The Influence of The Cooperative Learning Model Assisted by Interactive PowerPoint On The Learning Outcomes of Science In The Material of Kingdoms In The Archipelago for Grade IV Elementary Schools

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Abstract: Science learning on history material, especially about kingdoms in the Indonesian archipelago, still shows a gap between the philosophical objectives of the curriculum and its implementation in the classroom. One effort to improve student learning outcomes is to implement the Cooperative Learning model supported by interactive PowerPoint. This study aims to test the effect of the use of this media-assisted model on the learning outcomes of fourth-grade students on the material of kingdoms in the Indonesian archipelago. The method used was a quasi-experimental design with a nonequivalent control group. The research sample consisted of 47 students and was taken through a total sampling technique. Data analysis was carried out through descriptive statistics, the N-Gain test, and inferential analysis. The test results showed a significance value <0.001 which is smaller than 0.05, so it can be concluded that the application of the Cooperative Learning model assisted by interactive PowerPoint has a significant effect in improving student learning outcomes in science learning on the material of kingdoms in the Indonesian archipelago.

Keyword: *Cooperative Learning*, *Interactive PowerPoint, learning outcomes*

PRELIMINARY

Along with the increasing challenges of the 21st century caused by technological advances, globalization, and social change, education also requires a more measurable and concrete set of competencies (Nurhayati et al., 2025). One crucial component that serves as a guideline in the educational process is the curriculum (Andriyani et al., 2025). According to (Rahayu et al., 2022), curriculum development has a strategic function as a means to improve the quality of education. Therefore, a curriculum is needed that can adapt to current developments, is flexible, and emphasizes mastery of 21st-century competencies. In this context, Indonesia is currently implementing the Independent Curriculum, which is designed and implemented at all levels of education with the aim of

reactivating and giving meaning to the student learning process (Marlina & Ain, 2025). This curriculum allows for a more adaptive and project-based approach, so that students can develop critical analytical thinking, collaboration, and problem-solving skills more optimally (Syafriani et al., 2025). Thus, the independent curriculum can be seen as an effort to improve the quality of education by adapting to changing times, emphasizing freedom of creative thinking and a student-centered approach.

In its implementation, the Independent Curriculum still faces several significant obstacles (Azzahra et al., 2025). This creates a gap between the curriculum's philosophical objectives and actual practice. One of the main contributing factors is teachers' difficulty adapting to the changes (Mayangsari et al., 2024), particularly regarding their understanding of innovative approaches. This adaptation problem is increasingly evident in science subjects, particularly history, which requires a deep understanding of chronology and context. This situation is exacerbated by the difficulty in changing the negative stigma, as the material is theoretical and contains a lot of factual data, such as the names of figures, events, and important dates, which are considered boring and difficult to remember (Repu et al., 2025). This urges the need for interventions focused on the presentation of history material to make the learning process more active, contextual, and engaging for students, in accordance with the demands of the Independent Curriculum.

The challenges of the Independent Curriculum outlined in the previous paragraph proved relevant to the conditions in the fourth grade of Sengon Elementary School. Based on observations conducted by researchers with fourth grade teachers on September 8, 2025, significant obstacles were identified in the History material because the teacher admitted that students quickly became bored and showed low attention during the learning process. According to the teacher, this difficulty was triggered by several factors, namely the material was considered boring because it was full of memorization, which led to a less conducive classroom atmosphere. Less than 50% of students focused on the teacher's explanations, while the rest tended to be passive. This low level of attention is a strong indication of the lack of optimal learning outcomes. Therefore, interventions that can transform the History learning process into an active, contextual, and engaging one are urgently needed to address the gap between the ideals of the independent curriculum and practice in the field.

Considering the learning conditions in the field, efforts to transform the process into an active one are essential. Innovative learning models that encourage student interaction and collaboration, such as the Cooperative Learning model, are a key solution. Cooperative learning encourages student interaction, including active communication and participation within groups (Ahyar et al., 2021). Furthermore, this learning model not only increases student interest in learning but is also effective in improving student learning outcomes (Mahanani, 2022). Therefore, implementing the Cooperative Learning model is a fundamental strategy in addressing the problem of passive learning processes that have historically occurred in history.

