

Used module results study for improvement ability student data interpretation Class X of Mataram Senior High School 5 Year 2015

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ABSTRACT

Learning moment This not enough practice skills students. The results of the PISA survey show that ability literacy science is one of them ability interpreting Indonesian student data is still very low. The use of source Study in the form of module results study allegedly can increase ability data interpretation. Research This aiming for know influence use module results study to improvement ability student data interpretation Class X of Mataram State Senior High School 5 2015. Type of research This is experiment pseudo with design Nonequivalent Control Group Design research. The instrument used for measure ability interpreting data is essay test. Research data in the form of Normalized Gain value is analyzed using the Independent Sample Test at the level significance 5% with assistance of the SPSS 16.0 program. The results of the data analysis show that the value of $\text{Sig} < \alpha$ is $0.006 < 0.05$, meaning that H_0 is rejected and H_a is accepted. This is means that there is difference ability interpreting significant data on both class. With thus can concluded that there is influence use module results study for improvement ability student data interpretation Class X of Mataram State Senior High School 5 Year 2015.

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1. INTRODUCTION

Education is the most important need for humans. As is known, education is very useful in forming quality human resources. The ever-changing situation of society requires education to look far ahead and think about what students will face in the future.

Efforts made to find out the picture of the quality of Indonesian education include joining the Programme for International Student Assessment (PISA). PISA is a world-class assessment held every three years to determine the academic performance of 15-year-old school children (Ekohardi, 2009:28). According to Scott (2004), the purpose of PISA is to measure the education system and measure the science process abilities of students so as to get a stronger picture of students' science literacy. The results of PISA can be used to determine the strengths and weaknesses of a country's education system.

The variety of questions in the PISA test presented are not only concepts, but also demand science process skills. One of these science process skills is the ability to interpret data in the form of images to obtain information. The results of the 2000 PISA survey showed that Indonesia's science

literacy ability was in 38th position out of 41 countries, in 2003 it was in 38th position out of 40 countries, in 2006 it was in 50th position out of 57 countries, in 2009 it was in 60th position out of 65 countries and in 2012 it was in 64th position out of 65 countries with an average score of 390 (Ministry of Education and Culture, 2011). These data show that Indonesia's position is significantly below the international science literacy standard, which is 500. In addition, the overall data shows a decline in ranking from year to year, indicating that there is no effort made to improve achievement.

Some factors that cause low levels of data interpretation in students are that the exercises given to students in the implementation of learning are more focused on intellectual abilities and do not fully improve affective and psychomotor abilities. In addition, the lack of learning resources that train students to interpret data is also a factor that causes low student ability to interpret data. According to Wena (2011:56) one of the problems in the learning process is the lack of learning resources in the form of quality textbooks so that students find it difficult to understand the books they read and often these textbooks are boring. Learning resources are everything that can make it easier for students to obtain a number of information, knowledge, experience, and skills in the teaching and learning process (Mulyasa, 2002:48). So that learning resources are very important to support learning outcomes.

The low ability to interpret data and the unavailability of learning resources that train the ability to interpret data are problems that need to be solved. One alternative that can be used to solve this problem is to modify learning resources to produce quality learning resources that can train the ability to interpret data. One of the learning resources that can be used is a learning module. So far, the learning module still contains a summary of the material in the textbook without being enriched with research information, therefore the learning module is modified into a research module. The module is equipped with research information that is arranged with an orientation towards activities to train the ability to interpret data, so that by reading the module students will be accustomed and trained to interpret data. Learning with modules allows students to learn anywhere, learning intensity can be controlled and students who have fast learning abilities can be facilitated. Based on the description above, it is necessary to conduct research to determine the increase in data interpretation abilities using the biology research module in Class X students of SMA Negeri 5 Mataram in 2015.

2. METHOD

2.1 Types of research

The type of research used is quasi-experimental research, called quasi-experimental research because this experiment does not have a real experimental design, namely it is difficult to control external variables that influence the implementation of the experiment (Sugiyono, 2013:77) .

2.2 Time and Place Study

Study This conducted in August - September at School State High School 5 Mataram in class X odd semester year 2015-2016 lessons.

2.3 Population and Sample

2.3.1 Population

Population in study This all over student class X SMA Negeri 5 Mataram odd semester year 2015/2016 lessons.

