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# Enhancing 5th-Grade Student Learning Outcomes with the Predict-Observe-Explain Learning Model in Integrated Thematic Learning

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ABSTRACT

The Curriculum 2013 for elementary schools is designed around integrated thematic learning, One such approach is the Predict-Observe-Explain (POE) model. This study investigates the impact of the POE learning model on the learning outcomes at a private elementary school. Employing a quantitative experimental method with a Quasi-Experimental Design, the research targets fifth-grade students as the population. The independent variable is the learning model, while the dependent variable is the student's learning outcomes in integrated thematic learning. Data were collected through observation, tests, and documentation. The findings reveal a significant positive effect of the POE learning model on student learning outcomes. This is demonstrated by an increase in the average post-test scores compared to pre-test scores by 10.05, verified using the Wilcoxon test. Additionally, the Mann-Whitney U test analysis shows a significance value of 0.002, which is less than the alpha value of 0.05. This indicates a significant difference in learning outcomes between the experimental and control groups, confirming the effectiveness of the POE learning model in enhancing student learning in integrated thematic contexts.

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**Keywords**
Elementary School
Learning Outcomes
Predict-Observe-Explain
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## Introduction

The Curriculum 2013 represents an evolution of the previous educational framework, aimed at fostering students who are more productive, creative, innovative, and effective through the integration of attitudes, skills, and knowledge [1], [2]. As articulated by Ref. [3], [4], [5] these curriculum changes aim to build on the 2006 Education Unit Level Curriculum, incorporating competencies in attitude, knowledge, and skills holistically. The Minister of Education and Culture (MoEC) of Indonesia underscores that the Curriculum 2013 for elementary schools is designed around integrated thematic learning [6], [7], [8], [9]. Such learning should be delivered through varied instructional strategies that align with the curriculum's characteristics.

An effective learning model must stimulate student interest, provide opportunities for self-directed problem-solving, and validate their understanding through integrated thematic contexts. POE learning model is particularly suited to these needs. It is an exploration-based strategy often employed in science education, emphasizing prediction, observation, and explanation. This model aligns well with the Curriculum 2013 's objectives, encouraging creativity and active engagement in learning while promoting efficient use of instructional time.

Despite the curriculum's objectives, the implementation of integrated thematic learning often falls short of expectations. The study noted that conventional teaching methods predominated, leading to a fragmented understanding of the subject matter and hindering the development of meaningful learning experiences. Similarly, Ref. [10] found that the application of effective learning models significantly impacts student outcomes. This research demonstrated that students displayed greater enthusiasm and interest in learning when innovative models were employed.

Previous research also discussed this topic significantly. Ref. [11] states that the influence of Entrepreneurship-based POE has a positive influence on student learning outcomes. Ref. [12] ) states that the Tri Hita-based POE has a positive influence on students' science learning outcomes. Ref. [13] also states that this model influences students' genetic skills. Ref. [14] also states that one of the efforts made to improve students' science learning outcomes is by developing science student worksheet based on POE. Furthermore, research related to the one model has been carried out well in several schools so it is necessary to thoroughly ascertain whether this learning model can also be applied in integrated thematic learning.

This study aims to address these issues by investigating the impact of the POE learning model on student learning outcomes in integrated thematic learning. By exploring this model's effectiveness, the research intends to provide valuable insights and practical guidance for

enhancing learning experiences and outcomes in elementary education. Ultimately, the objective is to demonstrate that the POE learning model can serve as an effective alternative learning strategy, fostering improved student engagement and performance.

## Material and Methods

This study employs a quantitative experimental approach with a Quasi-Experimental Design, conducted at a private elementary school (SD Muhammadiyah Pajangan 2, Yogyakarta, Indonesia) beginning in June 2022. The target population includes all fifth-grade students. Data collection involved observation, tests, and documentation. Non-participant observation was used, allowing the researcher to objectively record classroom activities without influencing the interactions. Objective tests (multiple choice) assessed the mathematics learning outcomes. The pre-tests were conducted to ensure homogeneity between experimental and control groups. The post-tests were administered after the intervention to measure learning outcomes. Documentation, including photographs and recordings, supplemented observational and test data to ensure the reliability and validity of the findings.

Before the intervention, initial tests were given to both groups to confirm their homogeneity. The experimental group then received POE learning model treatment, while the control group continued with conventional teaching methods. Post-tests were conducted to evaluate the impact of the learning model on student learning outcomes. Data analysis included the Normality Test to confirm data distribution, the Homogeneity Test to verify group similarity before intervention, and Hypothesis Testing to determine significant differences in learning outcomes. The Wilcoxon test compared pre-and post-test scores within groups, and the Mann-Whitney U-test compared outcomes between groups. This methodological approach rigorously evaluates the effectiveness of the learning model in enhancing student learning outcomes in integrated thematic learning.

