

PROJECT-BASED LEARNING WITH POP-UP BOOKS: IMPACT ON WRITING AND LEARNING OUTCOMES

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ABSTRACT

This research is motivated by the low learning outcomes of students in Indonesian language learning, particularly in writing short stories. Several factors contribute to this issue, including students' limited understanding of short story writing, their lack of comprehension of intrinsic story elements, and their low writing skills. The purpose of this study is to examine the effect of the Project-Based Learning (PBL) model using pop-up book media on students' short story writing skills and learning outcomes. The research employed a quasi-experimental method with a Non-Equivalent Control Group Design. The sample consisted of two classes: Class IV A as the experimental class, which received instruction through the PBL model and pop-up book media, and Class IV B as the control class, which received conventional instruction. Data collection techniques included a short story writing test and a learning achievement test in the form of multiple-choice and essay items. The results showed that the average score of short story writing skills in the experimental class increased from a pre-test score of 64.8 to a post-test score of 82.4, while the control class increased from 63.2 to 71.5. Regarding learning outcomes, the average post-test score of the experimental class was 84.6, compared to 73.8 in the control class. A t-test indicated that there was a significant difference between the experimental and control classes, both in short story writing skills and in learning outcomes. Thus, the use of the Project-Based Learning model assisted by pop-up book media was proven to effectively improve the short story writing skills and learning outcomes of fourth-grade elementary school students.

Keywords: Project-Based Learning; Pop-Up Book Media; Short Story Writing Skills; Learning Outcomes; Elementary School Students.

INTRODUCTION

Language education plays a crucial role in developing students' communication skills, particularly at the elementary level where the foundations of listening, speaking, reading, and writing are established. These skills are taught from the early grades as a foundation for acquiring knowledge (Saleh, et al., 2024). Among these skills, writing is considered the most complex because it requires the integration of knowledge, imagination, and linguistic ability. Azhar & Wahyudi, (in Rahman, et al., 2025) Student involvement in learning is an important point to achieve maximum results. In Indonesian language learning, short story writing is an important component; however, students often face difficulties in generating ideas, understanding intrinsic elements of stories, and expressing them in written form. Preliminary observations and interviews with teachers at UPTD SDN 1 Dukuhjati revealed that many fourth-grade students scored below the Minimum Mastery Criteria (KKM), especially in writing short stories. This problem highlights the urgency of implementing innovative teaching models and learning media that can improve both writing skills and overall learning outcomes.

The low achievement in writing is influenced by several factors, including students' limited understanding of short story structure, lack of imagination, and the use of conventional teaching strategies that fail to actively engage students. To overcome these challenges, an instructional approach that promotes creativity, critical thinking, and meaningful learning is required. One promising strategy is the integration of the Project-Based Learning (PjBL) model with Pop-Up Book media. PjBL emphasizes active, student-centered learning through projects that encourage collaboration and problem-solving, while Pop-Up Books provide three-dimensional visual representations that can stimulate imagination, increase motivation, and make abstract concepts more concrete. The combination of these two approaches is expected to create a more interactive and engaging learning environment, thus supporting students in improving their writing abilities and learning outcomes.

Previous studies have shown the effectiveness of PjBL in language learning. Research conducted by Umriyah et al. (2024) indicated that the implementation of PjBL in short story writing significantly improved students' creativity and writing quality. Similarly, Adnan, Setiawan, and Naila (2023) found that PjBL encouraged students to think more critically and creatively, resulting in better short story projects. Meanwhile, studies on Pop-Up Books, such as those by Rahayu (2020) and Nazhira et al. (2024), demonstrated that this medium increases students' engagement and motivation in learning. These findings suggest that combining PjBL with Pop-Up Book media provides a rational and innovative solution to enhance students' short story writing skills and academic performance in elementary schools.

Grounded in this rationale, the present study aims to analyze the effect of Project-Based Learning assisted by Pop-Up Book media on short story writing skills and learning outcomes of fourth-grade elementary students. Furthermore, the study seeks to measure the improvement in learning outcomes following the implementation of this model. Based on these objectives, the research hypothesizes that Project-Based Learning with Pop-Up Book media significantly affects students' writing skills and learning outcomes, and that it leads to a measurable improvement in students' overall achievement.

