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QUALITATIVE STUDY: IMPLEMENTATION OF PROBLEM-BASED LEARNING MODEL TO IMPROVE STUDENTS' ACTIVE LEARNING IN LEARNING PHYSICS

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Abstract :
This research was motivated by the results of students' low learning activity. The aim of this research is to determine the implementation of the problem based learning model in increasing students' active learning in physics learning. This research uses descriptive qualitative research methods. The research subjects were physics subject teachers at SMAN 15 Muaro Jambi with the subject selection technique used, namely purposive sampling. The data collection techniques used in this research were observation and interviews. Data analysis uses the Miles and Huberman data analysis technique which begins with data reduction, the data is then presented (data display), and finally verified (conclusion drawing) using survey and questionnaire techniques with a quantitative approach. The findings of this research show that implementing the problem-based learning model can enhance students' active learning. The conclusion is that this research aims to boost students' engagement in learning and can be regarded as an effective approach for increasing student participation and involvement in the physics learning process.

Keywords: *Active Learning, Physics Learning, Problem Based Learning.*

INTRODUCTION

Education is crucial in human life, meaning that everyone in Indonesia has the right to access education and is expected to continually progress in it (Alpian et al., 2019; Mariesi et al., 2024; Afrida et al., 2024). Nationally, education is defined as a deliberate and planned effort to create a learning environment and process that enables students to actively develop their potential (Hanafy, 2014; Amiqoh et al., 2024). In education, there are efforts made by a person or group of people to mature or develop the potential of students (Supardi, 2015; Juwita & Mateha, 2024). The main activities in education are learning and studying.

Learning is a process that leads to the emergence or modification of new behaviors, not due to maturation, and is often temporary, resulting from the formation of an initial response (Nasution, 1993; Romita & Opeloyeru, 2023). According to Slameto (2003), learning involves an individual's efforts to achieve a comprehensive change in behavior through their experiences and interactions with their environment. In education, besides studying, learning is a key activity. It is defined as an

interactive process between students and their surroundings that results in positive behavioral changes (Arfani, 2016; Philogene et al., 2024; Ilyas et al., 2024). Physics is one of the subjects taught in schools.

Physics education aids in understanding various aspects and phenomena in nature and their links to existing sciences, playing a vital role in life (Dani et al., 2019; Triastiti et al., 2024). Physics learning involves interactions among school members using learning resources focused on physics (Winarti et al., 2021; Retnani et al., 2024). It can also be seen as applying principles of physics to everyday life (Yosua et al., 2019; Ambarwati et al., 2023; Asis et al., 2023). Effective physics education requires careful attention to student activity and engagement in the learning process.

Active learning encompasses various teaching models that place responsibility for learning on students, encouraging them to engage in meaningful learning experiences and reflect on their actions during the process (Warsono & Haryanto, 2014; Handayani et al., 2023). Choosing a suitable learning model can stimulate students' interest and foster their active participation. Teachers should act as facilitators, guiding students toward achieving learning objectives and developing essential skills. To enhance students' active learning, teachers can modify classroom practices and consider implementing a problem-based learning model.

The problem based learning model is a form of innovative learning model that is centered on students (student centered learning) so that it can provide conditions for active, innovative, creative and independent learning and places educators as facilitators and motivators, and can confront students with a problem. real things that exist in the everyday environment (Sari et al., 2018; Suryonegoro & Hidayah, 2023). In the problem-based learning approach, assessment focuses on the level of student activity during the learning process. The problem based learning model requires students to have an understanding of the learning objectives and the ability to solve the problems presented. In this context, students are expected to be able to identify learning objectives and break down a problem into simpler sub-subs.

Problem-based learning involves presenting students with a problem—either real or simulated—and having them seek solutions through research and investigation, applying theories, principles, and concepts they've learned from various disciplines (Mayasari et al., 2022; Kiftiah, 2022). This model centers students in the learning process, promoting a deeper understanding and application of concepts in real-world contexts. In this approach, the discussion method is crucial for encouraging student collaboration. The goal of problem-based learning is to foster teamwork and active participation, encouraging students to share ideas, make suggestions, and express their views. By making students the focal point of the learning experience, this model emphasizes a student-centered approach, with the teacher serving merely as a facilitator.

Research on problem-based learning has been explored by several scholars. Kawuri et al. (2019) found that problem-based learning can improve physics learning activities, while Hoyi et al. (2021) reported that this model enhances physics learning outcomes. This study offers a novel approach by applying the Problem-Based Learning model specifically within the realm of physics education. Despite its broad application across various fields, problem-based learning's use in physics, particularly to boost active learning, has not been extensively investigated. This research fills this gap by adapting Problem-Based Learning strategies to address the specific challenges and opportunities in physics education, offering new perspectives on how to increase student engagement. It also sheds light on active learning dynamics, showing how problem-based learning can be effectively incorporated into the physics curriculum to develop critical thinking and problem-solving skills.

