Jurnal Studi Guru dan Pembelajaran, Vol. 9, No. 1, January – April 2026

Effectiveness of Project-Based Learning (PjBL) on Students' Critical Thinking Skills In History Learning

Octavian Hendra Priyatno [1*], Anisa Pitriani [2], Heri Susanto [3], Dewica Fatma Nadilla [4], Fathurrahman [5]

[1, 2, 3, 4] Universitas Lambung Mangkurat, Indonesia
[5] Universitas Sebelas Maret, Indonesia

* octahend@ulm.ac.id

Abstract

Critical thinking is a key 21st-century skill that is important to develop in the learning process, including in history lessons. However, history teaching practices in schools are still dominated by conventional teacher-centered methods, limiting opportunities for students to hone their critical thinking skills. This study aims to examine the effectiveness of the Project-Based Learning (PjBL) model in improving the critical thinking skills of 11th grade students at SMA Negeri 1 Alalak. This study uses a quantitative approach with a quasi-experimental design of the Nonequivalent Control Group Design type. The sample consisted of 62 students, namely class XI-2 as the experimental group and XI-5 as the control group, which were determined through purposive sampling techniques. The research instrument was an essay test based on Anderson and Krathwohl's (2001) critical thinking indicators. Data were obtained through pretest and posttest, then analyzed using descriptive statistics, normality test, homogeneity test, paired sample t-test, and independent sample t-test with the help of SPSS 27. The results showed that both groups experienced an increase, with a greater increase in the experimental group (M = 6.94; d = 0.87) compared to the control group (M = 4.19; d = 0.41). The independent sample t-test showed the effectiveness of PjBL on critical thinking skills (p = 0.004). Although the effect size was moderate, PjBL indicated superiority in strengthening critical thinking skills. However, its effectiveness was influenced by the learning context, student motivation, and school support.

Keywords: *Project-Based Learning, Critical Thinking, History Learning, Quasi-Experiment*

Introduction

Critical thinking skills are an essential 21st-century competency that students desperately need, including in the context of history learning. This subject not only emphasizes mastery of facts about past events but also serves as a means to examine, evaluate, and relate the meaning of events to contemporary realities. Quality history learning should be able to develop students' historical awareness, namely the ability to understand the past, interpret the present, and critically project the future (Argyanti, 2024). However, in practice, the history learning process in schools is still dominated by conventional, teacher-centered methods. This learning pattern results in low student participation, so their ability to think critically and apply historical understanding does not develop optimally. The dominance of lecture and memorization methods results in students tending to be passive, simply receiving information without engaging in in-depth analysis and evaluation of historical events (Evitasari et al, 2022). This condition causes history learning to lose its essence as a vehicle for character development and critical thinking in students.

https://doi.org/10.30605/jsgp.9.1.2026.8008

Students' low critical thinking skills are also closely related to the lack of a culture of literacy fostered in schools. Weak reading habits often lead students to passively receive knowledge without in-depth analytical processing. Limited access to quality reading resources, both in the form of textbooks and digital literature, further exacerbates this situation. Yet, strong literacy skills are the primary foundation for developing critical thinking, as through literacy activities, students can assess issues from multiple perspectives and organize logical and systematic arguments. Literacy is not only related to reading and writing skills but also encompasses the ability to understand, analyze, and critically evaluate information (Anggraini et al, 2020). Adequate literacy skills are a prerequisite for students to independently and critically access, understand, and process historical information from various sources.

This situation becomes even more challenging when combined with the rapid flow of information in the global era. The widespread phenomenon of hoaxes shows that many teenagers still have difficulty distinguishing factual information from fake news, especially in the context of historical information, which is often manipulated for specific interests. National literacy data indicates that Indonesia still lags behind, with a digital literacy index score of only 62%, below the average of several other Asian countries (Havid, 2023). This situation underscores the need for a learning approach that fosters literacy while simultaneously training critical thinking skills in an integrated manner within history learning.

Various studies have shown that Project-Based Learning (PjBL) is effective in improving students' critical thinking skills. This learning model emphasizes active student engagement through collaborative activities and product development relevant to real life. Through PjBL, students not only learn theoretical concepts but also apply them in real-world contexts through meaningful projects (Susanta et al, 2020). In the context of history learning in Indonesia, the implementation of PjBL contributed 60.8% to students' critical thinking skills in history at Kabuh State Senior High School, Jombang (Mekarsari et al, 2019). Similar findings, obtained through a quasi-experimental study, also indicate a significant improvement in students' critical thinking skills following the implementation of Project-Based Learning (PjBL). The study emphasizes that PjBL encourages students to actively seek information, critically analyze historical sources, and develop arguments supported by valid historical evidence (Sularmi et al., 2018).