RESEARCH METHODS

This study employed a quantitative approach with a quasi-experimental design, specifically the Non-Equivalent Control Group Design. This design was chosen because it allows for comparison between an experimental class that received treatment and a control class that did not, even though the groups were not randomly assigned. The purpose of using this design was to determine whether the Project-Based Learning (PjBL) model assisted by Pop-Up Book media had a significant effect on students' short story writing skills and learning outcomes.

The scope of this research was limited to fourth-grade students at UPTD SDN 1 Dukuhjati, Indramayu Regency, during the 2023/2024 academic year. The population consisted of 242 students from grades I to VI, while the research sample was determined through purposive sampling. Two classes were selected as the sample: Class IV A, which consisted of 30 students and served as the control group, and Class IV B, which also consisted of 30 students and served as the experimental group. The control group was taught using conventional learning methods, while the experimental group received instruction through the PjBL model supported by Pop-Up Book media.

The main materials used in this study were Indonesian language learning modules on short story writing and Pop-Up Book media specifically designed to support students' imagination and creativity. The primary instruments for data collection were a short story writing test and a learning achievement test, which included multiple-choice and essay questions. The short story writing test was assessed based on several indicators such as theme, plot, setting, character development, language use, and moral message, while the learning achievement test measured students' understanding of the intrinsic elements of short stories.

The operational definitions of the research variables were as follows. The independent variable was the Project-Based Learning model supported by Pop-Up Book media, defined as a student-centered instructional strategy in which students engage in project-based tasks supported by three-dimensional illustrated books. The dependent variables were short story writing skills and learning outcomes. Short story writing skills were defined as the ability of students to generate ideas and express them coherently in written form according to the intrinsic elements of a short story. Learning outcomes were defined as students' mastery of Indonesian language material, measured through multiple-choice and essay tests on short story concepts.

Data collection was conducted in three stages: a pretest administered to both classes before treatment, the implementation of learning activities according to their respective methods, and a posttest administered after treatment. To ensure the validity and reliability of the instruments, the tests were examined and analyzed prior to use. The data analysis techniques included normality and homogeneity tests to ensure statistical assumptions, followed by an independent sample t-test to determine differences between the experimental and control groups. In addition, an N-Gain score test was conducted to measure the level of improvement in students' learning outcomes.

RESULTS AND DISCUSSION

The findings of this study are presented in three parts: students' short story writing skills, students' learning outcomes, and an overview of the improvement in their learning outcomes. The data were obtained through pretests and posttests conducted in both the control and experimental classes.

Results of Short Story Writing Skills

The measurement of short story writing skills was conducted through pretests and posttests in both the experimental and control classes. Table 1 presents the mean scores of students' writing skills.

Table 1. Average Scores of Short Story Writing Skills

Group	Pretest	Posttest	Improvement
Control Class	63.2	71.5	+8.3
Experimental Class	64.8	82.4	+17.6

The results show that the control class experienced an increase of 8.3 points from pretest to posttest, while the experimental class showed a greater improvement of 17.6 points. This indicates that the use of the Project-Based Learning (PjBL) model assisted by Pop-Up Book media was more effective in enhancing students' writing performance.

To demonstrate the results of the pretest and posttest of short story writing skills, it was shown that the Project-Based Learning model had a significant effect on students' short story writing skills. Therefore, a hypothesis test was conducted, preceded by prerequisite testing. Table 2 shows the results of the normality test of students' writing skills, indicating that the data were normally distributed.

Table 2. Normality Test Results for the Variable of Short Story Writing Skills

Tests of Normality	Shapiro-Wilk			Description
	Statistic	df	Sig.	
Pre-test Control	.940	30	.092	Normal
Post-Test Control	.937	30	.077	Normal
Pre-Test Experimental	.950	30	.166	Normal
Post-Test Experimental	.967	30	.459	Normal

Based on the results of the Shapiro-Wilk normality test (Table 2), the significance values for all groups pre-test and post-test in both the control and experimental classes—are greater than 0.05 (Pre-test Control = 0.092, Post-test Control = 0.077, Pre-test Experimental = 0.166, Post-test Experimental = 0.459). This indicates that the data for short story writing skills in all groups are normally distributed. Therefore, the assumption of normality is met, and parametric statistical tests can be used for further analysis.

The homogeneity test is conducted to examine whether the data have equal variances, that is, whether the data come from the same population. The homogeneity test in this study was conducted using Levene’s statistic in SPSS, and the results are presented in the table below.

