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IMPLEMENTATION OF GUIDED DISCOVERY MODEL USING LABORATORY ACTIVITIES IN ELASTICITY MATERIAL AT SECOND GRADE OF SMAN 1 KANDANGAN

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Abstract

Guided discovery models with laboratory activities is one of the learning that facilitates students to conduct a guided discovery. The results of interviews at SMAN 1 Kandangan found that 60% of the students gets score below the minimum passing score in the elasticity material which one of the factors is caused by the activity of the students during the learning process. Based on the above, the research implemented guided discovery model with laboratory activities for improve the activity of the students. The aims of research are describing the implementation of learning, improving learning outcomes, and student responses to elasticity materials. This research used quantitative research type with pre-experimental research design using one group pretesst-posttest design, with one experiment class and two replication classes. The data method used are observation, test, and questionnaire. The data obtained from pretest and posttest result were analyzed by normality test, homogeneity test, t test and normalized gain test. The result of research are: a) the implementation of the learning process in the three calsses that were observed from the teacher's activity in two meetings is very well done; b) based on gain test analysis, the learning outcomes for all the three classes were increased with high category; c) the learning has received positive response from students with very good category. Based on the above explanation, the learning processes that are implemented using guided discovery model with laboratory activities can improve student learning outcomes.

Keywords: guided discovery models, laboratory activities , learning result, elasticity.

INTRODUCTION

In globalization era technology has a rapid development, this can be seen from various fields. The technology itself is created based on the science of existing science and refined with the value of art. Science has big role in creating technology so that the concept of science is very important in life. Science itself is divided into two namely the Natural Science (IPA) and Social Sciences (IPS).

Natural Science (IPA) is a science that requires a process to find the concept. The first step needed is an observation. Observations are needed to know the actual events or phenomena of nature. The next stage is the withdrawal of the hypothesis as a temporary answer from the observation. Experiments need to be done to make sure whether the hypothesis is right or wrong. The results of the experiment can be analyzed to answer the withdrawal of the initial hypothesis. Conclusion is the end result, the final result is the actual concept. The steps are commonly called the scientific method.

Physics is one of the branches of Natural Science (IPA) and requires a scientific method to discover the real concept. One step in the scientific method is testing hypotheses, testing the more frequent hypotheses are laboratory activities.

Student involvement in the investigation may help him to understand the concepts learned. Students' inquiries are based on the initial knowledge that students have previously obtained. The results of the investigation can be either a new concept or a proof of concept that has been obtained. In learning that involves students directly, students will more easily understand the concepts taught. So in the learning of physics, it is required an experiments or direct experiments to help students understand the concept. One of the learning models that can be used is the guided discovery model.

Guided discovery learning model is an inquiry activity conducted by individual students with guidance from the teacher (Adhim, 2015). The guided discovery learning model is suitable for students in concept discovery by minimizing misconceptions due to teacher guidance. Teachers acting as facilitators and teachers will help students who have difficulty during the learning process. Concept invention can be done through experiment or group discussion. Investigations that are conducted by students can be the form of discussions, seminars, experiments, or reading so find your own concepts. This kind of learning activity is called student-centered learning (student center learning).

According to Confusious (in Adhim, 2015) who says that "What I hear, I forget; what I see, I remember; what I do, I understand ", based on the theory then the students will understand more if they gained experience directly. Direct experience will be more effective in learning and

one of them is laboratory activities. Laboratory activities are experimental activities aimed at discovering new concepts or proving existing concepts of data and events. It is also in line with learning theory. Laboratory activities can also train students' skills in using measuring tools, reading scale in measuring tools as well as communication skills. In laboratory activities, students do the experiment independently. Students will find the concept independently, so that the knowledge gained will be stored in long-term memory. During the laboratory activities, teachers guide students in case of difficulties. This encourages students to play an active role during the learning process. The facts show that not all teachers teach direct experimentation so that students tend to be passive. In addition, most students assume that the most scary subject is physics.

According to Yuliani's Research (2015), entitled "The Guided Discovery Learning Model of Students at Islamic Junior High School of Medan" shows that the guided discovery learning model can improve students' conceptual understanding. This can be seen from the improvement of learning achievement achieved by the students. Meanwhile, according to Yogantari Research (2015), entitled "Identification of Student Difficulties in Physics Learning" shows that the top percentage of 35% of students have difficulty on the material Elasticity. The difficulty is caused by less than maximum learning in hands on activity. In another study conducted by Adhim (2015), in his research stated that learning guided discovery with laboratory activities can improve student learning outcomes but less optimal learning due to lack of facilities in learning.

The results of physics teacher interview at SMA Negeri 1 Kandangan on January 23, 2017 found that teachers provide initial motivation with the declarative, then ask the students' opinions about the motivation given. The teacher connects motivation with the material to be learned, and then the teacher explains about the material. At the end of the lesson, the teacher and the students conclude the material that has been studied. Student enthusiasm during the learning process also influences understanding of the concepts they receive. Student learning outcomes obtained as many as 60% of students who get value under the minimum score, especially on the material Elasticity. Based on the above, the need for learning innovation which involves the students to do activities in finding the concept. Guided discovery learning model with laboratory activities can be one of the solutions that can be used.

Based on the above description will be conducted research by title “Implementation of Guided Discovery Model Using Laboratory Activities in Elasticity Material at Second Grade Of Sman 1 Kandangan”.

METHOD

The type of research used in this study is descriptive-quantitative research. The research design is pre-experimental design with one-group pretest-posttest. The classes used were one experimental class and two replication classes, each consisting of 30 students. All three classes are given equal treatment. The study was conducted in the odd semester of the academic year 2017/2018.

