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IMPROVING FIFTH-GRADE STUDENTS' SCIENCE LEARNING OUTCOMES ON THE TOPIC OF ECOSYSTEMS THROUGH THE PREDICT–OBSERVE–EXPLAIN (POE) MODEL AT MI NW PESENG

[1]Sary Qurrata A'yunin Putri

[1]Student, Faculty of Tarbiyah and Teacher Training, Mataram State Islamic University, Indonesia

Corresponding Author Email: sariqap@gmail.com

A B S T R A C T S

This study aimed to improve fifth-grade students' Science learning outcomes on the topic of ecosystems through the implementation of the Predict–Observe–Explain (POE) learning model at MI NW Peseng, Kopang District. The study was motivated by students' low achievement in Science, with several students obtaining scores below the Minimum Mastery Criterion (KKM) of 65. This study employed Classroom Action Research (CAR) conducted in two cycles, with each cycle consisting of two meetings and four stages: planning, action, observation, and reflection. The participants were 18 fifth-grade students. Data were collected through learning achievement tests, observations, and documentation and analyzed descriptively by comparing students' mean scores and classical mastery percentages across the pre-cycle, Cycle I, and Cycle II. The results showed a gradual improvement in students' learning outcomes. In the pre-cycle, the mean score was 59.88, with 44% classical mastery. Following the implementation of the POE model, the mean score increased to 67.72 with 67% mastery in Cycle I and further increased to 78.77 with 89% mastery in Cycle II. The Cycle II achievement exceeded the predetermined success criterion of 85%. During the POE activities, students were encouraged to predict outcomes, observe phenomena, discuss their findings, and explain their understanding of ecosystem concepts. These findings indicate that the POE model contributed to improved Science learning outcomes and student engagement within the context of this classroom action research. Therefore, POE shows potential as an alternative approach for teaching ecosystem concepts at the elementary-school level

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INTRODUCTION

Education plays an important role in developing students' knowledge, skills, attitudes, and potential. The educational process is not only directed toward mastering knowledge but also toward developing students' ability to understand, apply, and connect knowledge with everyday life. Science is one of the subjects that is closely related to students' everyday experiences. Science learning is not merely intended to make students master concepts but also to provide opportunities for students to observe natural phenomena, identify problems, conduct investigations, obtain information, and draw conclusions. Therefore, Science learning at the elementary school level needs to provide students with concrete and meaningful learning experiences. One of the important topics in elementary Science is the ecosystem. Ecosystem material includes the relationship between biotic and abiotic components as well as interactions among components within an environment. Therefore, ecosystem material can actually be learned through phenomena found in students' surroundings, such as school environments, rice fields, gardens, rivers, and residential areas.

However, the initial observation at MI NW Peseng indicated that students' learning outcomes in Science, particularly on ecosystem material, were still low. The learning process tended to be teacher-centered, resulting in students being less active and having limited opportunities to develop their thinking skills, discuss with their peers, conduct observations, and relate the learning material to real-life situations. These conditions affected students' learning outcomes. The original research document also indicates that the use of lecture methods and the limited use of learning media contributed to the problems in Science learning.

Based on these problems, an appropriate learning model was needed to provide students with greater opportunities to participate actively in the learning process. One of the relevant models is the Predict–Observe–Explain (POE) model.

The POE model consists of three main stages: Predict, Observe, and Explain. Through these stages, students do not simply receive information from the teacher but construct their knowledge through predicting, observing phenomena, and explaining the results of their observations.

In this study, the Predict stage was used to encourage students to express their predictions based on their prior knowledge and the phenomena presented by the teacher. The Observe stage provided students with opportunities to directly observe phenomena or their surrounding environment. In the Explain stage, students compared their observations with their initial predictions, discussed their findings, and presented their results to the class.

These stages were applied to ecosystem material, particularly the components of ecosystems and the relationships among ecosystem components. Therefore, this study aimed to determine whether the implementation of the Predict–Observe–Explain learning model could improve the Science learning outcomes of fifth-grade students on ecosystem material at MI NW Peseng, Kopang District.