Table 3. Homogeneity Test of the Short Story Writing Skills Variable

<i>Levene Statistic</i>	<i>df1</i>	<i>df2</i>	<i>Sig.</i>	<i>Description</i>
2.604	3	116	.055	Homogeneous

The homogeneity test for the short story writing skills variable was conducted using Levene’s test. As shown in the results, the Levene statistic is 2.604 with a significance value of 0.055, which is greater than the alpha level of 0.05. This indicates that the variances of short story writing skills across the groups are homogeneous. Therefore, the assumption of homogeneity of variance is fulfilled, allowing the use of parametric statistical tests for further analysis.

The Independent Samples t-Test is a statistical test used to measure the differences in posttest results between samples (experimental and control classes). This test aims to determine whether there is a significant difference in short story writing skills between the group that received the treatment (experimental) and the group that did not receive the treatment (control). The results of the independent samples t-test can be seen in the table below.

Table 4. Independent Samples t-Test for Short Story Writing Skills

Variable	Levene's Test F	Sig. (Levene)	t	df	Sig. (2-tailed)	Mean Difference	95% CI of Difference
Short Story Writing Skills	1.797	0.185	-4.344	58	0.000	-5.600	[-8.181, -3.019]

The Levene’s test for equality of variances shows a significance value of 0.185, which is greater than 0.05. This indicates that the assumption of equal variances is met.

The independent samples t-test shows a t-value of -4.344 with a significance (2-tailed) of 0.000, which is less than 0.05. This indicates a statistically significant difference in short story writing skills between the experimental and control groups. The mean difference of -5.600, with a 95% confidence interval ranging from -8.181 to -3.019, suggests that the experimental group outperformed the control group.

The Paired Sample t-Test is used to examine whether the Project-Based Learning model with pop-up book media has an effect on short story writing skills. The data used in this test are the pretest and posttest scores of the experimental class that received the treatment.

Table 5. Paired Sample t-Test for Short Story Writing Skills

Pair	Mean Difference	Std. Deviation	Std. Error Mean	95% CI of Difference	t	df	Sig. (2-tailed)
Pretest – Posttest	-19.86	11.292	2.062	[-24.083, -15.650]	-9.637	29	0.000

Based on the table above, the t-value is 9.637 with $df = n - 1 = 29$, and the 2-tailed significance value is 0.000. Since the p-value is less than 0.05, it indicates that the difference between the pretest and posttest scores is highly significant. This demonstrates that the treatment had a meaningful effect on the variable. In other words, the use of the Project-Based Learning model with Pop-up Book media has a significant effect on short story writing skills in the fourth-grade students of elementary school.

Results of Learning Outcomes

The learning outcomes were also assessed through multiple-choice and essay tests. Table 6 presents the results of the normality test, confirming that both groups’ data were normally distributed.

Table 6. Normality Test of Learning Outcomes

Group	Sig.	Interpretation
Pre-test Control	0.680	Normal
Post-test Control	0.144	Normal
Pre-test Experimental	0.776	Normal
Post-test Experimental	0.204	Normal

The homogeneity test (Table 6) indicated that the data were homogeneous with a significance value of 0.121 (>0.05). Based on the results of the sample analysis, it can be concluded that the pretest and posttest data for both the control and experimental classes are normally distributed.

The homogeneity test is conducted to examine whether the data have equal variances, that is, whether the data come from the same population. The homogeneity test in this study was conducted using Levene’s statistic in SPSS, and the results are presented in the table below.

Table 7. Homogeneity Test of Learning Outcomes

Levene Statistic	df1	df2	Sig.	Interpretation
1.613	3	116	.190	Homogeneous

Based on the table above, the significance value for both the control and experimental classes is 0.190, which is greater than 0.05. This indicates that the test scores from the control and experimental classes are homogeneous.

The hypothesis tests were conducted using the Independent Samples t-Test and the Paired Samples t-Test. The results of both hypothesis tests are presented below.

Table 8. Independent Sample T-Test of Learning Outcomes

Variable	Levene's F	Sig. (Levene)	t	df	Sig. (2-tailed)	Mean Difference	95% CI of Difference
Learning Outcomes	0.090	0.765	-3.903	58	0.000	-9.200	[-13.918, -4.482]

Based on the table above, the t-test results for the learning outcomes variable show that the significance value in Levene’s test is 0.765, which is greater than 0.05. This indicates that the variances between the groups are homogeneous (equal variances assumed). Furthermore, the significance value in the 2-tailed column is 0.000, which is less than 0.05. This means that H_1 is accepted, indicating that the use of the Project-Based Learning model with Pop-up Book media has a significant effect on the learning outcomes of fourth-grade elementary school students.