## Results

This research utilized experimental procedures to examine the effect of the POE learning model on integrated thematic learning for fifth-grade students during the 2022/2023 academic year. Conducted from January 19, 2023, to February 2, 2023. The study involved two groups (the experimental group and the control group), each group comprising 20 students. The experimental group received instruction using the POE learning model, while the control group was taught using conventional lecture methods. The assignment of experimental and control groups was based on pretest results, consisting of 20 questions. The pretest and posttest results are shown in Fig. 1 and Fig. 2.

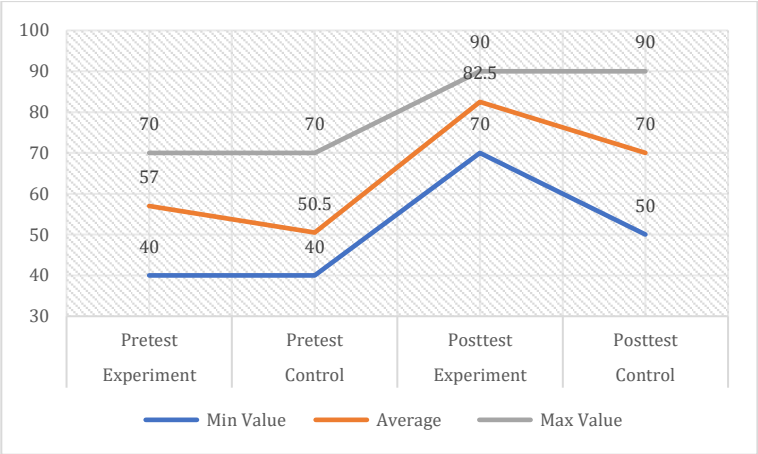



**Fig. 1.** The value of Min, Max, and Average for each group

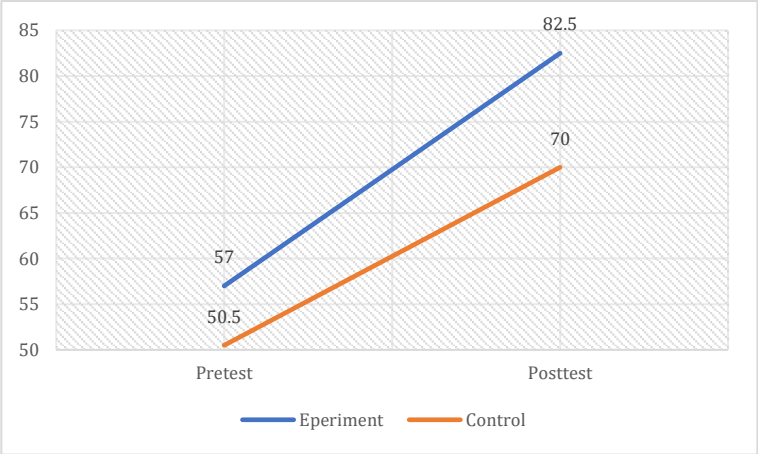



**Fig. 2.** The average pretest and posttest scores for the both groups

Based on Fig. 2, the average pretest score for the experimental group (Mean=57; SD=13.42) was higher than the control group (Mean=50.5; SD=10.90). The experimental group's average score was in the "Sufficient" category, while the control group was in the "Poor" category.

Post-test results, consisting of 10 questions, the results are presented in Fig. 2. According to that figure, the average post-test score for the experimental group was 82.5, compared to 70 for the control group. The experimental group's average is categorized as "Very Good," whereas the control group's average is categorized as "Good." The result indicates that the average pre-test score for the experimental group was 57, while the control group averaged 50.5. Post-test scores averaged 82.5 (SD=7.16) for the experimental group and 71 (SD=12.10) for the control group, highlighting the significant improvement in the experimental group following the implementation of the POE learning model.

The Kolmogorov-Smirnov and Shapiro-Wilk tests indicated that the research data was not normally distributed, as all significance values (Sig.) were less than 0.05 (Table 1).

Consequently, non-parametric statistics (Wilcoxon Test and Mann-Whitney Test) were used for data analysis.

**Table 1.** Normality Test

| Group | Kolmogorov-Smirnov | | | Shapiro wilk | | |
|---|---|---|---|---|---|---|
| | Statistics | df | Sig. | Statistics | df | Sig. |
| Pretest-Experiment group | 0.284 | 20 | 0.000 | 0.765 | 20 | 0.000 |
| Posttest-Experiment group | 0.252 | 20 | 0.002 | 0.795 | 20 | 0.001 |
| Pretest-Control group | 0.230 | 20 | 0.007 | 0.823 | 20 | 0.002 |
| Posttest-Control group | 0.233 | 20 | 0.006 | 0.884 | 20 | 0.021 |

The Wilcoxon Signed Ranks Test indicated a significant difference between pre-test and post-test scores in both the experimental and control groups, with an Asymp. Sig. (2-tailed) value of 0.000 (Table 2). This confirmed the hypothesis that the POE learning model positively impacted student learning outcomes.

**Table 2.** Wilcoxon Test

| | PostTest Exp.- PreTest Exp. | PostTest Ctrl. - PreTest Ctrl. |
|---|---|---|
| Z | -3.960 b | -4.087 b |
| Asymp. Sig. | 0.000 | 0.000 |

The homogeneity test (Levene Statistics) showed a Significance (Sig.) based on a Mean value of 0.070, greater than 0.05, indicating that the variances of post-test data from the experimental and control groups were not homogeneous (Table 3). This led to the use of the Mann-Whitney U test as an alternative to the independent sample t-test.