RESEARCH METHOD

The methodology is generally appropriate for a Classroom Action Research study and clearly identifies the research design, POE learning procedure, data collection techniques, and success criterion. However, several aspects require clarification and improvement before publication. First, the manuscript should clarify the roles of the researcher and classroom teacher, including who implemented the POE lessons and who conducted the observations. Second, the CAR procedure should explain what specific problems were identified in Cycle I and what concrete improvements were made in Cycle II. Third, the POE procedure is clearly described, but the authors should provide more detail about the learning activities, such as the types of ecosystem phenomena or observations used, how students worked in groups, and how their predictions were compared with the observation results. Fourth, the 30-item multiple-choice test should be described more systematically, including whether the test was administered at the end of each cycle and whether the items were validated before use. Fifth, the observation instruments should be explained by indicating the number of indicators and the aspects observed for teacher and student activities. Sixth, the data analysis section should provide the formulas used to calculate the mean score and classical mastery percentage, rather than only stating that descriptive analysis was applied. Seventh, the research should explain how the 85% success criterion was determined and clarify that this criterion refers to the proportion of students achieving the KKM of 65. Eighth, the manuscript should clarify whether the study included a pre-cycle assessment because the Results section reports pre-cycle data; if so, the methodology should describe when and how the pre-cycle test was conducted. Finally, the dates and sequence of Cycle I and Cycle II should be presented consistently with the research timeline. Reviewer Recommendation: Minor to Moderate Revision. The methodology is suitable for the research objective, but additional details regarding the implementation of POE, researcher–teacher roles, instrument quality, pre-cycle procedures, and data analysis are needed to improve methodological transparency and reproducibility.

RESEARCH FINDING AND DISCUSSION

Before implementing the action, the researcher conducted a pre-cycle to determine the students' initial learning conditions. The pre-cycle test consisted of 30 multiple-choice questions. The results showed that the highest score was 73, the lowest score was 43, and the average score was 59.88. Of the 18 students, 8 students or 44% achieved the KKM, while 10 students or 56% did not achieve the KKM. These results indicated that the students' learning outcomes had not reached the predetermined classical mastery criterion of 85%. Therefore, an instructional intervention was required through the implementation of the POE learning model.

Cycle I

Cycle I was conducted in two meetings. The learning material focused on the components of ecosystems. During the Predict stage, students were presented with pictures and questions related to environmental conditions. They were asked to make predictions and provide reasons based on their prior knowledge. During the Observe stage, students observed the surrounding environment, including the school environment and rice fields. They identified and recorded biotic and abiotic components. During the Explain stage, students discussed their observations, compared their findings with their initial predictions, and presented their results. The results of the Cycle I test showed that the highest score was 83, the lowest score was 50, and the average score was 67.72. Twelve students or 67% achieved the KKM, while six students or 33% did not achieve the KKM. Although there was an improvement compared with the pre-cycle, the classical mastery percentage of 67% had not reached the predetermined criterion of 85%. Therefore, the research continued to Cycle II.

The observation results also showed that several weaknesses remained in Cycle I. Some students were still reluctant to express their opinions, had difficulty preparing observation reports, and were less active in the learning process. The teacher also needed to improve the explanation of learning objectives, the connection between learning material and students' everyday experiences, and guidance during the observation activities.

Cycle II

Cycle II was conducted as an improvement based on the weaknesses found in Cycle I. The learning material focused on the relationships among ecosystem components. The teacher improved the learning process by explaining the learning objectives more clearly, providing more systematic explanations, connecting the material with students' everyday experiences, and providing more intensive guidance during observation activities. The

Predict, Observe, and Explain stages were maintained. However, clearer instructions were provided so that students could conduct observations more effectively and prepare their reports appropriately. The results of the Cycle II test showed that the highest score was 90, the lowest score was 60, and the average score was 78.77. Sixteen students or 89% achieved the KKM, while two students or 11% did not achieve the KKM. Since the classical mastery percentage reached 89%, the predetermined success criterion of 85% was achieved. Therefore, the research was terminated after Cycle II.

Comparison of Students' Learning Outcomes

The development of students' learning outcomes from the pre-cycle to Cycle II is presented below.