2.3.2 Sample

Retrieval sample with Purposive Sampling method, namely technique determination sample with consideration certain (Sugiyono, 2013: 85). Taking sample with Purposive Sampling based on consideration that is take the class is the educator (teacher who guides at school when research) teaching in class the is the same, so that 2 classes selected for become sample without shuffle his students. Sample in study This is student Class X of SMA Negeri 5 Mataram odd semester year 2015/2016 lessons consisting of from two classes, namely class X MIPA 5 as class control and class X MIPA 3 as class experiment.

2.4 Data collection technique

Data collection techniques are one of the formulated activities in a way right. This is It is intended that the data obtained truly accurate. For obtain the necessary data in study This so used technique data collection, as following:

2.5 Test Ability Interpreting Data

Data collection was carried out with use structured test in form essay test. Students will given a pre-test and post-test with the same question and is valid in principle the discussion that has been

determined. Administration of pre- test and post- test done for know condition beginning students and compared with condition end students in class control and experiment for determine existence influence treatment to ability interpreting data. To avoid leakage question so question collected return finished testing. Pre- test and post- test value data will obtained from class control and experiment.

2.6 Variables Study

Study This own variable free that is module results research and variables bound that is skills interpret data.

2.7 Research Design

Design used in study This is quasi- experimental research type of Nonequivalent Control Group Design (Arikunto, 2006:86) with use approach quantitative. Group experiment given treatment with apply augmented learning with module results study whereas group control No given treatment with addition module results research. The learning carried out on both group the started with give a pretest, after given treatment furthermore ended with posttest.

2.8 Procedure Study

2.8.1 Planning Activity

Planning done with steps as following: Creating a Research Results Module Variation Morphology Species Plant Street Shade in Mataram City and the Diversity and Distribution of Butterfly Species (Lepidoptera) in the Suranadi Nature Tourism Park Forest Area as source learning that will given to the class experiment. Result module study This moreover formerly validated by experts so that got valid module. Validation using validation instruments module; Create Plan Implementation Learning (RPP) with learning discussion in the control and experimental classes. The lesson plans that were made referring to the syllabus learning biology; Making grid instrument used runway in determination question for measure every indicators that will assessed; Compiling questions test ability interpreting data in form subjective (essay) which is not yet valid and has not been reliable. Then validity and reliability tests were conducted to the question that has been made. Based on validity and reliability test results question so obtained questions that are already valid for know ability interpret the data to be given to the class control and experiment; Researcher teach learning Biology with apply module results study Biology (variation) morphology species plant shade roads in Mataram City and the diversity and distribution types of butterflies (Lepidoptera) in the Suranadi Nature Tourism Park Forest Area) during the teaching process.

2.8.2 Implementation

Activity implementation done with steps as as follows : Determine the two classes to be sample in research ; Providing question For test ability interpreting data at the beginning learning (Pre-test) for know ability interpreting student data beginning ; Giving treatment of samples research that has been determined that is class experiment given treatment giving module results study Biology (Variation Morphology Species Plant Street Shade in Mataram City and Diversity and Distribution of Butterfly Species (Lepidoptera) in the Suranadi Nature Tourism Park Forest Area) while class control without given module results study Biology ; Giving question For test level ability interpreting student data after activity learning finished (post-test) for know influence the treatment that has been given ; Observation implementation of class lesson plans experiment and control , observation aspect affective class experiment and control and assessment aspect psychomotor class experiments and controls at the time learning ongoing assessment made in form sheet assessment containing a number of indicator assessment ; Processing the results data research , analyze and discuss findings in study .

2.8.3 Final Stage

At the stage end, researcher conclude research data and make report results research. Every activity study done documentation as proof implementation study.

2.9 Instrument Study

Instrument research developed for needs capability data collection interpreting data, namely sheet test ability interpreting data. Test sheet ability interpret this data equipped with sheet answers and rubrics his assessment. This sheet used for know ability student in interpreting data presented by the teacher with use module results study Biology.

2.9.1 Instrument Trial

Instrument evaluation ability interpret the data used is sheet test skills interpreting data. Instruments the conducted a feasibility test moreover formerly for know quality instrument as tool measure. Test statistics used for analyze the instrument are: Validity Test and Reliability Test.