**Table 3. Homogeneity Test**

| | Levene Statistics | df1 | df2 | Sig. |
|---|---|---|---|---|
| Based on Mean | 3.465 | 1 | 38 | 0.070 |
| Based on Median | 2.779 | 1 | 38 | 0.104 |
| Based on trimmed mean | 3.521 | 1 | 38 | 0.068 |

The Mann-Whitney U-test revealed a significant difference in student learning outcomes between the experimental and control groups, with an Asymp. Sig. (2-tailed) value of 0.002 (Table 6). This confirmed the effectiveness of the POE learning model in improving student learning outcomes.

**Table 4.** Mann-Whitney Test

| | Learning Outcomes |
|---|---|
| Mann-Whitney U | 89.500 |
| Wilcoxon W | 299.500 |
| Z | -3.093 |
| Asymp. Sig. | 0.002 |
| Exact Sig. | 0.002 b |

These findings indicate a significant positive impact of the learning model on student learning outcomes in integrated thematic learning.

## Discussion

This research reveals that the POE learning model has a significant positive influence on student learning outcomes. The findings align with previous studies that highlight the effectiveness of interactive and student-centered learning models in enhancing educational achievement. Research conducted by Ref. [15] similarly found that the application of engaging learning models significantly impacts student performance. Before implementing such models, students often exhibited boredom and a lack of interest. However, the introduction of dynamic and interactive learning strategies, such as POE, transformed their engagement levels, making them more enthusiastic and motivated to participate actively in the learning process. This underscores the necessity for teachers to adopt effective pedagogical approaches that not only stimulate interest but also enhance comprehension and retention of knowledge.

In addition to student learning outcomes, the POE learning model provides students with 21st-century skills. This is shown to the students. This is in line with Ref. [16], [17]. Apart from that, Ref. [18] states that POE can improve students' collaboration abilities. Ref. [19] states that POE learning can provide students with creative and analytical abilities. Ref. [20] further supports this by demonstrating that the POE learning model can substantially improve student learning outcomes. The research finding indicates that the POE learning model fosters a deeper understanding of the material, allowing students to perform better academically. The structured approach of predicting, observing, and explaining helps students build critical thinking skills, enabling them to analyze and understand concepts more thoroughly [21], [22], [23]. Similarly, Ref. [24], [25], [26] noted that student learning outcomes were suboptimal before the implementation of interactive learning models. Post-implementation, there was a marked improvement in student performance. This suggests that traditional teaching methods might not be as effective in engaging students or enhancing their learning experiences compared to models like POE which involve active student participation and inquiry-based learning [27], [28], [29], [30].

Ref. [31], [32] also highlights the relationship between the use of innovative learning models and improved student outcomes. The other researcher's findings indicate that after the adoption of effective learning strategies, there was a notable increase in student performance [33], [34], [35]. This reinforces the idea that the current learning models are crucial in achieving educational objectives, such as improved comprehension and academic success. POE learning model impacts on integrated thematic learning outcomes in fifth-grade students. The result indicates a significant positive influence of the learning model on students' mathematics

learning outcomes compared to conventional teaching methods [36], [37], [38]. This statistical evidence further confirms the efficacy of the learning model in fostering better academic performance.

The collective findings from these studies suggest that adopting the POE learning model in teaching can significantly enhance student engagement, motivation, and learning outcomes [39]. The prediction phase stimulates curiosity and sets a purpose for learning. The observation phase involves active participation and real-time feedback, which solidifies understanding. Finally, the explain phase encourages students to articulate their understanding, fostering deeper comprehension and retention of the material.

The POE learning model has demonstrated its effectiveness in improving student learning outcomes across various studies. This research, along with corroborating studies, highlights the importance of interactive and student-centered learning models in modern education [40], [41]. To maximize student performance and engagement, educators should consider integrating learning models into their teaching strategies. This not only aligns with the educational goals of fostering critical thinking and problem-solving skills but also ensures a more engaging and effective learning experience for students [16], [42].

## Conclusion

The findings of this research confirm that the POE learning model significantly enhances student learning outcomes in integrated thematic learning for fifth-grade students. The study demonstrated that students in the experimental group, who were taught using the POE learning model, showed marked improvement in their post-test scores compared to those in the control group, who received conventional instruction. It effectively engages students by involving them in the learning process through prediction, observation, and explanation, which enhances their understanding and retention of the material. The interactive nature of the learning model fosters a higher level of enthusiasm and interest in students, making the learning process more enjoyable and effective. Statistical analyses, including the Wilcoxon and Mann-Whitney tests, provided robust evidence of the significant positive impact of the learning model on student learning outcomes. The experimental group showed higher average post-test scores and greater improvement from pre-test to post-test compared to the control group.

## Conflict of Interest

The authors declare that there is no conflict of interest.

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