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The Effect Of The Project Based Learning Model Assisted By Crossword Puzzle Media On The Learning Outcomes Of Grade V Students

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Abstract

This study is to find out whether there is an influence of the Project Based Learning model assisted by crossword puzzle media on the learning outcomes of Class V students of SDN 2 Nanga Man. The research method uses a quantitative approach with a One Group pretest and posttest experimental design. The sample consisted of 17 students. "The research instrument was in the form of multiple-choice questions (pretest and posttest), validated through Cronbach Alpha constructs and reliability. Data analysis was carried out with the help of SPSS 25 through the Normality Test (Shapiro-Wilk), and the Non-Parametric Test (Wilcoxon Signed-Rank). The results showed that the shapiro-wilk test for pretest data was 0.031, meaning that the pretest data was not normally distributed. Meanwhile, the posttest data has a significance value of 0.738, meaning that the posttest data is normally distributed. The results of the" Wilcoxon Signed Rank Test were obtained at -3,630 with a significance value of Asymp. Sig. (2-tailed) is 0.000. So it can be concluded that there is a significant difference between student learning outcomes before and after the implementation of the Project Based Learning model assisted by Crossword Puzzle media**.**

Kata Kunci: Project Based Learning, crossword puzzle media, and learning outcomes.

1. Introduction

Modified learning supports learner diversity through adaptations in content, process, and product, as emphasized by (Athoillah, 2025)(Safitri et al., 2023). Such adaptations are important to accommodate students' varying characteristics, needs, and learning potentials. In the educational process, teachers play a crucial role in ensuring that the knowledge delivered can be understood and applied effectively by students. (Reni et al., 2025) explain that teachers function not only as transmitters of knowledge but also as educators, facilitators, innovators, observers, and information providers who contribute significantly to meaningful learning experiences.

In contemporary education, teachers are expected to move beyond traditional instructional roles and facilitate learning experiences that are responsive to students' needs and characteristics. (Gulzar, 2025) argues that selecting appropriate learning models can significantly improve student engagement and academic achievement. Similarly, (Lestari & Kurnia, 2023) emphasize that suitable instructional approaches foster active participation and improve learning outcomes. This is supported by(van Alten et al., 2019) who found that active learning strategies significantly enhance student achievement and participation compared to traditional approaches. Therefore, an adaptive learning approach is needed not only to respond to learner diversity but also to encourage students to be actively involved throughout the learning process.

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One relevant approach to accommodating student diversity is active learning. Among the models widely applied within this approach is Project-Based Learning (PjBL). (Condliffe et al., 2017) describe Project-Based Learning as a student-centered model that engages learners in exploration, problem-solving, and collaboration through the creation of authentic products. This model encourages students to think critically, creatively, and independently, as highlighted by (Kasi, 2023). (Mutawally, 2021) further explains that PjBL actively involves students through contextual and meaningful tasks. Empirical studies by (Azzahra et al., 2023);(Apriliyani et al., 2019) have shown that PjBL can improve students' critical thinking, creativity, and problem-solving skills.

Although previous studies have demonstrated the effectiveness of project-based learning in improving learning outcomes, its implementation in less supportive learning environments has not always maximized student engagement. Existing research has often focused more on cognitive outcomes than on examining how PjBL responds to students' diverse learning needs. Furthermore, integrating the PjBL model with innovative instructional media remains challenging in many classroom contexts. Therefore, this study is important for understanding how the implementation of Project-Based Learning assisted by specific educational media can improve students' learning outcomes while accommodating their learning characteristics.

The use of educational media is essential for creating inclusive and supportive learning environments. (Linda.S & Albar.J, 2024) emphasize that educational media can facilitate effective and meaningful learning experiences. Likewise, (Patmawati et al., 2018);(Syofiani et al., 2018) argue that innovative instructional media contribute to improved learning outcomes through effective strategies and engaging materials. One medium considered capable of supporting active learning is the Crossword Puzzle. This medium can help students better understand and relate to the material being studied. (Khairunnufus et al., 2024) explain that crossword puzzles require learners to complete blank spaces using appropriate letters based on clues provided. Beyond serving as an instructional medium, crossword puzzles also encourage students to think critically in order to generate correct answers, as noted by (Amri, 2023).

(Rambe & Putri, 2023) describe crossword puzzles as a matching activity in which learners identify correct words according to given clues. Their use in teaching involves a straightforward procedure. Teachers first assess students' abilities and prior knowledge before designing puzzles that include questions related to concepts, definitions, examples, and direct inquiries, as explained by (Susanti, 2024). Because crossword puzzles are cognitively stimulating and enjoyable, they can reduce boredom and increase students' motivation to learn. Thus, combining supportive learning media such as crossword puzzles with innovative models such as Project-Based Learning has the potential to improve student learning outcomes.

