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Analysis of Learning Motivation Through the POE (Predict-Observe-Explain) Learning Model in Science Education

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Abstract

Learning motivation is an important factor in science learning, but it is still uneven among students. The particular study aimed to analyze the increase in student learning motivation after applying the Predict-Observe-Explain (POE) learning model compared to conventional methods. The method used descriptive quantitative with a structured survey technique. The subjects were seventh-grade students of MTs Darul Falah Langgam in the 2024/2025 school year. The sample was selected using a purposive sampling technique, consisting of 48 students, who were divided into two classes, namely VII A and VII B, each totaling 24 students. The research instrument was a questionnaire consisting of 30 questions with six indicators of learning motivation. The results showed that the POE learning model was more effective in increasing learning motivation than conventional methods. Students' learning motivation in classes using the POE model increased by 68% (high category), meanwhile conventional methods increased by 58% (medium category). This finding indicates that the POE approach create a more interesting learning experience, increase student engagement, and help them understand concepts more deeply through the stages of prediction, observation, and explanation.

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INTRODUCTION

Education plays a crucial role in human life, and various aspects of life require education. Schools play a role in guiding students to achieve optimal development by fulfilling their developmental tasks. This development can be achieved if students have high learning motivation (Kurnia Sari et al., 2020).

One of the subjects that requires increased learning motivation is Natural Science (IPA) (Yanti, 2023). Science studies the universe and reveals everything related to natural phenomena (Aningsih & Shalecha, 2023). However, based on a needs analysis questionnaire in three schools, it was found that students' learning motivation was low, with a percentage of 60.4%.

Interview results at MTs Darul Falah Langgam show that the school implements the Merdeka Curriculum, which provides flexibility in learning and assessment methods. The dominant techniques used are discussions, demonstrations, and lectures. Experimental activities are rarely conducted out due to limited equipment, while commonly used learning media are presentation slides, videos, and simple props. In addition, students are not allowed to bring smartphones to school. As a result, learning relies on LKS (student worksheet) and printed

books. Also, Projector facilities are limited due to electricity constraints.

The lack of students' motivation to learn in science is caused by the assumption that science is a difficult and less fun lesson (Ihzah et al., 2024). This is closely related to the learning process in the classroom, where the methods can affect students' learning motivation (Hidayati et al., 2022). However, learning motivation has an impact on the lack of active participation of students, which affects the achievement of learning outcomes (Suari et al., 2022).

Learning motivation is influenced by various factors, such as family support (Djarwo, 2020), ideals, learning abilities, and students' physical and mental conditions (Ritonga, 2024). The correct learning strategy is needed to increase students' learning motivation, for example, the learning models of Predict, Observe, Explain (POE). This model encourages students to be more active in the learning process through prediction, observation, and explanation (Hussain & Wijaya, 2020). POE learning can reduce teacher domination and provide flexibility for students to make their discoveries (Nurfadilah et al., 2022). In addition, this model increases creativity, allows students to compare hypotheses with reality, and makes learning more interesting and easier to understand (T. Sri et al., 2021).

Current students tend to only memorize concepts, theories, and laws in science without understanding their in-depth application (Serawaidi et al., 2024). More meaningful learning can increase learning motivation, because it is related to clear learning objectives and interesting approaches (Amin et al., 2023). Teachers plays a crucial role in building a pleasant learning atmosphere and motivating students in learning (Hayati, 2020). Effective science learning must provide opportunities for students to have experience and find the meaning of the material directly (Lusidawaty et al., 2020).

This study aims to analyze students' learning motivation after applying the POE learning model compared to conventional methods.

RESEARCH METHOD

The particular study used a structured survey approach, involving MTS Darul Falah Langgam. Students were provided a student's learning motivation questionnaire with physics topics based on POE learning models and Conventional Learning Models. The research design is presented in Figure 1.