2.10 Data Analysis Techniques

Data analysis was performed with Prerequisite Test The analysis consists of from Normality Test and Homogeneity Test; Hypothesis Test.

3. RESULTS AND DISCUSSION

3.1 Research Result Data

The data of this study were obtained from two classes that were given different treatments. Class X MIPA 3 which was used as the Experimental Class was given treatment, namely learning using the biology research result module while Class X MIPA 5 as the Control Class was not given treatment, namely learning without using the biology research result module. The data collected in this study included data on the ability to interpret data. Data on the ability to interpret data was obtained from the data interpretation ability test sheet given to students before and after the treatment consisting of 14 questions in subjective form (essay).

3.1.1 Implementation Learning Using the Research Results Module Biology

Description about implementation learning This aiming for give strengthening that learning that is done in accordance with indicators contained within sheet implementation learning that has been made previously. Implementation learning by teachers in class Experiment can seen in table 1, while implementation learning by teachers in class Control can seen in table 2 below This:

Table 1. Implementation Learning by Teachers in Class Experiment

Kegiatan	Indikator yang Muncul	Total Indikator	Keterlaksanaan Pembelajaran (%)	Penilaian
Pendahuluan	7	7	96.42	Sangat Baik
Inti	12	12	97.91	Sangat Baik
Penutup	4	4	81.25	Sangat Baik
Rerata			91.86	Sangat Baik

Table 2. Implementation Learning by Teachers in Class Control

Kegiatan	Indikator yang Muncul	Total Indikator	Keterlaksanaan Pembelajaran (%)	Penilaian
Pendahuluan	7	7	96.42	Sangat Baik
Inti	12	12	95.83	Sangat Baik
Penutup	4	4	81.25	Sangat Baik
Rerata			91.16	Sangat Baik

The results of the calculation of the implementation of learning in the Experimental Class and the Control Class respectively showed that the learning activities took place very well with the implementation of learning of 91.86% and 91.16%. So it can be said that the learning carried out during the research in the Experimental and Control Classes was in accordance with the learning indicators that had been planned in the form of RPP.

3.1.2 Ability to Interpret Data

Data on the ability to interpret data obtained based on the results of the pretest and posttest in the Experimental Class and Control Class can be seen in Table 3 below:

Table 3. Summary of Data on Measurement of Students' Ability to Interpret Data Based on Pretest and Posttest Results

	Kelas Eksperimen		Kelas Kontrol	
	Pretest	Posttest	Pretest	Posttest
Skor Tertinggi	40	57	37	42
Skor Terendah	5	13	5	12
Rata-rata	22.35	33.47	17.14	24.63

Based on table 3, a bar chart is made as shown in Figure 1 which aims to make it easier to understand the comparison of the average value of the ability to interpret student data from the Experimental Class and the Control Class. The increase in the value of the ability to interpret student data achieved in the Experimental Class was 11.12. Meanwhile, the increase in the value of the ability to interpret student data achieved in the Control Class was 7.49. It can be seen that the increase in the Experimental Class was higher than in the Control Class.

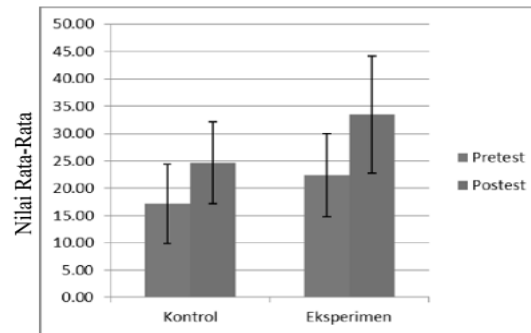


Figure 1. Average Pretest and Posttest Data Interpretation Ability

3.2 Hypothesis Test Results

Before the data is analyzed using parametric analysis techniques, namely the t-test, the data needs to be tested first through the analysis prerequisite test. The prerequisite test consists of two types, namely the normality test and the homogeneity test. This normality test is carried out to determine whether the data is normally distributed or not, while the homogeneity test is carried out to determine whether the data is homogeneously distributed or not. After the analysis prerequisite test is carried out, it will then be analyzed using a difference test (t-test). Based on the calculations with the data analysis technique, the following results are obtained:

3.3 Analysis Prerequisite Test

3.3.1 Normality Test

The data normality test of the ability to interpret data was conducted on pre-test and post-test data in the Experimental and Control Classes. The data normality test used the Kolmogorov Smirnov test with the help of the SPSS 16.00 program where the significance level (α) used was 5% (0.05). The results of the normality test can be seen in table 4. which is listed below:

Table 4. Results of the Normality Test of Pre-test and Post-test Data for the Experimental and Control Classes

	Kelas	Kolmogorov-Smirnov ^a		
		Statistic	df	Sig.
Pretes	Kontrol	0.146	35	0.056
	Eksperimen	0.129	34	0.168
Postes	Kontrol	0.096	35	0.200*
	Eksperimen	0.102	34	0.200*

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Data is said to be normally distributed if the Sig. (Significant) value is greater than the α value (0.05). The results of the normality test in the Experimental Class for the ability to interpret pre-test data were 0.168, while for the ability to interpret post-test data it was 0.200. The results of the normality test in the Control Class for the ability to interpret pre-test data were 0.056, while for the ability to interpret post-test data it was 0.200, indicating that the Sig. $> \alpha$ (0.05) value, so that all data is said to be normally distributed. All calculations of data normality tests using the Kolmogorov Smirnov test with the help of the SPSS 16.00 program.

3.3.2 Homogeneity Test

Before conducting a hypothesis test, a data homogeneity test is first conducted to determine the ability to interpret data. The homogeneity test is conducted using the F-test with the help of the SPSS 16.00 program. Data is said to be homogeneous if the significance level (Sig.) $> \alpha$ (0.05). The results of the homogeneity test can be seen in table 5 below:

Table 5. Results of the Pre-test and Post-test Data Homogeneity Test for the Experimental and Control Classes

	Levene Statistic	df1	df2	Sig.
Pretes	0.002	1	67	0.961
Postes	3.774	1	67	0.056

The results of the homogeneity test of the pre-test data of the Experimental and Control Classes on the ability to interpret student data were 0.961, while in the post-test it was 0.056 indicating that the Sig. (Significant) value was greater than α (Sig. > α (0.05)), so that all data were said to be homogeneously distributed. All calculations of the data homogeneity test used the F test formula with the help of the SPSS 16.00 program.

3.4 Hypothesis Testing

Pre-test Difference Test The results of the analysis of the difference test in the ability to interpret pre-test data between the Experimental Class and the Control Class using the Independent Samples Test with the help of the SPSS 16.00 program at a significance level of 5% are shown in the following table 6:

Table 6. Results of the Pre-test Difference Test for the Ability to Interpret Data for the Experimental and Control Classes

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
Pretest	Equal variances assumed	0.002	0.961	-2.915	67	0.005	-5.210	1.788	-8.778	-1.642
	Equal variances not assumed			-2.912	66.552	0.005	-5.210	1.789	-8.781	-1.639

From the calculation results obtained the value of Sig. (2-tailed) = 0.005. This result shows that the value of Sig. (2-tailed) < α (0.005 < 0.05) then H_0 is rejected. This means that there is a difference in the ability to interpret student data between the Experimental Class and the Control Class before treatment. Therefore, data analysis does not need to be continued with a post-test difference test to prove the hypothesis. The difference in the ability to interpret student data in the Experimental and Control Classes before treatment makes the pre-test and post-test difference tests in the Experimental and Control Classes cannot be used to decide which hypothesis to accept. So that the value of increasing data interpretation ability is sought using the Normalized Gain test.

3.4.1 Normalized Gain (N-Gain) Test

The N-Gain test on the ability to interpret data from the Experimental Class and the Control Class uses Hake's (1999) N-Gain calculation formula in Coletta and Jeffrey (2007:3):

$$g = \frac{S_{posttest} - S_{pretest}}{S_{maksimum} - S_{pretest}}$$

with provision, If :

- $g > 0.7$ = Height
- $0.3 < g \leq 0.7$ = Medium
- $g \leq 0.3$ = Low

N-Gain test results on values ability interpreting student data Class Experiment and Control can seen in table 7 below This:

Table 7. Results of the Normalized Gain Class Test Experiment and Control

	Kelas Eksperimen			Kelas Kontrol		
	Pretest	Posttest	N-Gain	Pretest	Posttest	N-Gain
Rata-rata	22.35	33.47	0.23	17.14	24.63	0.14

From the calculation results of the Normalized Gain (g) value, it was found that the g values for the Experimental and Control Classes were 0.23 and 0.14, respectively. The g values of both Classes were less than 0.3 (0.23 and 0.14 < 0.3). This means that the N-Gain of both Classes is in the low category.