International research also confirms the effectiveness of PjBL in the context of history learning. The implementation of Project-Based Learning (PjBL) in history education at the secondary school level can enhance higher-order thinking skills (HOTS) and foster responsibility for self-directed learning through historical documentary projects in Brunei Darussalam (Lim et al., 2023). Other studies also emphasize the positive impact of Project-Based Learning (PjBL) on students' critical thinking, analytical reasoning, and problem-solving skills, while emphasizing the importance of the teacher's role as a facilitator for optimal PjBL implementation (Williamson, 2023).

This study, conducted in the United States, found that the success of PjBL depends heavily on teachers' ability to design challenging projects and provide appropriate scaffolding during the learning process. The research also identified PjBL as effective in strengthening problem-solving and critical thinking skills at the tertiary level (Susanto et al., 2020). These findings demonstrate that PjBL has consistent effectiveness across educational levels and cultural contexts. However, most of these studies have focused on science and mathematics. PjBL is effective because it provides authentic learning experiences that stimulate problem-solving skills and collaboration among students (Puspitasari, 2020). However, its implementation in history subjects has not been explored in depth through quantitative, experimental approaches. This

limitation indicates the need for more research examining the application of PjBL in history learning with more rigorous research designs. Based on the literature review, several gaps have been identified that require further study. First, the majority of research on PjBL in history learning uses a qualitative or descriptive approach, while studies with quasi-experimental designs that quantitatively measure the effectiveness of PjBL are still rare in Indonesia.

While qualitative approaches provide in-depth understanding of the learning process, they lack strong empirical evidence on the extent of PjBL's influence on measurable improvements in critical thinking skills. Second, specific aspects of historical critical thinking, such as causal analysis, interpretation of historical sources, and the ability to connect past events with present conditions, have not been systematically studied using standardized instruments. Most existing research tends to measure critical thinking in general terms without considering the unique characteristics of critical thinking in a historical context, which has specific dimensions such as the ability to understand temporal context, analyze historical causality, and evaluate the credibility of historical sources. Third, the context of PjBL implementation in history learning in high schools in Indonesia, particularly considering the still-dominant characteristics of conventional learning, requires further study to provide stronger empirical evidence. The transition from conventional methods to PjBL requires adjustments that are not easy, both from the perspective of teachers, students, and school infrastructure, so research that examines the implementation of PjBL in this context will provide practical insights into the challenges and strategies needed.

The existing conditions underscore the need for an empirical study that examines the effectiveness of *Project-Based Learning* (PjBL) in enhancing students' critical thinking skills in history education through a quasi-experimental approach. This study was conducted in Grade 11 at SMA Negeri 1 Alalak, based on preliminary observations indicating that history instruction is still predominantly characterized by lecture-based teaching and rote memorization, resulting in the underdevelopment of students' analytical abilities. Students tend to memorize dates, historical figures, and sequences of events without adequately understanding the meaning, interconnections, and relevance of historical events within the context of their everyday lives. This situation is further corroborated by students' daily test results, which show that the majority have not met the Minimum Achievement Criteria for Learning Objectives (KKTP) of ≥ 75, indicating persistent challenges in achieving the expected competencies in history learning.

This study employs a quasi-experimental design with a control group to enable direct comparison between the effectiveness of the PjBL model and conventional instructional methods, and utilizes a critical thinking skills instrument developed based on the revised Bloom's Taxonomy and contextually adapted to the characteristics of history learning (Aprilliyah et al., 2024). In addition, effect size analysis is applied to provide a more comprehensive understanding of the magnitude of PjBL's impact on students' critical thinking skills. The primary objective of this study is to empirically test the effectiveness of the PjBL model in improving students' critical thinking skills in history education. The novelty of this study lies in the integration of a quasi-experimental design, the use of a critical thinking instrument grounded in the Revised Bloom's Taxonomy and contextualized for history learning, and the inclusion of effect size analysis to strengthen the empirical evidence for the implementation of PjBL in the context of history education in Indonesia.

Method

This research was designed with a quantitative approach using a quasi-experimental design, namely the Nonequivalent Control Group Design type (Emzir, 2019). This design was chosen based on its suitability to the research objective, which was to examine the effectiveness of PjBL implementation in improving students' critical thinking skills in history. Comparisons were made between the experimental and control groups, whose members were not determined through randomization, thus better reflecting real-world conditions.

The research was conducted at SMA Negeri 1 Alalak, Barito Kuala Regency, South Kalimantan, in the even semester of the 2024/2025 academic year, from January to May 2025. The location was selected based on the consideration that the history learning practices at the school were still predominantly conventional. The research population included all 11th grade students, totaling 195 people. Through purposive sampling technique, two classes with relatively equal abilities were determined, namely XI-2 with 31 students as the experimental group and XI-5 with the same number of students as the control group, so that the total sample used was 62 students.

