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APPLICATION OF PROBLEM-BASED LEARNING (PBL) MODEL TO IMPROVE THE ACTIVITY OF GRADE VIII STUDENTS IN THE LIGHT AND OPTICAL SYSTEM LEARNING MATERIAL

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Abstract

Learning based on actual problems experienced by students using problem-based learning models is believed to increase student participation in identifying problems and student activity in solving problems. This study aimed to increase the activeness of class VIII students in the material of light and optical instruments. The subjects of this study were 32 class VIII A students of SMPN 1 Karanggeneng, Lamongan. The study was conducted in the pre-, cycle I, and cycle II stages. Data collection techniques were carried out using activeness observation techniques, cycles I and II tests, and documentation. Data analysis techniques are used to compare the results of observations of student activity at the pre-cycle, cycle I, and cycle II stages. The results showed increased student activity in cycles I (74.55%) and II (85.27%). Several factors can influence student activity. Therefore, the role of teachers as facilitators is needed to determine learning strategies for student needs so that students can more readily accept and understand the material that will be delivered well. Applying the problem-based learning model can increase the activeness of class VIII students in the material on light and optical systems.

Keywords: *Light; Optical Systems; Problem Based Learning; Student activity*

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INTRODUCTION

The learning process is a learning activity for students to achieve learning goals. Teachers and students interact with each other during the teaching and learning process. This learning activity can run effectively, efficiently, and optimally if students have an active role. With the active role of students, a teacher can find out their success in carrying out learning. Student learning activity is a teaching and learning process that requires students to be actively involved and participate in the learning process so that they can change the behaviour or habits of students (Erniyanti et al., 2022)

The success of the teaching and learning process can be influenced by several factors, one of which is the learning method used by the teacher. Teachers have an essential role in determining the quality and quantity of teaching they do. Therefore, teachers must think and plan carefully to increase learning opportunities for their students and improve their teaching quality. Teachers with competence will make the classroom atmosphere more lively and enjoyable by daring to try new methods to help improve teaching and learning activities and increase student motivation to learn so that they can learn well and achieve learning goals.

Natural Sciences (In Indonesia Its known as IPA) is a subject related to systematically finding out about nature. Therefore, IPA is the mastery of a collection of knowledge in the form of facts, concepts or principles and a process of discovery (Trianto, in Nursadah, 2019). Students are expected to be active in learning activities. Students can develop their knowledge, while the teacher's role here is only as a guide or facilitator. Based on this opinion, learning activities will run well if student activities support learning, such as actively asking questions or daring to express their opinions (Sardiman in Natalia et al., 2022). The activeness of student learning can be observed in student activities during the learning process. The activeness of students in learning activities is none other than to construct their knowledge. Students will be involved in the process by building an understanding of the problems or everything they face in the learning process. Based on the results of the pre-research study conducted on class VIII A students of SMP Negeri 1 Karanggeneng, several students tend to be passive in learning. The teaching method that teachers often use is lectures, which also play a role in influencing the activeness of students. Some factors include the monotonous teaching style of teachers, the delivery of materials that still depend on textbooks and student handbooks so that the teaching and learning process becomes less enjoyable, and the need for more utilization of learning media. Based on the results of these observations, a learning strategy must be necessary to increase student activity. Therefore, real action is

needed from teachers to overcome these problems, one of which is through changes in the learning model. A suitable learning model, especially in the 2013 curriculum, is problem-based and is called problem-based learning (PBL).

The Problem-Based Learning (PBL) learning model in the problem-based learning model is a learning model that involves students in learning activities and prioritizes real problems both in the home, school and community environments as a basis for gaining knowledge and concepts through student involvement in processing critical thinking skills and solving problems (Nugrahaeni in Setiyaningsih, 2022). Problem-based learning (PBL) learning is a learning process that involves problem-solving and critical thinking in an authentic context. PBL provides students with the opportunity to learn broader things that focus on preparing students to become active and responsible citizens. Through PBL, students will gain experience in dealing with realistic problems and emphasize using communication, cooperation, collaboration and existing resources to formulate ideas and develop intellectual abilities.

RESEARCH METHOD

This research is a quantitative descriptive research. Quantitative descriptive is a type of research used to analyze data by describing or depicting the collected data as it is. This research design uses classroom action research. There are two cycles in classroom action research: cycle I and cycle II. Each cycle has four stages of action, namely making action plans (planning), taking action according to the plan (acting), observing the actions taken (observing), and analyzing data with comparative descriptions followed by critical analysis by reflecting (reflecting). The study subjects were 32 class VIII A students of SMPN 1 Karanggeneng, consisting of 10 male and 22 female students. Data collection techniques include documentation, activity observation, and written tests: the research instruments included list documents, learning journal record documents, observation sheets, and test questions. In the pre-cycle stage, documentation techniques were used, while the learning activity used observation sheets. The activity data's validity was measured by assessing the suitability of students' attitudes during the learning process with the indicators listed on the observation sheet. The expected achievement in this classroom action research is an increase in student activity, which is indicated by a percentage of activity of more than >75%. Indicators of activity that students must achieve include 1) paying attention to the teacher's explanation, 2) asking questions, 3) answering questions, 4) discussing with groups, 5) reading materials, 6) paying attention to friends' presentations, and 7) taking notes on the teacher's explanation and discussion results.

