THE APPLICATION OF THE DISCOVERY LEARNING MODEL TO IMPROVE STUDENTS' LEARNING OUTCOMES IN ELASTICITY AND HOOKE LAW MATERIALS IN CLASS XI IPA 1 SMA NEGERI 1 PURI

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ABSTRACT

Ideally, the learning process should be carried out by fully involving the activities of students, but what happens is that learning is more dominated by educators so that student learning outcomes are limited. This research is a type of Classroom Action Research (CAR) using the Kemmis and Taggart models which was carried out in two cycles with two meetings per cycle, each cycle consisting of planning, implementation, observation and reflection stages. The subjects of this study were all 36 students of class XI IPA 1 SMA Negeri 1 Puri. Data collection methods are documentation, observation, tests, and field notes. The results show that the application of the discovery learning method can improve the quality and learning outcomes of students, this is shown from the data on the implementation of lesson plans reaching 100% in both cycles and student activities in the active category, scientific behavior in the good category, as well as positive student responses and an increase completeness of student learning outcomes in each cycle, namely cycle I (66.67%), cycle II (86.11%).

Keywords: Discovery Learning, Learning Outcomes, and Elasticity and Hooke's Law

1. Introduction

The main objectives of high school physics lessons include; (1) Forming a good attitude towards physics by realizing the regularity and beauty of nature and glorifying the greatness of God Almighty, (2) Cultivating a scientific attitude that is objective, critical, honest, tenacious, open, and able to cooperate, (3) Developing a culture of skills the scientific process through experimental activities or experiments by formulating problems, hypothesizing, testing hypotheses, designing experiments, collecting data, processing, and interpreting data, and conveying results orally and in writing, (4) able to think critically and analytically, (5) mastering concepts physics as a provision to continue at the next level (Kemendikbud, 2013).

The rapid development of information and communication technology today requires all aspects of life to adapt to the development of science and technology (IPTEK). In order to be able to compete, quality competencies or skills are needed. Efforts to improve and improve the quality of human resources can be done through education. Education will change the mindset of people. As stated in the Law of the Republic of Indonesia number 20 of 2003 concerning the national education system, article 1 implies that education is a structured effort in the learning process to develop various potentials of students so that they have a positive attitude as a provision to face life in order to meet the needs of themselves, society, nation and state.

To produce quality learning, of course, it requires the composition of various elements of education, namely educators, students, parents or the community, the environment, school facilities and infrastructure and full support from the government. Of the various elements of education, educators are the main determinant in classroom learning. Great educators are educators who are able to provide a comfortable and fun learning atmosphere. Students will be very enthusiastic if education presents various models, methods and learning media that are varied and in accordance with the characteristics of students and the characteristics of teaching materials.

The results of observations made in class XI IPA 1 SMA Negeri 1 Puri, show that all teaching and learning activities are still dominated by educators, educators are less able to utilize the abilities of students by applying learning according to the needs of students. Educators only focus on meeting curriculum targets, especially those related to learning content. Educators only emphasize students to memorize more physics formulas in order to face the test. learning in the classroom still uses the conventional model so that learning tends to be student-centered.

Actions that need to be taken in overcoming these problems include, among others, educators need to apply methods, models, strategies, and learning approaches that are in accordance with the needs and development of students. It is necessary to apply a learning model that is able to activate students in the classroom so that various potentials of students can be explored, explored to the maximum so that students will be able to build their knowledge independently. In addition, the role of educators in the classroom needs to be changed from dominating the class to being a facilitator and motivator in the classroom. One model that fits these characteristics, including the discovery learning model. The discovery learning model can make students receive knowledge not in the final form, but they must seek, analyze and build it in their own way (Kemendikbud, 2013). Students will try to find and understand a concept that will be conveyed by educators with science process skills including observing, asking, trying, collecting data, grouping data, analyzing and concluding. This process is believed to be able to form knowledge that is permanent in the long-term memory of students. According to Bruner (Bahm, 2009:2) states that discovery learning is learning that activates students to build knowledge based on the latest information through observation and exercises that students collect independently and exploratory.

2. Method

The place of research was carried out in a teaching place, namely in class XI IPA 1 SMA Negeri 1 Puri Semester 1 for the 2018/2019 academic year. The time of the study was carried out from January to August to October 2018. The subjects of the study were class XI IPA 1 students in SMA Negeri 1 Puri Semester 1 of the 2018/2019 academic year, totaling 35. This research method uses a quantitative descriptive approach through a series of cycle methods with two cycles. Each cycle is intended to determine the increase in student learning outcomes and activities in mastering the material of elasticity and Hooke's law. This research is classroom action research (CAR) with four stages, namely planning, implementation, observation, and evaluation/reflection.

The types of data used in this study are qualitative and quantitative data consisting of: 1) Student activity data. 2) Data on the implementation of learning by educators. 3) Test data / evaluation of student learning outcomes. The standard for the success of this action research is if: 1) there is an increase in classical learning outcomes of at least 85%. 2) there is an increase in student activity at least 85% classically.