Table 9. Paired Samples t-Test for Learning Outcomes (Experimental Class)

Pair	Mean Difference	Std. Deviation	Std. Error Mean	95% CI of Difference	t	df	Sig. (2-tailed)
Pretest – Posttest	-11.36	3.978	0.726	[-12.852, -9.881]	-15.650	29	0.000

Based on Table 9, the t-value is 15.650 with $df = n - 1 = 29$, and the 2-tailed significance value is 0.000. Since the p-value is less than 0.05, it indicates that the difference between the pretest and posttest scores is highly significant. This demonstrates that the treatment had a meaningful effect on the variable. In other words, the use of the Project-Based Learning model with Pop-up Book media has a significant impact on the learning outcomes of fourth-grade elementary school students.

Improvement of Students’ Learning Outcomes

The N-Gain is used to describe the relative change in data after an intervention or change. It measures the extent of data improvement in the context of an experiment or test. In this study, the N-Gain test was used to determine the degree of improvement in students’ learning outcomes for both the experimental and control classes. The N-Gain analysis in this study was conducted using SPSS, and the results are presented as follows.

Table 10. N-Gain Results of Experimental Class

Pretest Score	Posttest Score	Score Gain	Maximum Possible Gain (100 - Pretest)	N-Gain
58.8	78.4	19.6	41.2	0.45

Based on Table 10 and the results of the N-Gain calculation above, the improvement in learning outcomes using Pop-up Book media in the experimental group was 0.45. According to the N-Gain score criteria, this indicates that the improvement in learning outcomes in the experimental class falls into the moderate category.

Table 11. N-Gain Results of Control Class

Pretest Score	Posttest Score	Score Gain	Maximum Possible Gain (100 - Pretest)	N-Gain
69,2	58,8	10,4	41,2	0,24

Based on the N-Gain calculation above, the improvement in learning outcomes using Pop-up Book media in the control group was 0.24, which falls into the low category. According to the N-Gain score criteria, the improvement in learning outcomes in the control class is therefore classified as low.

Discussion

The findings of this study indicate that the Project-Based Learning (PjBL) model assisted by Pop-Up Book media significantly improved fourth-grade students' short story writing skills. The experimental class showed a greater increase in mean scores (17.6 points) compared to the control class (8.3 points), suggesting that the combination of PjBL and interactive media effectively enhances students' creativity and writing performance. Normality and homogeneity tests confirmed that the data met the assumptions for parametric analysis, allowing for t-tests, which revealed significant differences between the experimental and control groups.

The Independent Samples t-Test and Paired Samples t-Test confirmed that the treatment had a meaningful impact on students' short story writing skills. The experimental group outperformed the control group, and the pretest-to-posttest improvement within the experimental class was highly significant. These results are consistent with previous research showing that PjBL promotes higher-order thinking and active learning, while the Pop-Up Book media provides a visual and interactive context that stimulates students' engagement and imagination.

In addition to writing skills, the study examined overall learning outcomes. The experimental group demonstrated significant improvements in posttest scores compared to the control group. Both normality and homogeneity assumptions were met, and the t-test results confirmed the effectiveness of the treatment. The findings suggest that integrating PjBL with Pop-Up Book media supports not only skill development but also broader academic achievement by encouraging meaningful, student-centered learning.

The N-Gain analysis further showed that the experimental group achieved a moderate improvement (0.45), whereas the control group showed a low improvement (0.24). This indicates that the intervention facilitated notable learning gains, while traditional instruction alone produced limited progress. The moderate N-Gain suggests that students were able to apply knowledge creatively, complete projects, and benefit from immediate feedback through the PjBL approach.

Overall, the results demonstrate that PjBL combined with Pop-Up Book media has a significant effect on both short story writing skills and learning outcomes. The findings support the use of active, project-based, and multimedia-assisted learning strategies in elementary education to enhance students' motivation, engagement, and academic achievement.

CONCLUSIONS

The Project-Based Learning model assisted by Pop-Up Book media significantly improves fourth-grade students' short story writing skills and overall learning outcomes. The experimental group showed higher score gains and greater N-Gain values compared to the control group, indicating that this approach effectively enhances students' creativity, engagement, and academic performance. These results suggest that integrating interactive media with PjBL can be an effective strategy in elementary education.

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