$$S = \frac{\sum \text{fixi} - (\sum \text{fixi})^2}{n(n-1)}$$

Information :

S = Standard Deviation (Standard Deviation)

n = Number of Students

$\sum \text{fixi}$ = Average

e. Test the Research Hypothesis

To test the hypothesis whether the truth can be accepted or rejected, a t-test with a significant level of $\alpha = 0.05$ is used. According to Sudjana (2016: 239), hypothesis testing can be calculated using the formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where S^2 is the combined variance calculated by the formula:

$$S = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

Information :

- t = coefficient sought
- \bar{X}_1 = The average value of Experiment I class
- \bar{X}_2 = Average grade of Experiment II class
- S = Standard deviation
- S^2 = Standard deviation combined
- S_1^2 = Standard deviation of Experiment I class
- S_2^2 = Standard deviation of Experiment II class
- n_1 = Number of sample for Experiment I class
- n_2 = Number of sample for Experiment II class

With testing criteria:

- a. If $t_{count} < t_{table}$, at a significant level $\alpha = 0.05$ and degrees of freedom $(dk) = (n_1 + n_2) - 2$, then H_0 is accepted and H_a is rejected, meaning there is no difference in student learning outcomes using the Make a Match and Snowball learning model. Throwing on Ecosystem material in Pematangsiantar Family Foundation High School 2019/2020 Academic Year.
- b. If $t_{count} > t_{table}$, at a significant level $\alpha = 0.05$ and degrees of freedom $(dk) = (n_1 + n_2) - 2$, then H_0 is rejected and has accepted, meaning that there are differences in student learning outcomes using the Make a Match learning model and Snowball Throwing on Ecosystem material in SMA Yayasan Perguruan Keluarga Pematangsiantar Academic Year 2019/2020.

III. Discussion

3.1 Result

The population in this study were all students of class X MS in SMA Yayasan Perguruan Keluarga Pematangsiantar consisting of 3 classes of 103 students and the sample in this study was taken by cluster random sampling obtained by two classes namely class X MS 1 as an experimental class 1 (34 people) and class X MS 2 as experimental class II (34 people).

Before learning is done, both classes are given a Pre-test, then the experimental class I (X MS 1) is given treatment using the Make A Match model and the experimental class II (X MS 2) is treated using the Snowball Throwing learning model. After learning is finished both classes are given a Post-test, then data from the class are analyzed.

The data obtained in this study is the value of student learning outcomes using the Make A Match model with Snowball Throwing on Ecosystem material in class X SMA Yayasan Perguruan Keluarga Pematangsiantar Academic Year 2019/2020.

Table 1. Conclusion of Student's Pre-test and Post-Test Results in Experiment Class I and Experiment II

NO	Result	Experiment Class I		Experiment Class II	
		Pre-test	Post-test	Pre-test	Post-test
1	The highest score	65	100	65	95
2	The lowest score	20	85	20	80
3	Average	37,79	91,62	42,64	85.74
4	Minimum Mastery Criteria	65			

In table 1 it can be seen that the students' post-test in the experimental class I was higher than the experimental class II. The average post-test of experimental class I and experimental class II was 91.62 and 85.74 with a difference of 5.88. This shows that there are differences in student learning outcomes taught using the Make A Match learning model with the Snowball Throwing learning model. The highest pre-test score in experiments I and II are both 65. The highest post-test value in experiment I with a score of 100 while the experimental value II is 95. The Minimum Mastery Criteria that students must achieve is 65.

3.2 Research Hypothesis Test

From the results of testing the post-test data hypothesis after being given treatment for the experimental class I (Make A Match) with the experimental class II (Snowball Throwing), in table 2 below:

Table 2. Post-test Hypothesis Test Data Experiments I and Experiments II

	Paired Sample Test					t	Df	Sig. (2-tailed)
	Paired Differences							
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Post-test I	91.61	6.480	1.111	3.091	8.673	4.208	66	.002
Post-test II	85.73	4.943	.847	3.087	8.677			

From the results of testing the hypothesis using the t test at a significant level $\alpha = 0.05$ obtained $t_{\text{count}} (4.208) > t_{\text{table}} (2.00)$, then H_0 is rejected H_a means that there are differences in student learning outcomes by using the Make A Match and Snowball Throwing learning model on Ecosystem material in Class X SMA Yayasan Perguruan Keluarga Pematangsiantar Academic Year 2019/2020.

3.3 Research Discussion

The purpose of this research is to find out differences in student learning outcomes using the Make A Match learning model and Snowball Throwing on Ecosystem material in Class X SMA Yayasan Perguruan Keluarga Pematangsiantar Academic Year 2019/2020.

Based on the results of data analysis, obtained the number of Pre-test score of Experiment I class is 1285 with an average value of 37.79 out of 34 students in Experiment I class, out of these values none of the students reached Minimum Mastery Criteria. The total Pre-test score of Experiment II class was 1450 with an average value of 42.64 out of 34 students in Experiment II class, the value of all students did not reach Minimum Mastery

Criteria. The average Pre-test value of Experiment I and Experiment II classes were 37.79 and 42.64 with a difference of 4.85.

From the results of the study, obtained the number of Post-test scores Experiment I class is 3115 with an average value of 91.62 from 34 students. Students who reached Minimum Mastery Criteria 65 were 34 students. The number of Post-test scores of Experiment II class is 2915 with an average score of 85.74 out of 34 students. Students who reach Minimum Mastery Criteria 65 are 34 students (100%). The average value of Post-test of Experiment I class and Experiment II class is 91.62 and 85.74 with a difference of 5.88.

Wulandari (2016) concluded that. In the Make A Match learning model students are more active and can get the highest score compared to Snowball Throwing.

IV. Conclusion

Based on the results of research, data analysis, and discussion, the following conclusions can be obtained:

1. From the results of testing the hypothesis test using t -test obtained $t_{\text{count}} (4,208.) > T_{\text{table}} (2.00)$, then H_0 is rejected and H_a is accepted, meaning that there are differences in student learning outcomes using the Make A Match and Snowball Throwing learning model in Ecosystem material in Class X SMA Yayasan Perguruan Keluarga Pematangsiantar Academic Year 2019/2020.
2. From the research results obtained by Post-test value with an average of experimental class I (Make A Match) of 91.62 and the average value of experimental class II (Snowball Throwing) of 85.74 thus obtained differences in learning outcomes from the two classes by 5.88.

Based on the conclusions above, the following suggestions can be given:

1. For teachers, they should be able to choose and master the learning model / method that will be used in the teaching and learning process, and the teacher follows the education curriculum in applying the learning model / method to be used.
2. For students, it is better when the teacher applies a learning method in class, can follow the teacher's instructions well so that the results achieved can be in accordance with what is expected by the teacher.
3. For all fellow students as prospective teachers, let's work together to educate the nation's life and to the next researchers, who are researching about Make A Match and Snowball Throwing in other schools and with other materials so that they can be a comparison for teachers in improving the quality of education especially in biology.

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