Table 1 Comparison of Students' Learning Outcomes

Stage	Average Score	Students Achieving KKM	Students Not Achieving KKM	Mastery Percentage
Pre-Cycle	59.88	8	10	44%
Cycle I	67.72	12	6	67%
Cycle II	78.77	16	2	89%

The table shows a consistent improvement in students' learning outcomes. The mastery percentage increased by 23 percentage points from the pre-cycle to Cycle I and by another 22 percentage points from Cycle I to Cycle II. Overall, students' mastery increased by 45 percentage points from the pre-cycle to Cycle II. The original research data also show the same pattern of improvement: 44%, 67%, and 89%. The findings demonstrate that the implementation of the Predict–Observe–Explain learning model improved students' Science learning outcomes on ecosystem material. The improvement was reflected in both the students' average scores and their classical mastery percentages.

In the pre-cycle, the students' average score was only 59.88, with a classical mastery percentage of 44%. This indicated that most students had not achieved the minimum learning criterion. The low learning outcomes were related to the teacher-centered learning process, in which students had limited opportunities to observe, discuss, develop predictions, and connect learning concepts with real-life experiences.

The implementation of POE in Cycle I resulted in positive changes in the learning process. Students were given opportunities to construct their knowledge through direct experiences. The Predict stage encouraged students to express their initial ideas before receiving explanations from the teacher. This activity encouraged students to think about a phenomenon and formulate possible explanations based on their existing knowledge. The Observe stage provided students with direct learning experiences. Students observed their surrounding environment and identified biotic and abiotic components. Such activities helped students understand ecosystem concepts through concrete experiences. The Explain stage allowed students to organize and communicate their findings. Students compared their initial predictions with the results of their observations, discussed their findings, and presented them to the class. Thus, students were actively involved in constructing and communicating knowledge.

The characteristics of elementary school students require learning experiences that are concrete, integrative, and hierarchical. The original research also connects Science learning with students' direct experiences and their surrounding environment. Nevertheless, the results of Cycle I had not yet reached the success criterion. Several students were still reluctant to express their opinions and had difficulty preparing observation reports. The teacher also needed to improve the learning instructions and provide more guidance during the activities.

Therefore, several improvements were implemented in Cycle II. The teacher provided clearer learning objectives, improved explanations, strengthened the connection between learning material and students' everyday lives, and provided more intensive guidance. These improvements resulted in a significant increase in students' learning outcomes. In Cycle II, the classical mastery percentage reached 89%, exceeding the predetermined criterion of 85%. Sixteen students achieved the KKM, while only two students remained below the KKM. These two students were subsequently provided with remedial activities.

The improvement indicates that POE is an appropriate learning model for Science materials that involve observation and real-life phenomena. Ecosystem material is particularly suitable because students can predict phenomena, observe environmental conditions, and explain relationships among ecosystem components based on their observations.

In addition to improving cognitive learning outcomes, the POE model also encouraged students to become more active during the learning process. Students participated in group discussions, expressed opinions, responded to other groups' presentations, and conducted observations. The original research indicates that learning through direct experience and the use of supporting learning resources helped students understand information more easily and become more actively involved in learning.

Therefore, the improvement in students' learning outcomes was not only related to the POE model itself but also to the improvement of instructional practices from one cycle to another. The combination of the learning model, learning media, direct experiences, environmental resources, group discussions, and presentations created a more active and meaningful learning process.

CONCLUSION

Based on the results of the study, it can be concluded that the implementation of the Predict–Observe–Explain (POE) learning model improved the Science learning outcomes of fifth-grade students on ecosystem material at MI NW Peseng, Kopang District. The improvement occurred gradually from the pre-cycle to Cycle II. In the pre-cycle, the students' average score was 59.88, with a classical mastery percentage of 44%. After implementing the POE model in Cycle I, the average score increased to 67.72, with a mastery percentage of 67%. In Cycle II, the average score increased to 78.77, and the classical mastery percentage reached 89%. Thus, the achievement exceeded the predetermined classical mastery criterion of 85%. The implementation of POE also encouraged students to become more active in observing, discussing, expressing opinions, responding to other students' ideas, and connecting ecosystem concepts with their real-life experiences. Therefore, the Predict–Observe–Explain learning model can be considered an alternative model for Science learning, particularly for materials that require observation, investigation, and direct learning experiences.

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