

The Influence Of Learning Model Application of Discovery To The Results of The Study of Biology

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Abstract.

This research was conducted in the upper secondary school Panai Middle years learning 2018/2019. This study aims to determine the influence of learning model application of Discovery to student learning outcomes on the material the human excretory system in class XI Science. This type of research is quasi-experimental. Population, all students of class XI Science high school Panai Tenga amounted to 32 people. The sampling technique is total sampling, where the entire population in the study sample. The instruments used are test, observation sheet and questionnaire. Data were analyzed using descriptive statistics, test prerequisites and the test of hypothesis with the help of SPSS software version 22. From the results of the hypothesis test, t-test paired samples (Paired Sample t-test), obtained the value of tcount of 5,422 and ttable with $\alpha = 0.05$, $df = 15$, the obtained values ttable amounted to 2,131. The value of tcount > ttable or $5,422 > 2,131$ can be concluded that H_0 is rejected and H_a accepted. This means that there is significant influence of learning model application of Discovery to student learning outcomes in class XI Science high school Panai Middle years learning 2018/2019.

Keywords : Learning Outcomes, Model Pembelajaran Auditory Intellectually Repetition

I. INTRODUCTION

During this process of knowledge transfer carried out by the teacher to the students only megandalkan source of books. Learning these in addition to make the students get bored, also can make students ' thinking is less developed. This can happen because the process of learning that takes place seem monotonous, resulting in a lack of understanding of the subject matter presented by the teacher that lead to student learning outcomes is low. The factors that affect the learning outcomes classified into two, namely internal factors and external factors [1]. States that learning by Discovery is a method or way of learning that is characterized by the presence of a real problem, a real-world problems as a context for students to learn critical skills and solve problems and acquire knowledge [2]. States that learning by Discovery is a learning model that engages students to solve a problem through the stages of the scientific method so that students can learn knowledge based on the problem and have the skills to solve the problem [3]. In the process of learning biology, required the application of learning models appropriate to the material presented can be understood by the students and students were no longer passive and feel bored in following the learning activities that took place. Because if the teachers apply the learning model in accordance with the subject matter, then the opportunities to acquire the learning outcomes expected was greater.

II. RESEARCH METHODS

The type of research used in this research is a quasi experiment to analyze the influence of what happens in between variable X (Independent) to Y variable (Dependent) based on the difference in learning outcomes of students taught in the experimental class that uses learning model of Learning, Discovery and students in the control group using conventional learning models. The research design used for this study is Non-randomized Pretest – Posttest control group Design. In this design, the subject group is not done randomly. The researcher did not change the student's grade in determining the subject to group – experimental group. The design of the study is stated as follows :

The Research Variables

In this study, there are two research variables, namely, variables X (Independent) and Y variable (Dependent). Variable X (Independent) is a model of learning Discovery and variable Y (Dependent) is the result of learning biology the student on the material of the excretory system of man.

Techniques of Data Retrieval

Data collection techniques used to retrieve the data of this study is to give a pre – test at the beginning of the meeting on the control class and the experiment to obtain preliminary data research to be used as a control or comparison. After the learning activity is over, done post – test, to retrieve data the end of the study, in addition in doing observations, through the teacher observation sheet and observation sheet of students during learning activities take place by the observator.

III. RESULTS AND DISCUSSION

1. Description Of The Results Of Research

The research instrument used is in the form of learning about the test results, questionnaire and observation sheet of students 'learning activity, as well as the observation sheet activities of teachers' teaching. Instruments in the form of test learning outcomes have been drafted that amount to as much as 35 solved, before it is given to the sample, the first have been tested for validity and reliability by using SPSS software Version 22. The results of the validity of the question show of 35 questions tested, obtained 30 about which is declared invalid, thus the questions are not valid are considered fall or discarded, while the questions are valid to use as instrument in the research.

Testing instrument the results of the study followed with the reliability test, namely using SPSS software version 22. Based on the reliability test by using SPSS software version 22, the obtained value of the reliability count r , of 0,942 and then compared with r tables with $df = (N-2)$, the obtained $df = (33-2) = 31$, then the obtained r value tables for the significant level 0.05 is equal 0,3440. The terms for the item about the said reliable is if the value of r count $>$ r table. Based on the calculation of the reliability of the obtained value of r count $>$ r table = to $0.918 >$ $0,3440$ thus, the questions tested are reliable or can be trusted, and the reliability is high. With so then the questions that have been tested for validity and reliability of such, has been eligible to serve as a data collection tool or be used as research instrument.