Learning outcomes are important indicators for evaluating the success of the educational process and represent the primary goal of classroom learning. (Ambarwati et al., 2025) define learning outcomes as changes achieved after students undergo the learning process. (Mawardhani et al., 2023) state that students can improve their learning outcomes when they consistently and consciously strive for positive change. (Rahman, 2021) further explains that learning outcomes encompass not only knowledge acquisition but also the development of perspectives, critical thinking, and practical skills that can be applied in everyday life. Therefore, learning outcomes should be understood not merely as academic scores but as a reflection of students' comprehensive development.

Preliminary observations conducted in fifth grade revealed that student engagement and science achievement remained below expectations. Of the seventeen students, only four achieved the minimum mastery criteria (KKM), while most did not meet the established benchmarks. Several indicators of classroom participation, including asking and answering questions, applying learning strategies, and showing enthusiasm, were found to be low. Some students also experienced difficulties in understanding concepts, which hindered their learning progress. Interviews with teachers indicated that instruction often relied on limited media such as textbooks and videos, with minimal student participation. Learning media were used only occasionally because they were considered impractical.

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These conditions illustrate a gap between the theoretical principles of active and project-based learning and their implementation in classroom practice. This situation highlights the need for practical solutions to improve student learning outcomes.

Based on these conditions, one potential solution is the implementation of the Project-Based Learning model assisted by Crossword Puzzle media to create active, enjoyable, and meaningful learning experiences. The Project-Based Learning model enables students to engage directly in learning through the completion of authentic and relevant projects, while Crossword Puzzle media can strengthen students' understanding of concepts interactively. The combination of these two approaches is expected to increase students' motivation, participation, and ultimately their learning outcomes, particularly in science subjects for fifth-grade students at SDN 2 Nanga Man. Therefore, this study aims to determine whether the implementation of the Project-Based Learning model assisted by Crossword Puzzle media influences the learning outcomes of fifth-grade students at SDN 2 Nanga Man.

2. Methods

This study uses a quantitative research method (Sugiyono, 2022). Quantitative experimental strategies were used in this study. This study is a pre-experimental research, using a pretest/posttest design of one group. After the initial pretest measurements and the determination of predetermined behaviors, one group of subjects was then given the treatment in this design. The treatment ended with the administration of a posttest. The study using the PJBL model with the help of crossword puzzles can compare student learning outcomes before and after treatment.

According to (Amin et al., 2023), researchers draw conclusions from their research based on the characteristics of the objects or subjects that make up the population. All fifth-grade students from the 2025–2026 school year at SDN 2 Nanga Man make up the research population. This study uses a sample of seventeen students from the fifth grade at SDN 2 Nanga Man. Saturated sampling is the method used for sampling. All members of the population were used as samples in saturated sampling, as stated by (Sugiyono, 2022). In this particular research problem, the use of crossword puzzles as a project-based learning model is an independent variable, and students' cognitive learning outcomes are dependent variables.

Pre-tests and post-tests with multiple-choice questions and detailed documentation are used to collect data. The reliability and validity of the construct were evaluated using Cronbach's alpha. For the purpose of assessing the validity and reliability of the questionnaire, the researcher gave it to students at different schools.

The Wilcoxon Marked Rating Test and the Shapiro-Wilk Normality Test are among the methods used for data analysis. The purpose of the Normality Test is to determine whether the data in the sample is distributed normally. Before and after the introduction of the PjBL model and crossword puzzles, student learning outcomes were compared using the Wilcoxon test

3. Results and Discussion

3.1 Research Results

The questions were tested at other schools to ensure the reliability and validity of the instrument before the study was conducted. Fifth grade students from SDN 11 Nanga Pinoh participated in the pilot study. Both the pretest and posttest consisted of 25 multiple-choice questions, obtained 20 valid questions and 5 invalid questions. In the testing phase, 22 students were given the instrument. We use the product moment correlation method to check validity. If the calculated r-value of the question is higher than the critical r-value at the significance level of $\alpha = 0.05$, then the question is considered valid. A question is considered valid if the correlation value is greater than or equal to the threshold set in the table r. A question is considered invalid if the correlation value is less than the r-value in the table. The table below shows the questions that are determined to be valid through product moment correlation. These questions are based on calculations performed with SPSS version 25:

Table 1. Validity Test

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Pernyataan	r-Hitung	r-Tabel	Keterangan
P1	0.557	0.423	Valid
P3	0.519	0.423	Valid
P4	0.457	0.423	Valid
P5	0.507	0.423	Valid
P6	0.497	0.423	Valid
P7	0.656	0.423	Valid
P8	0.573	0.423	Valid
P9	0.553	0.423	Valid
P11	0.507	0.423	Valid
P12	0.615	0.423	Valid
P13	0.503	0.423	Valid
P14	0.615	0.423	Valid
P16	0.615	0.423	Valid
P17	0.572	0.423	Valid
P18	0.441	0.423	Valid
P19	0.572	0.423	Valid
P22	0.457	0.423	Valid
P23	0.503	0.423	Valid
P24	0.653	0.423	Valid
P25	0.526	0.423	Valid

The reliability test "is carried out after the validity test. When the reliability test results are consistent across multiple measurements, it is concluded that the instrument is reliable. The reliability of sustainable research instruments and the consistency of their results are the goals of reliability testing (Wahyuningsih & Slamet, 2022). Table 1.2 shows the results of Cronbach's Alpha method according to the analysis performed using IBM SPSS 25.