3. Results And Discussion

Cycle 1

Planning activities in this study include: 1) Researchers determine the actions to be carried out, namely in this case the researchers choose actions by applying the discovery learning learning model. The reason for choosing this model is that the discovery learning model has never been applied to physics learning. Based on other studies, the discovery learning model is effective in increasing the activities and learning outcomes of students. 2) Researchers determine the time and place of research. 3) This research involves several parties, including those who serve as educators are researchers, and observers are the focus of observation on the activities of educators and student activities. 3) Researchers develop research instruments, including RPP implementation sheets, student activity sheets, student character/scientific behavior sheets, and learning outcomes test sheets.

The design for implementing classroom action research is implemented with the commitment of educators to continue to follow the previously planned design without changing the reasonableness

of behavior, and avoiding situations of rigidity, meaning that learning flows as usual so that the information obtained is accurate.

The results of the research and observations are presented in the following paragraph. The time of the research, the parties involved in the research, and the actions as planned.

Based on the results of the observations above, it can be seen that the use of discovery learning models in the material of elasticity and Hooke's law is categorized as good.
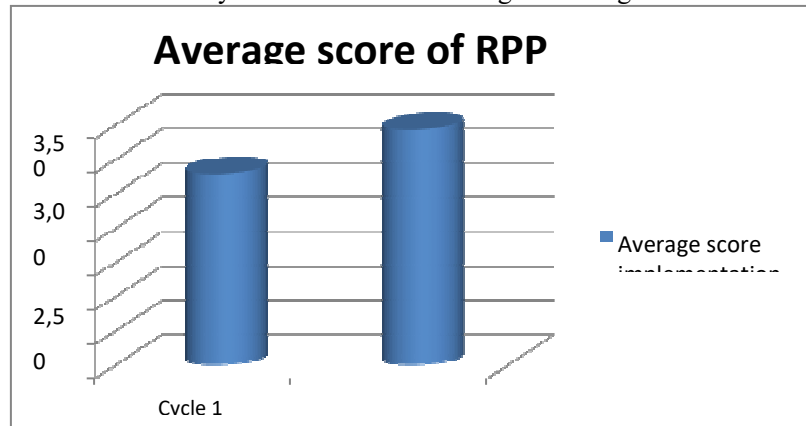

Figure 1 comparison of the average score of RPP implementation

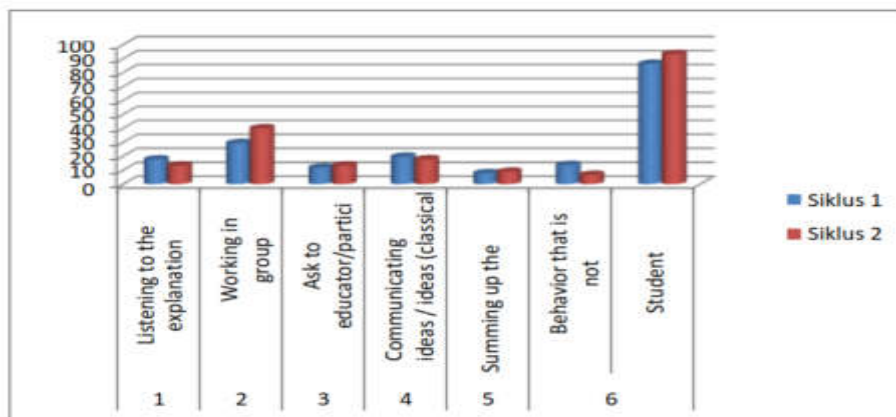The level of student activity also looks very good, as shown in the following diagram:

Figure 2 diagram of the percentage of student activity

From the data above, it proves that the activeness of students has also increased. In cycle 1 the activeness of students was only 86.27%, but in cycle 2 it increased to 93.33%. This proves that the application of the discovery learning model to the materials of Elasticity and Hooke's Law works very well.

In the behavioral/scientific aspect, it also shows that there is an increase, from good category to very good category. This increase shows that the learning process with the discovery learning method is able to improve and train students in showing scientific behavior or character behavior.