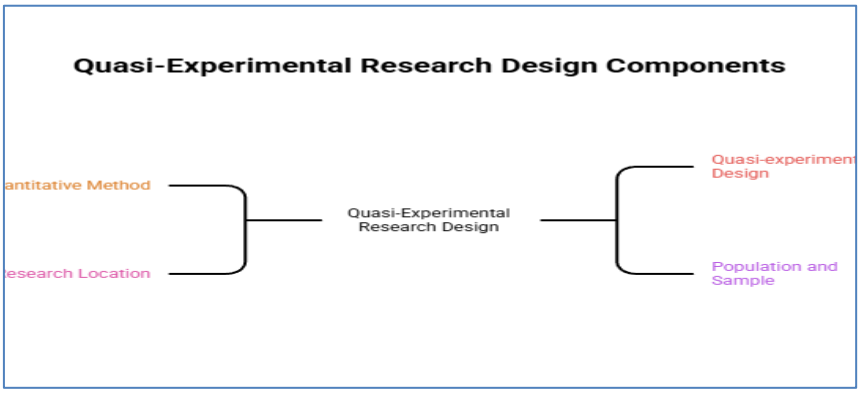

Figure 1: Quasi-Experimental Chart of Educational Research

The research instrument is in the form of an essay test constructed based on critical thinking indicators according to Anderson & Krathwohl (Syahri et al, 2021). The instrument's quality was tested through validity using product-moment correlation and reliability using Cronbach's Alpha, which yielded a value of 0.616, categorizing it as reliable (Janna et al, 2021). In addition, tests were also conducted on the level of difficulty of the questions and their discriminatory power to ensure the instrument was suitable for use in the data collection process.

Data collection was conducted by administering a pretest and posttest to both groups. The experimental group received learning using the PjBL model, while the control group received learning through conventional methods. The research data were analyzed using IBM SPSS 27 software. The analysis included descriptive statistics to describe the data, normality and homogeneity tests as prerequisites for analysis, paired sample t-tests to identify differences in pretest and posttest scores in each group, independent two-group difference tests to compare the average critical thinking skills between the two groups, and normalization gain test calculations to measure the increase in learning outcomes from pretest to posttest (Sugiyono, 2019).

Results

Descriptive data analysis showed an increase in learning outcomes from pretest to posttest in both research groups. In the experimental class, the initial average score of 78.55 increased to 85.48 after the learning implementation, with an average difference of 6.94. Meanwhile, the control class recorded a pretest score of 74.35, which increased to 78.55 in the posttest, with an average increase of 4.19.

Table 1. Descriptive Statistics Results Using IBM SPSS 27 Software

Descriptive Statistics						
	N	Min	Max	Sum	Mean	Standard Deviation
Pretest Control	31	55	90	2305	74.35	10,307
Posttest Control	31	60	95	2435	78.55	10,016
Pretest Experiment	31	65	95	2435	78.55	7,549
Posttest Experiment	31	70	100	2650	85.48	8,302

From the table above, it shows the general finding that both project-based learning and conventional methods can improve student learning outcomes, although the improvement experienced by the experimental group is relatively greater. Before hypothesis testing was conducted, the data were first tested using an assumption test. The Shapiro-Wilk test showed that the data were normally distributed ($p > 0.05$). Meanwhile, Levene's homogeneity test indicated equality of variance between groups with a significance value of 0.139 ($p > 0.05$), thus meeting the criteria for using parametric analysis as shown in the table below.

Table 2. Results of Normality Test Using IBM SPSS 27 Software

	Class	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistics	df	Sig.	Statistics	Df	Sig.
Results	Pretest A (Control)	.127	31	.200*	.949	31	.143
	Posttest A (Control)	.127	31	.200*	.954	31	.196
	Pretest B (Experiment)	.158	31	.046	.939	31	.076
	Posttest B (Experiment)	.186	31	.008	.941	31	.087

The normality test results in the figure show that the tests were conducted using Kolmogorov–Smirnov and Shapiro–Wilk on the pretest and posttest data in the control and experimental groups with a sample size of 31 respondents. Although the Kolmogorov–Smirnov test showed that some data were not normally distributed, the Shapiro–Wilk test results showed that all significance values were above the 0.05 limit, indicating that the data were normally distributed. Considering the relatively small sample size, the Shapiro–Wilk test results were used as the main reference in drawing conclusions, so that the research data were declared to meet the normality assumption. The next stage of analysis was the homogeneity test, the results of which are presented in the following table.