The implementation of the Cooperative Learning Model as a powerful strategy must be supported by conducive and engaging tools to achieve maximum effectiveness. One strategy to help students anticipate disruptions or obstacles is for teachers to be adept at creating a supportive learning environment, namely by providing learning media (Fajriah & Sadiah, 2022). Interactive PowerPoint is considered effective in fostering student learning engagement (Marlina & Ain, 2025). By optimizing the interactive elements within it, this media not only facilitates material delivery but also strengthens student participation and discipline (Budianti et al., 2023). Therefore, Interactive PowerPoint is a highly relevant solution for implementation in History science learning, as it has the potential to engage students more in the learning process. Therefore, this research is expected to be an innovative effort in aligning learning practices with the demands of the Independent Curriculum, thereby achieving optimal learning outcomes.

Several studies have been conducted to improve student learning outcomes, including through the implementation of the Cooperative Learning model and the use of interactive PowerPoint media. (Ali, 2021) explains that Cooperative Learning is a learning model that emphasizes group collaboration to achieve specific goals. Previous research findings also indicate that the use of Cooperative Learning supported by interactive PowerPoint can have a positive impact on student learning outcomes (Istiqomah & Hendratno, 2025). However, studies specifically examining the impact of the Cooperative Learning model on the use of interactive PowerPoint on the material on the history of kingdoms in the archipelago in science learning are still relatively limited.

This research is important because it can provide an overview of the selection of the most appropriate and effective models and media to help improve students'

understanding of the material on kingdoms in the archipelago. Furthermore, the research results are expected to serve as a reference for further research in science and education learning and become a consideration for teachers in determining the appropriate learning models and media. Thus, this study aims to analyze the differences in student learning outcomes between classes that implement the Cooperative Learning model assisted by interactive PowerPoint and classes that use conventional methods in science lessons, specifically the material on kingdoms in the archipelago.

METHOD

This study uses an experimental research type. This study uses a quasi-experimental design with a nonequivalent control group design.

Table 1. Research Design

O1	X	O2
O3	-	O4

Sources : (Sugiyono, 2023)

Information:
- **X** = Treatment in the experimental group class using the Cooperative Learning model assisted by interactive PowerPoint media
- **O1** = Experimental Class Pretest
- **O2** = Experimental Class Posttest
- **O3** = Control Class Pretest
- **O**4 = Control Class Posttest

This research was conducted from September to November 2025 using a quantitative approach to measure the effect of implementing Cooperative Learning with interactive PowerPoint presentations on student learning outcomes. The study population was all fourth-grade students at Sengon Elementary School, Jombang, in the 2025/2026 academic year. Sampling was conducted using a total sampling technique, resulting in two classes: IV A and IV B, with a total of 47 students. Class IV B was designated as the control class and received conventional learning models, while class IV A served as the experimental class, receiving the Cooperative Learning model with interactive PowerPoint presentations. The material taught in both classes was the same: kingdoms in the Indonesian archipelago. The research procedure was implemented in four stages. The first stage was the preparation of learning materials. The second stage was the administration of a pretest to both classes to measure students' initial abilities. The third

stage was the implementation of the treatment according to the established model. The final stage was the administration of a posttest to measure changes in student learning outcomes in both groups.

The dependent variable in this study was student learning outcomes. Learning outcomes were measured using a test containing 25 multiple-choice questions. All data analysis stages were conducted using SPSS software. The analysis techniques used include prerequisite tests, namely the Shapiro–Wilk normality test and the homogeneity test using Levene's Test. To determine the effectiveness and extent of the increase in learning outcomes, the data were then analyzed using N-Gain. Furthermore, hypothesis testing was carried out in two stages: (1) Paired Sample T-Test to see whether there was a significant increase between the pretest and posttest scores in each group, and (2) Independent Sample T-Test to compare the average posttest scores of learning outcomes between the experimental group that implemented Cooperative Learning assisted by interactive PowerPoint and the control group that used conventional learning.

RESULTS

The results of the research conducted provide an overview of the differences in learning outcomes on the history of kingdoms in the archipelago between the experimental and control groups. The research report was conducted at Sengon Elementary School, Jombang. The results can be described as follows:

Table 2. Descriptive statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Pre-Test Eksperiment	25	36,00	23,00	59,00	41,00	9,43	88,917
Post-Test Eksperimen	25	18,00	68,00	86,00	77,16	5,81	33,723
Pre-Test Kontrol	22	39,00	18,00	57,00	35,86	9,85	96,981
Post Test Kontrol	22	20,00	52,00	72,00	61,36	6,43	41,385

Output : SPSS version 27

The statistical analysis results in Table 2 show that at the pre-test stage, the experimental group had an average of 41.00 with a standard deviation of 9.43. Meanwhile, the control group had a slightly lower initial average of 35.86 with a standard

deviation of 9.85. After the treatment, the experimental group's post-test score increased significantly to the highest average of 77.16 with a smaller score variation. The control group also showed an increase in post-test score to 61.36 with a standard deviation of 6.43. These descriptive results provide an initial indication that the treatment had a positive effect, with the experimental group achieving a significantly higher and more consistent final average than the control group.