3.5 Discussion

Based on the results of the hypothesis test using the t-test on the value of the increase in the ability to interpret data (Normalized Gain value) shows that the Sig. (2-tailed) value is smaller than α , which

is $0.006 < 0.05$. Based on the decision-making method in the hypothesis test, this condition informs that the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted. This means that there is a significant difference in the increase in the ability to interpret data in students who learn using the research results module and students who do not use the research results module.

Based on the test of increasing data interpretation ability, namely the Normalized Gain (N-Gain) test, the average N-Gain value for the control class was 0.14 and for the experimental class was 0.23. If the average Normalized Gain value is categorized into high, medium and low levels based on the category division by Hake, then the average Normalized Gain value of the control and experimental classes is in the low category. As stated in Sari's research (2011:1), increasing the ability to interpret good data requires repeated cycles. This means that to get an increase in good data interpretation ability, it cannot be obtained through several learning sessions. However, there is a difference between the average value of increasing data interpretation ability between the control class and the experimental class. The experimental class that uses the research result module shows a greater increase than the control class whose learning does not use the research result module.

Based on the average Normalized Gain value, we can see that providing research result modules in the experimental class provides a higher increase in students' ability to interpret data compared to the control class. The high increase in the ability to interpret data in the experimental class compared to the control class is because the experimental class is given a research result module while the control class is not given a research result module. Real learning resources that can be used directly by students in the form of modules can improve the ability to interpret data (Wulandari, 2011:65-75).

Learning using research result modules can improve students' data interpretation skills because of the module's advantages. According to Mulyasa (2006:152), the advantages of research result modules are that they focus on individual learning, there is control over learning outcomes through the use of competency standards, and curriculum relevance. In addition to the advantages of the module, the characteristics and structure of the module writing also contribute to improving data interpretation skills. This research result module is also specially designed, namely by being equipped with interpreted research data so that by reading this research result module, students will be accustomed to interpreting data. In addition, it is also equipped with observation activities to train students in managing data so that students can easily interpret it. As Purnomo (2012:11) said that the existence of independent activities in the module in the form of observation activities can improve students' psychomotor abilities because their skills will be honed through these activities.

The second advantage of the module is the control of learning outcomes through the use of competency standards. Finch and Crunkilton (Mulyasa, 2003:38), define competency as mastery of a task, skills, attitudes, and appreciation needed to support success. Referring to competency, students can find out what skills and attitudes they must have in learning about biodiversity material. So that the learning outcomes expected by teachers in learning using modules are that students can achieve the demands of competency.

The third advantage of the module is the relevance of the curriculum. The relevance of the curriculum is shown by the existence of objectives and how to achieve them, so that students can know the relationship between learning and the results they will obtain (Mulyasa, 2006:152). The general objective to be achieved in learning using this research result module is that students are able to interpret observation data. The existence of objectives and how to achieve them contained in the research result module provides students with an overview of the material that must be mastered. The existence of an overview of the results obtained by students when carrying out learning makes students motivated to study hard so that the intensity of learning increases which causes an increase in data interpretation skills.

The use of research result modules can increase students' knowledge and train students to connect one factor with another, interpret observation results into a general statement, describe conclusions from observation results through patterns or relationships and make written statements about patterns formed from data. This achievement is supported by a learning process that involves discussion activities, because discussion activities make students more active and independent in learning activities. According to Rosida and Suprihatin (2011:89) that active learning can improve learning outcomes through discussion learning activities because it makes students ask or answer questions in the discussion process. In the end, students will be active and better understand how to interpret data.

4. CONCLUSION

Based on the results of data analysis and discussion, it can be concluded that there is an influence of the use of research result modules on improving the data interpretation ability of Class X students of SMA Negeri 5 Mataram in 2015. Further research is needed on the relationship between this research result module and learning outcomes and motivation so that we can find out more about the benefits of research result modules, not only on the ability to interpret data.

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