The research instruments used were observation sheet, test sheet, and questionnaire. Before the research instrument is used, feasibility test is needed, that is validity, reliability, differentiation, and also difficulty level.

At the beginning of the meeting, it was conducted pretest with the aim to determine the initial ability of students. After that new learning material elasticity with laboratory activities. Students were divided into six heterogeneous groups during the experiment. They conducted a hooke law trial at the first meeting, and the spring constants at the second meeting. When the learning process takes place there is a skill assessment of students and also the implementation of learning conducted by observers. Posttest is done after the learning to know the ability of students after receiving the material. Problems used pretest and posttest same. In addition to posttest, at the end of the meeting students are also given a questionnaire to determine the response of students to the learning applied.

The result of the research is the students' pretest and posttest score, the value of the skill at the laboratory activity, the observation result of learning achievement, and also the result of questionnaire of the student's response. The pretest and posttest values were tested by normality and homogeneity tests to find if the samples is distributed normally and homogeneously. Furthermore, one-party t test and also gain test to know the improvement.

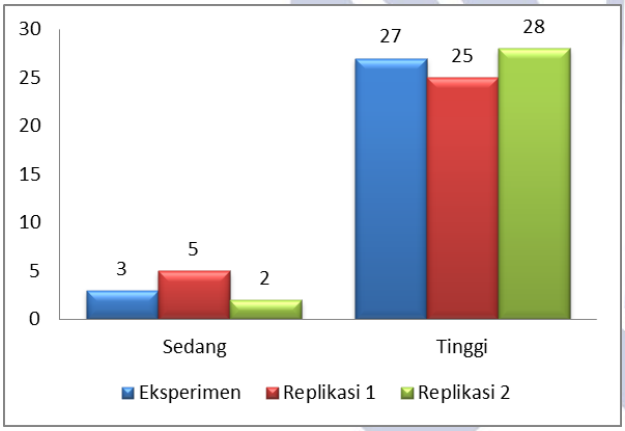
RESULT AND DISCUSSION

Based on the test of the problem to 30 students of class XII-MIA found that of the 25 tested questions obtained 20 questions that are feasible to use and 5 questions that are not feasible to use. A total of 20 questions that are used is a valid and reliable question with the criteria as much as 1 easy question, 18 problems being, and 1 difficult problem with weak power as much as 1 problem, enough 6 problem, and good 13 problem.

The result of observation of the implementation of learning by two observers found that there was an increase from the first meeting to the second meeting. This happens because there is an evaluation of the learning

process by the observer when the learning is completed so that there is improvement in the next meeting. However there are several stages that have decreased because the teacher could not really have control under the class and also the lack of enthusiasm from the students when at the stage of concluding. Overall, the implementation of the learning process works very well.

The pretest and posttest results were tested for normality and homogeneity and it was found that the samples were normally distributed and homogeneous so that one-party test could be tested. The result of t test of one party is found that thitung in the experimental class, replication 1, replication 2 is 24,338; 20,065; 22,114, while the t_{table} value is 1.699. Based on that then $t_{table} > t_{hitung}$ so H_0 rejected and H_1 accepted. This means that significantly the posttest value is greater than the average pretest value. This indicates an increase in learning outcomes of knowledge aspects after guided discovery learning with laboratory activities. In addition, the gain test to determine the improvement of learning outcomes, and obtained as follows.



Gambar 4.1 The Result of Gain analysis for Each Category

Based on Figure 4.1, it can be seen the majority of children experience improvement in high category. The average increase in the experimental class, replication 1, replication 2 is 0.77; 0.76; 0.83. All three classes experienced a high category increase.

The result of student skill observation when the laboratory activity is as follows.

Kelas	Pertemuan 1	Pertemuan 2	Rata-Rata
Eksperimen	3,40	3,53	3,47
Replikasi 1	3,41	3,55	3,48
Replikasi 2	3,42	3,56	3,49

Tabel 4.1 The Result of Average Skill Score

Based on Table 4.1 it can be seen that there is an increase in students' skill score at the first meeting to the second meeting. This is due to students' enthusiasm when the laboratory activities. Student enthusiasm when the laboratory activities describe their curiosity towards the theory is increasing so that it can improve students' understanding. This is evident from the increase in learning outcomes. Based on Table 4.1 it is seen that the average score of skill students above 3 so that can be said good categorized.

Questionnaire results obtained the following data.

No.	% rata-rata	Kategori
1.	99%	Sangat Baik
2.	100%	Sangat Baik
3.	92%	Sangat Baik
4.	95%	Sangat Baik
5.	94%	Sangat Baik
6.	90%	Sangat Baik
7.	96%	Sangat Baik
8.	93%	Sangat Baik

Tabel 4.2 Recapitulation of Students Response

Based on Table 4.2 it is found that over 90% of students agree with statements 1 through 8. This indicates that they are very fond of guided discovery learning with laboratory activities.

CLOSING

Conclusion

Based on the results and data analysis has been done then the conclusions that can be taken is as follows:

1. The guidance of guided discovery learning model with laboratory activities is done in very good category.
2. The enhancement of student learning outcomes after the introduction of guided discovery learning models with laboratory activities on elasticity material increased by high category in experimental class, replication 1 and replication 2.
3. Student response to guided discovery model with laboratory activity on elasticity material shows excellent positive response.

Suggestions

Based on the research that has been done, researchers provide suggestions as follows:

1. Guided discovery learning models with laboratory activities require considerable learning time, requiring good time management when learning takes place.
2. Guided discovery learning model with laboratory activities requires maximum experimental tools, so that further research is expected to prepare the tool independently so that at the time of research does not depend on the school.
3. The study of guided discovery learning model with laboratory activities requires maximum control of the

classroom so that the learning objectives are achieved well.

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