Table 3. N-Gain

Group	Mean (Rata-rata N-Gain)	Category N-Gain
Eksperiment	0,6112	Medium
Control	0,3951	Medium

Output: SPSS version 27

Based on the N-Gain calculation to assess the effectiveness of the treatment, the average N-Gain score in the experimental group was 0.6112. Referring to the criteria used, this value is included in the moderate effectiveness category ($0.3 \leq g < 0.7$). Meanwhile, the control group obtained an average N-Gain of 0.3951, which is also in the moderate category. Although both groups are still in the same category, the results show a quantitative difference, namely that the increase in learning outcomes in the experimental group was greater than in the control group.

Table 4. Normality Test

Kelompok Data	Shapiro-Wilk			
	Statistic	df	Sig.	Keterangan
Pre-Test Eksperiment	,981	25	,912	Normal
Post-Test Eksperimen	,930	25	,088	Normal
Pre-Test Kontrol	,977	22	,858	Normal
Post-Test Kontrol	,954	22	,376	Normal

Output: SPSS version 27

Before conducting the hypothesis test, this study first conducted a normality test as a prerequisite for using parametric statistical analysis. The normality test aims to ensure that the data is distributed according to the assumption of a normal distribution. In this study, the normality test was conducted using the Shapiro-Wilk test. The test results showed that the significance value (Sig.) for all data, from both the experimental and control groups, was above 0.05. Therefore, it can be concluded that the data were normally distributed and met the requirements for proceeding to the homogeneity of variance test.

Table 5. Homogeneity of Variance Test

Tested Data	Levene Statistic	df1	df2	Sig.	Conclusion
Pre-Test of Experimental and Control Groups	0,045	1	45	0,834	Homogeneous
Post-Test of Experimental and Control Groups	0,086	1	45	0,770	Homogeneous

Output: SPSS versi 27

In Table 5, the homogeneity of variance test was conducted using Levene's Test to determine the similarity of learning outcome variances between the experimental and control groups. This test was applied to pretest and posttest data. The basis for decision-making states that data is considered homogeneous if the significance value (Sig.) is > 0.05. The test results show a pretest Sig. value of 0.834 and a posttest Sig. value of 0.770. Because both values are greater than 0.05, it can be concluded that the variance of learning outcomes in both groups is homogeneous.

After the prerequisite tests, namely normality and homogeneity, were met, the next stage was testing the research hypothesis. Testing was carried out in stages: first using a Paired Sample T-Test to see the increase in scores in each group, then using an Independent Sample T-Test to test whether there was a significant difference between the experimental and control groups. The results of the subsequent analysis are presented as follows:

Table 6. Paired Sample T-Test

Group	t	df	Sig. (2-tailed)	Description
Eksperiment	-23,186	24	< 0,001	Very significant
Control	-18,419	21	< 0,001	Very significant

Output: SPSS version 27

The paired sample t-test was used to compare student learning outcomes before treatment (pretest) and after treatment (posttest) in each group. The decision criterion in this test is to reject the null hypothesis (H0) if the Sig. (2-tailed) value is <0.05. In the experimental group, the calculated t value was -23.186 with df = 24 and Sig. (2-tailed) <0.001. Because the significance value is far below 0.05, it can be concluded that the experimental group experienced a very significant increase in learning outcomes. Meanwhile, in the control group, the calculated t value was -18.419 with df = 21 and Sig. (2-tailed) <0.001. With a significance value that is also smaller than 0.05, the control group also showed a very significant increase in learning outcomes.

Table 7. Independent Sample T-Test

Comparative Test	T	Df	Sig. (2-tailed)	Description
Post-test (Experimental vs. Control)	8,848	45	< 0,001	Very significant

Output: SPSS version 27

An independent sample t-test was used to compare the posttest scores of students between the experimental and control groups. The analysis showed a t-value of 8.848 with df = 45 and a Sig. (2-tailed) value <0.001. Since the significance value is less than 0.05, it can be stated that there is a significant difference in learning outcomes between the two groups. Thus, it can be concluded that the implementation of the Cooperative Learning model assisted by interactive PowerPoint is proven to be significantly more effective than learning with the conventional model.