RESEARCH RESULTS AND DISCUSSION

This classroom action research consists of 2 cycles. The use of the Problem-Based Learning learning model in cycles I and II has slight differences. In cycle I, the learning model uses problem-based learning with large groups consisting of 6 students per group. In contrast, in cycle II, the problem-based learning model is used with small groups of 5 people per group. The results of the analysis of student activity based on direct observation and indicators of activity that must be achieved can be seen in Table 1.

Table 1. Percentage of achievement of student activity indicators

Indicators	Precycle	Cycle I	Cycle II
Pay attention to the teacher's explanation	62,50 %	78,13 %	87,50 %
Ask questions	50,00 %	75,00 %	84,38 %
Answer questions	59,38 %	71,88 %	81,25 %
Discuss with groups	53,13 %	71,88 %	84,38 %
Read materials	62,50 %	75,00 %	81,25 %
Pay attention to friends' presentations	53,13 %	68,75 %	87,50 %
Take notes on the teacher's explanation and discussion results	65,63 %	81,25 %	90,63 %

The initial observations in the pre-cycle showed that the teacher still dominated the delivery of learning materials, causing students to be more passive. This can be seen from several students who did work outside of learning activities, were sleepy, and talked to their deskmates. The indicator of asking questions had the lowest average (50.00%), while the indicator of noting teacher explanations and discussion results had an average of (65.63%) so learning innovation by implementing the Problem-Based Learning (PBL) learning model was needed.

In cycle I, an average of 74.55% was obtained, an increase from the pre-cycle of 58.04%. The indicator of paying attention to friends' presentations had the lowest average (68.75%), while the indicator of noting

teacher explanations and discussion results had an average of (81.25%). Based on the observations in the cycle, the implementation of learning by referring to the RPP was going quite well but not optimally. Several things could have been improved during the implementation of learning, so improvements were needed in the next cycle. Some problems that also emerged in the cycle regarded teachers who still needed to become accustomed to using the Problem-Based Learning model. Hence, teachers felt they needed clarification about implementing several stages of learning for students who were also not yet accustomed to being taught using the PBL model. Hence, they needed to adapt to following a series of learning; there were still passive students in the learning process. Some students needed more initiative in their groups to solve problems given by the teacher. They only followed the performance of their groups and did not copy important information found through group discussions in their notebooks.

In cycle II, an average of 85.27% was obtained, an increase from cycle I of 74.55%. Based on these data, the expected achievement was achieved. Namely, the percentage of student activity was more than ≥ 75%. In cycle II, with the indicator of Recording teacher explanations and discussion results, the average was the highest (90.63%). The increase in the average student activity follows research conducted by (Krisanto, 2021), which states that implementing learning with the problem-based learning model positively impacts increasing science learning activities. This is indicated by increased science learning activities, from a low of 18.75% in the initial conditions to a high of 87.50% in the final conditions. The study showed increased student activity using the PBL (problem-based learning) learning model. Student activity can be increased through the PBL (problem-based learning) model. The implementation of learning activities follows expectations, and the actions taken have been successful, which can be seen from the increase in student activity. PBL (problem-based learning) is a learning model that aims to create interaction between students in their groups through problem-solving activities where learning is expected to train an attitude of responsibility in each individual and is a learning model that, according to the participation of all students in the group to collect as much information as possible to solve problems given by the teacher (Daniel, T et al., 2021)

CONCLUSION AND RECOMENDATION

A. Conclusion

Based on the research conducted in class VIII A of SMP Negeri 1 Karanggeneng, the results show that applying the Problem-based Learning learning model can increase students' learning activity in the Light and Optical Instruments material. Based on the results of observations in each cycle, the average percentage of student activity in cycle I was 74.55%, while the average in cycle II was 85.27%. Several factors can influence student activity; therefore, teachers need to be educators and facilitators for students. Teachers can determine learning strategies that are appropriate to the needs of students so that in their implementation, students can more readily accept and understand the material that will be delivered well.

B. Recommendation

Other researchers can develop motivating questions based on problems in everyday life to increase students' active responses to learning. Researchers or teachers can also direct students through the stages of implementing the problem-based learning model so that students can become responsive and successful learners.

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