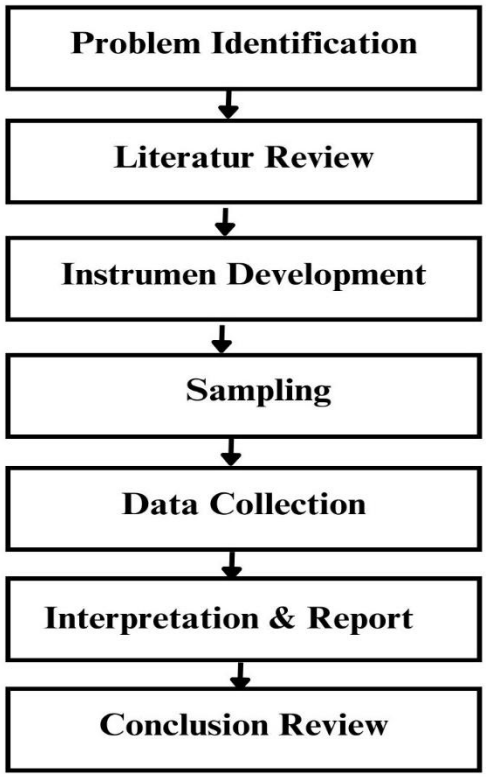


Figure 1. Research design of Structured survey

The population were all seventh grade students of Mts Darul Falah Langgam, totaling 72 students in the odd semester of the 2024/2025 school year. The sample consisted of 48 students with learning activities for 3 meetings. The data collection technique was a questionnaire of learning motivation, which consisted of 30 questions with 6 sub-indicators, as presented in Table 1.

Table 1: Indicators of Motivation

No	Indicators	Number of Items per Indicator	Item Number
1.	Desire and willingness to succeed	9	1, 2, 3, 4, 5, 6, 7, 8, 9
2.	The existence of encouragement and needs in learning	4	10, 11, 12, 13
3.	The existence of future hopes and aspirations	3	14,15, 16
4.	The existence of appreciation in learning	6	17, 18, 19, 20, 21, 22
5.	The existence of interesting activities in learning	3	23, 24, 25

No	Indicators	Number of Items per Indicator	Item Number
6.	The existence of a conducive learning environment, allowing students to learn well	5	26, 27, 28, 29, 30

Source: (Hamzah B. Uno, 2023)

The average percentage of student's response questionnaire scores from each aspect is calculated by the following formula:

$$P = \frac{K}{l\ x\ m}\ x\ 100\% \text{.....(1)}$$

Description:
P = percentage score of the questionnaire results
K = overall score obtained by students
l = number of students
m = maximum score

The percentage score of the student's learning motivation was analyzed according to the criteria adapted from the assessment guidelines, shown in Table 2.

Table 2. Category of Percentage Score of Student's Learning Motivation Questionnaire

Obtained Persentage (%)	Criteria
85,26-100	Very High
62,51-81,25	High
43,76-62,5	Low
≤ 43,75	Very Low

(Hidayat et al, 2023)

RESULT AND DISCUSSION

The study aimed to analyze the level of learning motivation of students who participated in learning with the Predict, Observe, Explain (POE) model and students who received conventional learning. The research sample consisted of 48 seventh-grade students, who were divided into two groups. First group, 24 students of class VII A as the control group, received conventional learning. And, 24 students of class VII B as the experimental group, received the POE model.

The implementation of the POE model in the experimental class is presented in Figure 2.

Figure 2. Implementation of POE learning model

Based on Figure 2, the learning process with the Predict, Observe, Explain (POE) model was carried out in three meetings. After all meetings were completed, a motivation questionnaire was distributed to students to measure their learning motivation level. This POE model consisted of three main syntaxes, namely prediction, observation, and explanation (Saleh, 2024; Lela, 2023).

The POE learning model has several advantages in increasing the effectiveness of the learning process. For example, the students are ease to understand the concepts conveyed by the teacher since it provides opportunities to prove their prior knowledge directly through observation (Sri, 2021; Elarismoy, 2023). This model stimulates students' creativity in making predictions and reduces verbalism, so they not only receive information verbally but also observe events or phenomenon through experiments. The learning process becomes more interesting because students are actively involved in direct observation, not just listening to explanations. Also, they have the opportunity to compare the theories or predictions with the results observed during the experiment (Yus'iran et al., 2021). By connecting new knowledge with existing knowledge, students build a deeper understanding through reflection (Murtihapsari et al., 2022).