DISCUSSION

The N-Gain test was conducted to measure the effectiveness of the treatment's learning outcomes. The results of the study revealed that the average N-Gain for the experimental group was 0.6112, higher than the control group (0.3951). This difference indicates that the interactive PowerPoint-assisted cooperative learning model was more effective in improving learning outcomes. This finding is supported by research by Istiqomah & Hendratno, 2025, which concluded that the use of interactive PowerPoint-assisted cooperative learning strategies had a positive and significant impact on learning outcomes.

A paired sample t-test was used to examine the differences in average student learning outcomes before and after the treatment in each group. The analysis showed a Sig. (2-tailed) value <0.001 for both the experimental and control groups, indicating that both groups experienced significant internal improvements in learning outcomes. However, the improvement in the experimental group was more significant because it was related to the implementation of the interactive PowerPoint-assisted cooperative learning model. Next, an Independent Sample T-Test was conducted to determine whether there was a significant difference in average learning outcomes between the experimental and control groups. The test results showed a t-value of 8.848 with a Sig.

(2-tailed) <0.001, indicating a significant difference in learning outcomes. Thus, it can be statistically concluded that the Cooperative Learning model assisted by interactive PowerPoint is more effective and superior in improving student learning outcomes compared to conventional learning. This finding aligns with research (Khusaini et al., 2025) which states that the implementation of Cooperative Learning combined with interactive PowerPoint media can improve student learning outcomes.

A series of classroom learning activities that implement the cooperative learning model assisted by interactive PowerPoint can help students focus and pay attention to teacher explanations. Furthermore, this model can also encourage students to actively ask questions during learning and engage in discussions within their respective groups. Cooperative learning encourages students to engage actively and productively in groups, thereby facilitating the exchange of ideas in a comfortable environment (Sutika et al., 2024). Students also responded very positively to the learning process, creating a relaxed atmosphere thanks to the engaging visuals and interactive features of interactive PowerPoint. This finding aligns with the opinion of (Marlina & Ain, 2025), who stated that interactive PowerPoint as a learning medium is increasingly relevant and has great potential to support active and meaningful learning in today's digital age.

The results of this study indicate that the implementation of the Cooperative Learning model supported by interactive PowerPoint media is effective in improving elementary school students' learning outcomes in the science and studies (IPS) material on kingdoms in the Indonesian archipelago. Based on these findings, the combination of this model and media can be an alternative learning strategy worthy of serious consideration by IPS teachers. This aligns with the opinion of (Tahumil, 2023), who emphasized that the integration of technology and a cooperative approach has proven effective in presenting difficult material, facilitating the understanding of abstract concepts, and creating a more dynamic and relevant learning experience. This study also emphasizes the importance of teachers adopting Cooperative Learning combined with interactive PowerPoint because this combination not only helps students understand the material better but also provides a more engaging, participatory, and meaningful learning experience. By integrating the two, student engagement can be increased and the achievement of learning objectives can be more optimal, which ultimately has an impact on improving the quality of student learning outcomes.

This study has several limitations that require attention. These limitations lie in the focus of the variables measured, which were only the learning outcomes of fourth-grade elementary school students, and the scope of the science and science content, which specifically focused on the theme of Kingdoms in the Indonesian Archipelago. Based on these limitations, it is recommended that further research expand the range of topics discussed and target a wider range of respondents. This aligns with Handy (2021) who argued that history learning at the elementary school level must be creatively packaged using various strategies and multimedia to avoid monotony. These findings can serve as an initial reference for validating other learning strategies or exploring different combinations of teaching tools to achieve innovative findings in learning activities that are more relevant and appropriate to diverse student characteristics.

CONCLUSION

Based on the research results and discussion, it can be concluded that the implementation of the Cooperative Learning model supported by interactive PowerPoint media has proven to be significantly effective in improving student learning outcomes in the science learning of the material of kingdoms in the archipelago in elementary schools. This conclusion is supported by the test results which show a t-count of 8.848 with df = 45 and a significance value <0.001 which is smaller than 0.05. Thus, the Cooperative Learning model assisted by interactive PowerPoint can be used as one of the relevant learning alternatives for elementary school teachers. The application of this combination of models and media also has implications for increasing teacher innovation in designing science learning in elementary schools. The suggestion for further research is to develop similar studies by applying the Cooperative Learning model assisted by interactive PowerPoint in different contexts, levels, or materials so that the data and findings obtained are more varied and enrich learning references.

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