2. Learning Outcomes Of Students In The Control Class

In control class, before they are carried out learning activities with conventional learning models, first performed activities pre-test (preliminary test) which aims to determine how the initial ability of the students about the subject matter to be taught such. Furthermore, after the pre – test, then do a learning activity with the use of conventional learning models with reference to the LESSON plans that have been made in advance. At the end of the learning activity and after all the subject matter of the excretory

system in humans has been done being taught, then do the activity post – test on students of the control class. Data learning outcomes (post-test) students in the control class, can be seen in table 4.1 below

Table 1. Data Learning Outcomes Students In The Control Class

Statistics	Pre-test (O3)	Post-test (O4)
The number of	656,7	990
The average	41,58	62,7
The Standard Deviation	11,92	11,07
Variance	142,25	122,70
The Maximum Value	75,9	85,8
The Minimum Value	33	49,5

Based on the data in the table above, shows that before the material learned in earn the amount of the value of the pre-test students is by 656,7 an average value of 41,58 and standard deviation of 11,92 variance 142,25 with the highest score 75,9, and the lowest value is 33. After the material of the excretory system human learned with using conventional learning models, and given the post-test, then based on data from the post-test obtained the amount of value of post-test of students by 990 the value of the average amount of 62.7 and a standard deviation of 11,07 variance 122,70 with the highest value of 85,8 and the lowest value was of 49.5. Based on the above data, it can be said that there is increased learning outcomes of students in the control class who are taught by using conventional learning models.

3. Student Learning Outcomes Experimental Class

The same as in the control class, the experimental class also performed first activities of the pre-test which aims to determine the level of initial ability of the students to the subject of the human excretory system that will be taught by using learning model of Discovery. After the pre-test, then the next treatment is given, namely by carrying out a learning activity using a learning model Discovery on the subject of human excretory system. At the end of a learning activity, after all the material about the human excretory system has been completed learned, then the next step is post-test that aims to determine the learning outcomes of students, after being taught with the learning model of Discovery. Below is a table summary of the results of pre-test and post-test students in the experimental class, which is presented in table 2 below.

Table 2. Data Student Learning Outcomes Experimental Class

Statistik	Pre-test (O1)	Post-test(O2)
Jumlah Nilai	775,5	1267,2
Ratified-ratified	48,46	79,2
Standar Deviasi	11	8,1
Mostly	121	65,34
Nilai Maximum	79,2	95,7
Nilai Minimum	33	59,4

Based on the data in the table above, shows that before the material is learned by using the model of the Discovery, obtained the amount of value of the pre-test of students by 775,5 the average value amounted to 48,46 and a standard deviation of 11 variance 121 with the highest value of 79.2 and the lowest value is 33. After the material of the excretory system human learned by using the learning model

Discovery, then given a post-test, then based on data from the post-test obtained the amount of value of post-test of students by 1267,2 an average value of of 79.2 and a standard deviation of 8.1 variance 65,34 with the highest value to 95.7 and the lowest value is 59,4. Based on the above data, it can be said that an increase in student learning outcomes in experimental class taught by using learning model of Discovery. This can be seen in the rise in the average value of learning outcomes on the post-test higher than the value of the results of the study on the pre-test. Here is a diagram of the increase in the value of learning outcomes of student that learned using the learning model of discovery.