Meanwhile, the conventional model class was taught using the lecture and discussion method, shown in Figure 3.

Figure 3. Implementation of Conventional learning model

The learning process with the Conventional model is carried out in three meetings. If teachers teach monotonously, the results will remain the same; students tend to feel bored and less motivated to receive material (Huda & Ikhsan, 2024). The use of inappropriate teaching methods leads to a less-than-optimal impact on student's learning outcomes (Ferawati, 2021). After all meetings were completed, a motivation questionnaire was distributed to students to measure their level of learning motivation.

The implementation of filling out this questionnaire is presented in Figure 4.

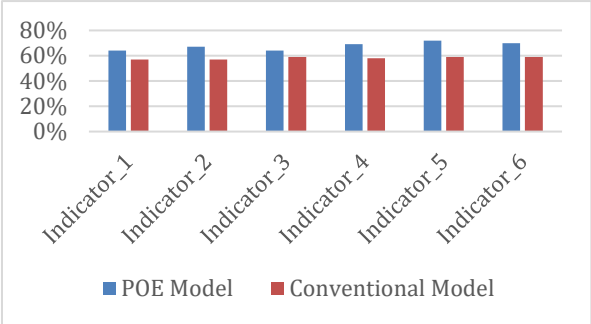
Figure 4. Filling out the Learning Motivation Questionnaire

Then, data from the motivation questionnaire was analyzed descriptively to provide an overview of the differences in motivation levels between the two groups. The results of the analysis of students' motivation scores after the application of both learning models is presented in Table 2.

Table 2. Results of Descriptive Analysis of Science Learning Motivation Posttest

Learning Motivation Indicator	Experiment Class Posttest average score	Criteria	Control Class Posttest average score	Criteria
Desire and willingness to succeed	64%	High	57%	Low
The existence of encouragement and needs in learning	67%	Very High	57%	Low
The existence of future hopes and aspirations	64%	Very High	59%	Low
The existence of appreciation in learning	69%	High	58%	Low
The existence of interesting activities in learning	72%	High	59%	Low
The existence of a conducive learning environment, allowing students to learn well	70%	High	59%	Low
Average	68%	High	58%	Low

Based on Table 2, the graph 1 shows the difference in student motivation between the experimental and control classes.



Graph 1. Results of Descriptive Analysis of Science Learning Motivation Posttest

Based on Graph 1, there is a difference in the average value obtained by students in the experimental and control classes. At the pretest stage, the average value of students' learning motivation in the experimental class was 55%, while the control class was 53%. After the learning, the Posttest showed a significant increase in the experimental class, with an average of 68%. Meanwhile, the control class only experienced a small increase to 58%.

Comparison of students' learning motivation between the two classes, both before and after learning, was further analyzed based on each indicator of learning motivation. A detailed explanation for each indicator is presented in the following section:

1. Desire and Willingness to succeed

Motivation from the indicator of the Desire and Willingness to succeed in students is designed to measure how strong the internal drive of students is to achieve success in science learning. It includes the level of students' willingness to achieve good grades, understand science concepts deeply, and feel proud of their achievements in science lessons. This indicator was assessed with 9 questions.

The average of students' learning motivation was 64%, after applying the POE learning model. In contrast, the conventional model class obtained a

percentage of 57%. These results show that the application of the POE model increase learning motivation in the aspect of desire and willingness to succeed.

Someone who has the desire and willingness to succeed will complete the task promptly (Makhmuri & Andini, 2020). In a supportive learning environment, (Farhan et al., 2023) Learning motivation arise due to the desire to succeed, learning needs, and ideals(Sri et al., 2023). Besides that, the willingness and motivation of students have a significant effect on the level of student involvement in the learning process (Rafi et al., 2023).

2. Existence of encouragement and needs in learning

The indicator is designed to measure how mitiative, interest and willingness of students to be actively involved in the science leaming process. It includes the level of students' interest to the topic of science material, how often students look for additional learning resources outside the classroom, how actively students participate in group discussions, and how responsible students are in completing science topic assignments given by the teacher.