Table 2. Reliability test results

Reliability Statistics	
Cronbach's Alpha	N of Items
.875	20

With Cronbach's Alpha values higher than 0.6, the reliability level is considered satisfactory. Therefore, we can say that this research instrument is very reliable. Table 1.2 shows the results of the reliability test, which, when analyzed using SPSS 25, shows Cronbach's Alpha of 0.875. The results show that the instrument can consistently measure the same thing over time or with different subjects.

3.1.1 Normality Test

The data on student learning outcomes was tested for normality to see if it followed the normal distribution. The Shapiro-Wilk test was used to ensure normality in this study because the sample size was small ($n < 50$), consisting of 17 respondents. For the data to be considered normally distributed, the significance value (Sig.) must be greater than 0.05. On the other hand, the data is considered unnormally distributed if the significance value is less than 0.05. The results of the normality test of pretest and posttest data are as shown below:

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Table 3. Normality Test Results

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	f	ig.	tatistic	Df	g. Si
PRETEST	.243	7	009	879	17	31 .0
POSTTEST	.150	7	200*	966	17	38 .7

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

The pre-test data did not follow the normal distribution, as shown in the table of normality test results, where the significance value of the Shapiro-Wilk test was 0.031. Meanwhile, the posttest data is distributed normally, as indicated by the significance value of 0.738. The pretest results in this study did not follow the normal distribution. To find out if there are differences in student learning outcomes before and after the learning model is implemented, non-parametric tests, specifically the Wilcoxon Signed-Rank test, are recommended for further analysis.

3.1.2 Wilcoxon signed-rank test results

To find out whether the project based learning model with crossword puzzles has a significant difference between students' pretest and posttest scores, the Wilcoxon Signed-Rank test is used. The results of the Wilcoxon Signed-Rank test are described below.

Tabel 4. Wilcoxon signed-rank test results

Test Statistics[a]

	POSTTEST - PRETEST
Z	-3.630[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

With the value of Asymp. Sig. (2-tailed) of 0.000, analysis using the Wilcoxon Signed-Rank test yielded a Z score of -3.630. The significance value is less than 0.05, which means that there is a significant difference between student learning outcomes before and after applying crossword puzzles in the project-based learning model. Student educational outcomes have increased significantly with this learning model.

3.2 Discussion

The results showed that students learned much more when they used crossword puzzles within the framework of Project based learning. The significance value of 0.000 from the Wilcoxon Signed-Rank test corroborates this, suggesting that there is a significant change in learning outcomes between the period before and after treatment. Furthermore, (Niland, 2021) underline that project-based and inquiry-based methods foster long-term retention and deeper conceptual understanding.

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The range of outcomes in student learning outcomes, then processes that involve active student involvement are much more important than conventional teaching methods in terms of improving student understanding. In the Project based learning method, students are not only given information but also given the opportunity to actively participate in the learning process by working on real-world projects. According to,(Almulla, 2020) found that student-centered learning models like PjBL significantly improve conceptual understanding and long-term retention.

The active participation of students in gathering information, contributing to class discussions, and finding solutions to problems is a hallmark of the project-based learning paradigm. According to(Taupik & Fitria, 2021) With the PJBL learning model, students are taught to think critically about their experiences and be able to relate them to learning standards. The PJBL model also gives them the opportunity to learn and practice skills with others, which are skills that will last for the future.

According to(Erviana, 2024), the use of crossword puzzles in the classroom is a great way to get children to move, think critically, collaborate, and interact with each other. With the addition of game elements, crossword puzzles take learning basic vocabulary to the next level, making them more engaging and potentially helping students better understand the concepts discussed in class. According to, (Expósito et al., 2020) report that game-based learning approaches improve both motivation and academic performance in various educational contexts.

Modern pedagogical practices that emphasize creativity, collaboration, and critical thinking are in line with the findings of this study. Students can develop these skills through the use of activity- and experiential-based learning methods. The use of crossword puzzles in a project-based learning environment encourages students to take initiative and work together on projects. Moreover, (Zhang et al., 2022) emphasize that integrating digital and interactive media in learning environments strengthens student engagement and learning effectiveness.

Thus, the results of this study confirm that the incorporation of crossword puzzles into the project-based learning model improves student learning outcomes. The use of these teaching tools and resources can pave the way for elementary schools to adopt an independent curriculum.

4. Conclusion

This study found that the learning outcomes of social studies students improved rapidly when the project-based learning model was equipped with crossword puzzles. The use of crossword puzzles in conjunction with the project-based learning model greatly increases student engagement and understanding of the subject matter. Elementary school students' performance in the classroom increases after using these methods and materials.

Teachers are expected to use the project-based learning and crossword puzzle approach as a substitute in educational science. Future researchers can use different materials, techniques, and variables to achieve more detailed and broad results.

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