In general, the activities carried out in cycle II are the same as in cycle I. It's just that the learning process is more optimized so that it can increase student activity, and student learning outcomes reach the classical minimum completeness criteria. The results of the evaluation in the second cycle showed that the number of students who achieved the minimum individual completeness criteria increased to 31 students (86.11%).
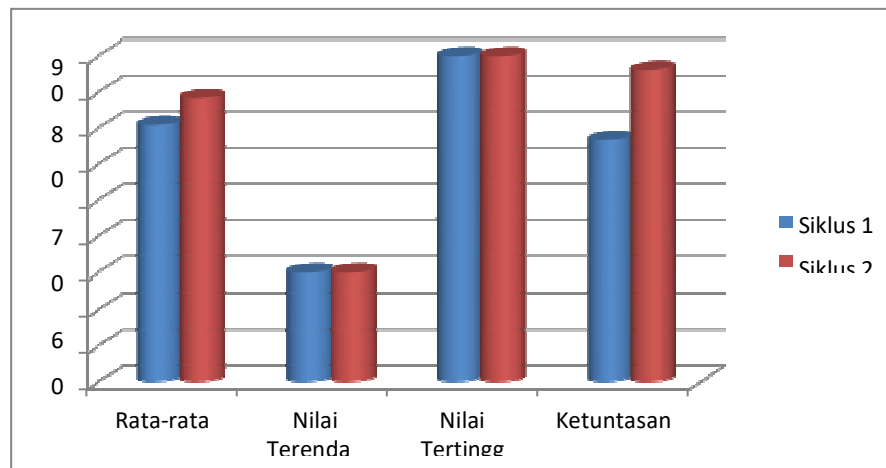
Figure 3 graph of student learning outcomes completeness

According to the graph above, there are only 24 students who complete learning in cycle 1 and cycle 2, students who complete learning increase to 31 students. This shows that the use of discovery learning models in the material of Elasticity and Hooke's Law is very good. In the aspect of the response, students also showed a positive response as illustrated in the following diagram:
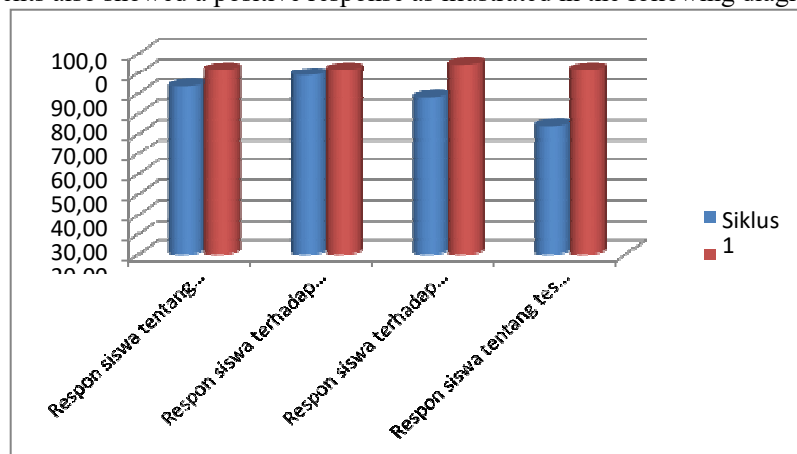

Figure 4 student response questionnaire

Based on the data in the figure, it can be seen that there is a positive correlation between improving the quality of learning and the results and interest of students in learning. Based on the diagram, it can be seen that all aspects of student responses have increased, especially in the aspect of responses to learning outcomes tests.

The positive results are in accordance with Bruner's learning theory. Bruner provides many views on human cognitive development, how humans learn or acquire knowledge, store knowledge and transform knowledge. In studying humans, he considers humans as processors, thinkers, and creators of information. Bruner in his theory states that learning will be more successful if the teaching process is directed to the concepts and structures contained in the subject being taught, in addition to the related relationships between concepts and structures.

Through discovery learning, students are directed to be able to find concepts independently, with the language and stages of student development. In the implementation of discovery learning model learning, students are directed to study in groups and heterogeneously. Eggen & Kauchak (in Maimunah, 2005: 21) suggest Discovery learning is a cooperative learning strategy that places

students into groups to investigate a topic. This is in line with the concept of Vygotsky's learning theory. Viewing that learning can be effective if it is in two conditions, namely the Zone of Proximal Development (ZPD) and scaffolding. Through ZPD, students in groups will find concepts based on the help of their peers. And educators act as facilitators who will provide assistance as needed according to the stages of student development or provide scaffolding.

The results of this study are also in accordance with the results of previous studies, such as the results of research by Pertiwi, et al (2013), the results of research by Arisma, et al (2012), and research by Erna (2012) which states that the discovery learning model is able to present learning that can activate participants' activities. students and complete student learning outcomes.

4. Conclusion

From the results of learning activities that have been carried out for two cycles, and based on all the discussions and analyzes that have been carried out, it can be concluded as follows: 1) The application of the discovery learning method has a positive influence, namely it can improve the learning process of students. reached 100% in both cycles and activities, students were categorized as active, scientific behavior also showed good behavior, and student responses were positive. 2) Learning with the discovery learning model has a positive impact on improving student learning outcomes, which is marked by an increase in student learning mastery in each cycle, namely cycle I (66.67%), cycle II (86.11%). From the results of the research obtained from the previous description so that the teaching and learning process for physics subjects on Elasticity and Hooke's Law is more effective and provides optimal results for students, the following suggestions are submitted: 1) To carry out the investigation group requires sufficient preparation, so that educators must be able to determine or choose topics that can really be applied with the group investigation model in the teaching and learning process so that optimal results are obtained.

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