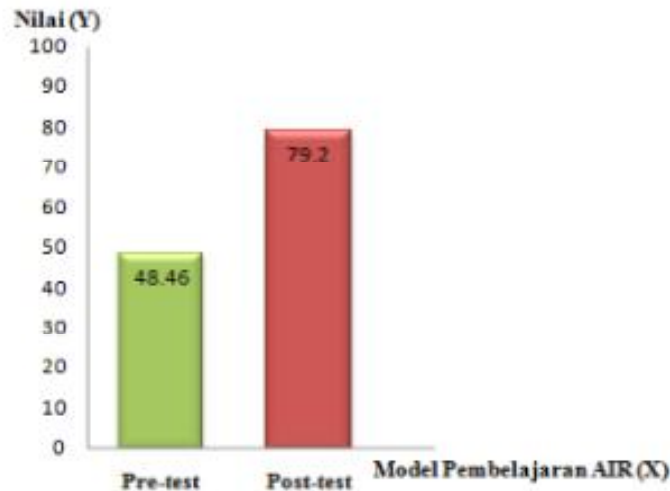


Fig 1. Diagram the Average Value of Student Learning Outcomes Experimental Class

Students that learned by using the learning model Discovery is active at the time the learning activities take place. Students were divided into groups to learn who numbered as many as three groups of students with each member of the group is as much as five and six students. Students discuss with their groups to complete the problems given by the teacher (Researcher). The liveliness of these students can be seen from the observation sheet of student's activities in observation by the teacher (the Researcher) at the time the learning activities take place. Here is the predicate value of each group of students at the time worked in his group.

Table 3. The Value Of The Results Of Observation Of Student Learning Activities Classroom Experiments

Group of Students	Score	Median	Percentage (%)	Qualification Value
I	42	4,2	84%	B
II	41	4,1	82%	B
III	43	4,3	86%	A

Based on the data in the table above, it can be seen that group III is the group that is most active with the predicate value A.

4. Analysis Of Research Data

Testing The Normality Of Data

Testing the normality of data research, conducted to determine whether the data pre-test in both groups of students both the control class and the experimental class the normal distribution or not. Calculation of the normality of the data was conducted using SPSS software version 22 using the formula of

kolmogorov-smirnov with a significance level of α 0.05, which will be compared with the value of Asymp.sig obtained from the calculation of SPSS. The results of the calculation of data normality by using the kolmogorov-smirnov in SPSS version 22, can briefly be seen in table 4.3 below.

Table 4. The Results Of The Calculation Of The Normality Test Data Pretest

Class	Research Data	Value	Sig Level Trust (α)	Conclusion
Experiments	Pretes (O ₁)	0,163	0,05	Normal
	Postes (O ₂)	0,136	0,05	Normal
Control	Pretes (O ₃)	0,063	0,05	Normal
	Postes (O ₄)	0,090	0,05	Normal

Table 3 above, show that the data pre-test on both groups of students come from a population with normal distribution. It can be seen from the Sig value obtained in the second group of that class, for the experimental class obtained value Sig. the data of pretest and posttest of each research is equal to 0,163 (16,3%) and 0,136 (13,6%) with a significance value of 0.05 (5%) then $\text{Sig.} > \alpha = 16,3\% > 5\%$ and $13,6\% > 5\%$, it can be concluded that research data have normal distribution

5. Testing The Homogeneity Of Data

Testing the homogeneity of the data aims to determine whether the two groups of students in the study sample have a variance of the data homogeneous and can represent other populations. Testing the homogeneity of the data was done by using SPSS software version 22 using the test of homogeneity of variances. Based on the results of the test data pretest study the control class and the experimental class, the significant values obtained in the control class of 0,978 and the experimental class is 0,974. The terms for the data for the homogeneous is the value of significant is greater than 0.05, then $0,978 > 0,05$ and $0,974 > 0,05$. The value of significant is greater than 0.05, it can be stated that, the variance of the second data group of the research sample come from a population homogeneous, so that the results obtained can represent the population of the other.

4.3. Hypothesis Testing

Hypothesis testing is done to find the answers of the hypotheses in this study. After the requirements of the data analysis that is normality test and homogeneity are met, then the next step is testing the hypothesis. Testing the hypothesis made on the value of post-test of both groups of the sample of the research by way of different test average value of student learning outcomes obtained from the post-test both groups of the samples. Hypothesis testing is done using SPSS software version 22 using the formula t test paired samples (Paired Sample t-test). The test results are located in appendix, shows that the value of t obtained is equal to $5,422 > t \text{ table} = 2,131$ at the level of significance $\alpha = 0.05$ and $df = (16-1) = 15$. Thus, it can be interpreted that there is difference in the average value of student learning outcomes that learned by learning model, Discovery and conventional learning models, then the H_a which states that there is influence of learning model Discovery learning outcomes of students on the subject of the human excretory system in class learning model Discovery learning outcomes of biology students learning years 2019/2020 accepted and H_o is rejected.