Initial studies conducted in class XII Mathematics and Natural Sciences at SMAN 15 Muaro Jambi found that student activity in learning physics was relatively low. This is evident from students who show a lack of enthusiasm during classroom learning and from those who are still hesitant to ask questions or actively express their opinions. The lack of active learning of students in the learning process can be caused by the focus on delivering material which is limited to textbooks, so that the information obtained is limited to textbook content only. Additionally, the predominant use of lecture-based learning models can diminish student interest in physics, leading to low levels of participation and engagement.

The urgency of this research is in assessing the effectiveness of the Problem-Based Learning model, which addresses a key educational challenge by offering evidence-based strategies to enhance

active learning and better prepare students for real-world problem-solving. To address these issues, the researchers aim to explore how applying the problem-based learning model in physics can boost student engagement. The goal is for this model to encourage students to be more proactive in solving physics problems, develop critical thinking skills, and connect physics concepts to real-life situations. By adopting a more interactive and problem-solving-oriented learning model, the study aims to increase students' interest and involvement in the physics learning process. The objective of this research is to evaluate how the problem-based learning model can enhance student activity in physics education.

RESEARCH METHOD

This research was conducted at SMAN 15 Muaro Jambi, this research was carried out on 13 September – 17 November 2023. This research used descriptive qualitative methods. The descriptive qualitative method is a research procedure that produces descriptive data not with numbers but with a person's written and spoken words and observed behavior (Napsawati, 2020; Prambanan et al., 2023; Utaya et al., 2024).

The research subject in this study was the Physics teacher at SMAN 15 Muaro Jambi. The subject selection technique used was purposive sampling. Purposive sampling is a technique where researchers identify and collect samples determined based on certain considerations (Sugiyono, 2015; Misbahuddin & Espinosa, 2022; Rismawan et al., 2023). The considerations made in this purposive sampling technique can vary and depend on the needs of the research to be conducted (Maharani & Bernard, 2018).

A research instrument is a tool used to collect data or measure specific variables in a study. To obtain precise data and draw conclusions that accurately reflect the situation, it is crucial to use valid and reliable instruments (Yusup, 2018). In this study, an interview sheet was employed to gather information relevant to the research topic. Interview sheets are used to collect verbal data from respondents or subjects. Additionally, researchers utilized observation results as an instrument for directly examining the research object. The interview instruments are detailed in Table 1.

Tabel 1. Interview Instrument

No	Question
1.	How mam identify problem liveliness participant educate in learning physics?
2.	According to mam, factor main what causes participant educate not enough active in learning physics?
3.	According to mam, what application of learning models problem based learning can overcome or minimize problem liveliness participant educate in learning physics?
4.	How mam ensure that problem physics presented in the learning model problem based learning in accordance with level understanding participant educate and can motivating they for active study?
5.	What mam’s difference look in response and participation participant educate before and after implementation of the learning model problem based learning in learning physics?
6.	Is there is challenge especially mams facing during the process of implementing the learning model problem based learning for overcome problem liveliness participant educate in learning physics? How mam overcome challenge the?

Data collection techniques in this research were through observation and interviews. Observation is a technique or method of collecting data by observing ongoing activities. Observations were carried out to determine students' learning activities during Physics learning in order to see students' active learning (Sari, 2018). An interview was carried out with a Physics teacher from SMAN 15 Muaro Jambi using a teacher interview sheet. The purpose of these interviews was to gather qualitative data regarding students' engagement in learning activities.

The data obtained from interviews were analyzed descriptively using the Miles and Huberman technique. This method involves three key steps: data reduction, where the data is simplified; data

display, where the data is organized and presented; and conclusion drawing, where the data is verified and interpreted (Sidiq et al., 2019; Rahmatiah & Isa, 2023; Abbas, 2023).

RESULTS AND DISCUSSION

The research results were obtained from an instrument in the form of an interview sheet with the Physics subject teacher at SMAN 15 Muaro Jambi to obtain data related to the research to be carried out. The interview sheet consists of 6 questions. The following are the results of the teacher interview data in Table 2 below:

Table 2. Results of Physics Subject Teacher Interviews

No	Question	Answer
1.	How mam identify problem liveliness participant educate in learning physics?	I usually observe level participation participant educate in discussion class, response to questions, and results evaluation individual participant educate in learning physics.
2.	According to mam, factor main what causes participant educate not enough active in learning physics?	Possible causal factors participant educate not enough active is abstractness concept, lack of relevance material, or lack of chance for hook theory with situation world real participant educate so that make participant educate seen not enough active during the learning process .
3.	According to mam, what application of learning models problem based learning can overcome or minimize problem liveliness participant educate in learning physics?	Yes, because with application of the problem based learning model make participant educate as center in learning, so make participant educate more active in the learning process especially learning physics.
4.	How mam ensure that problem physics presented in the learning model problem based learning in accordance with level understanding participant educate and can motivating they for active study?	I designing problem with combine draft physics and situation life daily participant educate and i also try choose challenging problem for participant educate however still in accordance with level understanding participant educate, so participant educate can feel relevance material.
5.	What mam's difference look in response and participation participant educate before and after implementation of the learning model problem based learning in learning physics?	Yes, it is me see differences experienced by participant educate from enhancement involvement participant educate in formulate question and look for solution after application of the problem based learning model. Participant educate seen more enthusiastic and more focus as well as seen more active in the learning process physics.
6.	Is there is challenge especially mams facing during the process of implementing the learning model problem based learning for overcome problem liveliness participant educate in learning physics? How mam overcome challenge the?	Challenge specifically encountered that is adjustment participant educate to approach or different learning models. How to overcome challenge the that is with i try for facilitate understanding participant educate about benefit problem based learning and give necessary support through change this. I also keep going do reflection self and collaborate with fellow teachers for share experience and strategy best.

Based on interviews with Physics teachers and observations of teaching and learning activities, it is evident that while students are capable of participating in class, their overall engagement is low. Many students exhibit laziness, shyness, and indifference, as shown by their lack of attention to the material presented by the teacher. This becomes apparent when the teacher asks students to explain the material, but they are unable to respond correctly. These issues lead to a

teacher-centered learning environment with minimal student feedback, resulting in an inefficient learning process.

Problem based learning model can be said to be quite successful because each student is required to focus during learning and is required to understand and analyze the learning material. So students who usually don't care and do other activities outside of learning don't have the opportunity to do these things again. Based on the theory developed by Barrow, as quoted by Arifudin (2020), he explains that the characteristics of the problem based learning model are: (1) learning is student-centered: the problem based learning process focuses more on students as learning people; (2) authentic problems form the organizing focus for learning : the problems presented to students are authentic problems; (3) new information is acquired through self-directed learning: students try to find information through sources, whether from books or other information; (4) learning occurs in small groups: carried out in small groups; (5) teachers act as facilitators: teachers only act as facilitators.

The problem based learning model is carried out by facilitating learning videos sourced from YouTube as media and learning resources used apart from textbooks. This learning video was chosen because this teaching media can provide active learning to students because learning is presented attractively in the form of videos that can be visualized clearly so that physics learning which is considered difficult and abstract can be easily understood by students. Next, students are required to observe, understand and analyze the content of the video, then look for answers to the questions that have been given, then students conclude the content of the learning material presented in the video. Apart from that, students are also given the opportunity to ask questions regarding material that they do not understand so that it can be discussed again.

After using the problem based learning model, the level of student activity increased, this can be seen from their activeness in giving opinions about the conclusions of the content of the videos shown and students also became active in asking questions during the learning process. This is also in accordance with the research results of Vitasari et al. (2016) which shows that the application of the problem based leaning model can increase activity and mathematics learning outcomes in fifth grade elementary school students.

The use of problem-based learning models in physics education has notable effects on enhancing educational quality. This approach not only prompts students to engage more actively and critically in the learning process but also boosts their motivation by involving them directly in addressing real-world problems. In addition, problem-based learning develops collaborative skills, deepens conceptual understanding, and prepares students for the challenges of further education and future careers. In this context, teachers play more of a role as facilitators who guide students, thus requiring a change in the approach to teaching. Overall, problem-based learning can be an effective strategy to face the challenges of 21st-century learning, making students better prepared to face the complexities of the real world.

This study has several limitations that need to be considered. The success of implementing problem-based learning is highly dependent on the teacher's ability to design problems that are appropriate and relevant to the physics material being taught, which can be a challenge in itself. Available resources, such as time and supporting materials, can also be obstacles in implementing this model consistently. Finally, the results of this study may not be fully generalizable to the entire student population, especially in educational environments with very different conditions, such as differences in curriculum or dominant learning cultures.

CONCLUSION

Based on the research results, it can be concluded that there is an influence of the application of the problem based learning model on students' active learning in physics subjects at SMAN 15 Muaro Jambi. This can be seen from students being more active in the learning process, marked by students who are enthusiastic in participating in learning. Thus, the problem based learning model can increase students' active learning and can be considered an effective model in increasing students' participation and involvement in the physics learning process. This study suggests expanding the use of problem-based learning models within the physics curriculum and providing training for teachers to enhance student effectiveness and engagement in the learning process.

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