This variable is assessed through 4 questions. The results of the analysis showed that the average students' learning motivation increased in the aspect of the existence of encouragement and needs in learning by 67%, after applying the POE learning model. Meanwhile, the conventional model class obtained a percentage of 57%. Students who do not have the drive and need to learn tend to be passive and only receive learning from the teacher without trying to find additional information independently (Putra et al., 2022). Learning motivation plays a role in strengthening and directing the learning process so that it supports learning effectiveness (Yogi et al., 2024). Therefore, learning motivation needs to be instilled in every student to enable them active in following the material taught at school (Salmawati & Oktavia, 2023).

3. Hopes and aspirations for the future

The indicator is designed to measure the level of students believe that learning science is relevant and important to achieve their future goals. This includes how strongly students believe that their efforts in learning science today will make it easier for them to achieve their dreams and how much interest students have in seeking additional information related to science. Because they see the benefits for their future, and how much students feel motivated to learn science as they realize its connection to their desired career or field in the future.

This variable was assessed through 3 questions. The results of the analysis showed that the average students' learning motivation increased in the aspect of the existence of motivation and needs in learning by 64%, after applying the POE learning model. Meanwhile, the conventional model class obtained the percentage of 59%. Students who have high goals and aspirations tend to be more motivated in learning (Pardede et al., 2022). High motivation encourages students to be more active in learning to achieve better results (Maulidah et al., 2022).

4. The existence of rewards in learning

The indicator is designed to measure the level of students' motivation to learn science, which is influenced by teacher's recognition and appreciation. This includes how much students are motivated to learn science because they get praise when they successfully solve problems. After that, it includes how much students' interest and motivated in learning science depends on giving gifts by the teacher because of a good test score. Also, it includes the teacher's appreciation motivates and affects on students' interest in learning science. And, how much influence the gifts given by the teacher have on students' motivation to learn science.

This variable was assessed through 6 questions. The results of the analysis showed that the average students' learning motivation increased by 69%, after applying the POE learning model. Meanwhile, the conventional model class obtained a percentage of 58%.

Rewards can foster feelings of pleasure in students to make learning easier (Sudirman et al., 2023). In addition, it has a positive impact on student's learning motivation (Arsyah et al., 2024). Therefore, Rewarding students should be done when they succeed in achieving the set learning targets (Maharani, 2021).

5. The existence of interesting activities in learning

The indicator is designed to measure the level of students' interest and attraction to science learning methods and activities that are varied and involve students actively. This includes how much students feel motivated and happy when teachers use practicum methods in science learning, how much students enjoy games or quizzes relevant to science materials, and how effective the discussion activities in improving their understanding of science materials. This indicator was assessed through 3 questions.

6. The existence of a conducive learning environment

The indicator is designed to measure how much the physical and emotional atmosphere around students affects their interest and ability to learn science effectively. This includes how much students feel happy, calm, and comfortable learning science in the classroom, how comfortable students are in doing science practicum, how much the variety of learning that proves concepts directly (practicum/observation) reduces boredom, how much students feel motivated to learn science at home because of a supportive atmosphere, and how much the availability of complete laboratory facilities affects students' comfort in doing practicum.

This variable was assessed through 5 questions asked. The analysis showed that the average students' learning motivation increased by 70%, after applying the POE learning model. Meanwhile, the conventional model class obtained a percentage of 59%.

Effective and efficient students' development requires a conducive learning environment to achieve learning objectives. A positive environment has several characteristics, such as the teacher's ability to present material in an interesting way, concern for students, and student involvement. Also, providing feedback are important factors in building a conducive learning environment (Putri & Herdi, 2023; Setiawan & Mudjiran, 2022). Research conducted by Sulistyowati et al., (2024) showed that students who learn in a conducive environment tend to have better learning outcomes.

CONCLUSION

Based on the analysis and findings, the POE (Predict-Observe-Explain) learning model proved to be more effective in increasing students' learning motivation compared to the conventional model. Learning motivation in classes using the POE model increased by 68% in the high category. Meanwhile, conventional model class only increased by 58% in low category. It shows that the POE approach provide a more interesting learning experience, increase student involvement, and help them understand concepts better through the process of prediction, observation, and explanation.

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