Discussion

The results of the research show that there is a significant influence on the value of the learning outcomes of student that learned using the learning model of Discovery on the subject of the human excretory system in class years learning 2018/2019. Students in the control class learned by using conventional learning models, where before being given treatment, first performed the pre-test and obtained the

average value of the pre-test of 41,58 with a standard deviation of 11,07. While students in the experimental class given treatment in the form of learning by using learning model Discovery before treatment is also performed pre-test and obtained the average value of the pre-test amounted to 48.46 with a standard deviation of 11. Based on the average value of the pre-test and standard deviation obtained from the second group of that class, then performed the test significantly to the average value of the pretest the two groups of samples with the aim to find out whether nterdapat the difference in the average value of the pretest in both groups of the study sample with the basic decision-making if $t_{count} < t_{table}$, then H_0 is accepted and H_a rejected, meaning that there is no difference in the average value of the pretest both groups of the study sample, and vice versa if $t_{count} > t_{table}$, then H_0 is rejected and H_a accepted, this means that there is difference in the average value of the pretest both groups of the study sample . Based on the significance test data of the pretest the study of the second class groups by using t test paired sample , it is obtained the value of t_{count} by $-1,952$ and t_{table} with $df = 15$ and a significance level of 0.05 so that the values obtained t_{table} is $2,131$, then $t_{count} < t_{table}$, that is $-1,952 < 2,131$, H_0 is accepted and H_a rejected, meaning that there is no difference in the average value of the pretest both groups of the study sample, it can be concluded that the average value of the second group of that class have the ability the beginning of the same (not different). After the treatment given to the control class that learned with conventional learning models, then made post-test and obtained the average value of post-test rate of 62.7 with a standard deviation of $11,07$. While in the experimental class students that learned by using the learning model Discovery, then do the post-test once all the material is completed studied and obtained an average value of of 79.2 with a standard deviation of 8 . Based on the acquisition value of the average post-test in both groups of these students, after being given different treatment between the experimental class with the control class there are differences in the average value of the results of the study are significant. This is also evidenced by the results of testing the hypothesis that with the obtained value of $t_{count} = 5,422 > t_{table} = 2,131$ at the level of significance $\alpha = 0.05$.

The experimental class students that learned by using the learning model of Discovery, grouped into 3 groups of students consisting of respectively 5 and 6 students. The formation of groups of students performed heterogeneously. Students in the experimental class active in working together in solving the problems given by the teacher (Researcher). It is proved by obtaining the value of the predicate A and B of each group of student learning. The response of students towards learning model Discovery is also very positive. It can be seen from the positive responses of the students of the experimental class on the sheet of questionnaire about the learning model Discovery given by the teacher (Researcher).

Meanwhile, the students of the control class that learned by using conventional learning models, students work individually in completing the task given by the teacher (Researcher). The learning that takes place running in a clockwise direction, with only a couple of students who actively ask about the topic being studied and more students who are more passive and less eager at a time when learning activities take place. Nevertheless, based on the results of research conducted in the eleventh grade year learning 2019/2020 indicates an increase in the average value of student learning outcomes, but learning outcomes of experimental class students who learned with the learning model Discovery more effect on the results of student learning when compared with learning outcomes of students in the control class that learned with conventional learning models.

IV. CONCLUSION

Based on the results of the research data and discussion of data the results of the research, it can be concluded as follows :

- Model pembelajaran Discovery affect the value of student learning outcomes in class XI natural science High School Negeri 1 Panai Middle years learning 2019/2020
- The average value of student learning out comes that learned by learning model, Discovery is higher than the average value of learning outcomes that learned with conventional learning models.

REFERENCE

- [1] Irmayanti, dkk 2020. **International Journal of Innovative Science and Research Technology volume-5-2020_issue-3-march**
- [2] Sudjana, Ad dalam Arsyad. 2002. *Mengajar Dengan Sukses*. Jakarta: Penerbit PT Grasindo.
- [3] Agustin Sukses Dakhi. (2020). The Learn From Home and Alienation. *International Journal of Science, Technology & Management*, 1(2), 133-137. <https://doi.org/10.46729/ijstm.v1i2.33>
- [4] Syahfitri. 2008. *Pengelolaan Pengajaran*. Jakarta: PT Asdi Mahasatya.
- [5] Usman. 2000. *Strategi Belajar dan Mengajar Micro Teaching*. Ciputat: PT. Ciputat Perss.
- [6] Suryosubroto. 2002. *Pembelajaran Kompetensi dan Kontekstual*, Jakarta: Bumi Aksara,