Table 3. Results of Homogeneity Test Using IBM SPSS 27 Software

		Levene Statistics	df1	df2	Sig.
Mark	Based on Mean	2,249	1	60	.139
	Based on Median	1,908	1	60	.172
	Based on Median and with adjusted df	1,908	1	59,702	.172
	Based on trimmed mean	2,201	1	60	.143

Testing using paired sample T-test in the experimental group revealed a significant difference between the pretest and posttest scores. The $t(30) = -4.43$ with sig. (2-tailed) < 0.05 confirms that the increase that occurred was not coincidental, indicating that PjBL has a real contribution in improving students' critical thinking skills in History. The effect size is in the medium category with Cohen's $d = 0.87$. Meanwhile, in the control group, the same test results

showed an increase with a t(30) value = –12.49 with sig. (2-tailed) < 0.05. The effect size is in the small category with Cohen's d = 0.41, indicating that conventional methods also have a small-scale influence in developing students' critical thinking skills. The results of the paired sample T-test are shown in the following table.

Table 4. Results of the paired sample t-test using IBM SPSS 27 software

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Standard Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest_Kont–Posttest_Kont	-4.194	1,869	.336	-4,879	-3,508	-12,490	30	.000
Pair 2	Pretest_Eksp - Posttest_Eksp	-6,935	8,725	1,567	-10,136	-3,735	-4,426	30	.000

Next, a two-group independent test was used to compare the gain scores. From the test analysis, Independent Samples TestThe results showed a two-sided significance value (p-value) of 0.004 < 0.05. Although the average gain in the experimental group was higher, the difference was not strong enough at the percentage level. However, the effect size of 0.87 (medium category) suggests that PjBL tends to provide advantages over conventional learning. In other words, from a practical perspective, the implementation of PjBL offers greater potential in improving critical thinking skills, although the results are not yet fully optimal.

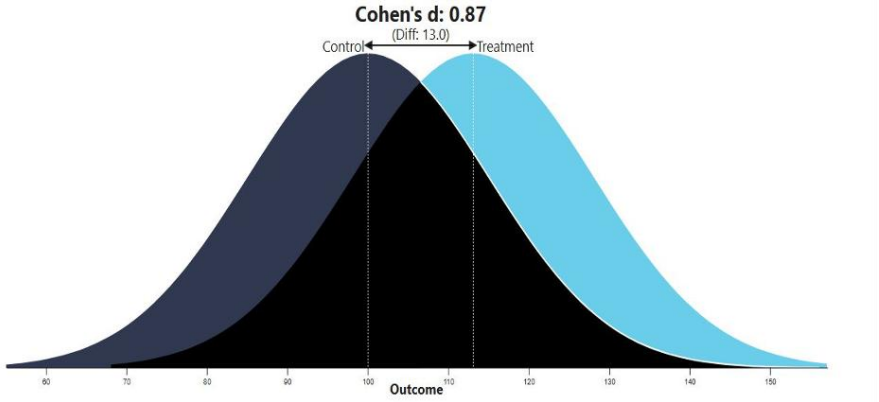

Figure 2: Cohen's Effect Size Graph

The figure shows Cohen's Effect Size graph, which illustrates the difference in the distribution of results between the control group and the treatment group, where the average of the treatment group appears to shift towards a higher value than the control group. A Cohen's d value of 0.87 indicates that the treatment given has a large effect, so that the difference in results between the two groups is not only statistically significant but also practically meaningful. Thus, these findings indicate that the intervention applied has a strong influence on improving research results.

Table 5. Results of Hypothesis Testing Using IBM SPSS 27 Software

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Standard Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Mark	Equal variances assumed	2,249	.139	-2,968	60	.004	-6,935	2,337	-11,609	-2,262
	Equal variances not assumed			-2,968	58,004	.004	-6,935	2,337	-11,613	-2.258

The table shows the results of hypothesis testing using a two-sample independent t-test preceded by a test of variance homogeneity using Levene's Test. The F value of 2.249 with a significance of 0.139 is greater than 0.05, so the variances of the two groups are declared homogeneous and the analysis is continued with the assumption of equal variances. The t-test results show a t-value of −2.968 with 60 degrees of freedom and a significance value (2-tailed) of 0.004, which is less than 0.05. This indicates a significant difference between the two groups. The mean difference of −6.935 with a 95% confidence interval between −11.609 and −2.262 reinforces the conclusion that the alternative hypothesis is accepted.

Discussion

The results of this study convincingly demonstrate that the implementation of PjBL has a stronger influence on improving students' critical thinking skills compared to conventional learning. The difference in score improvement between the experimental and control groups reflects not only a difference in numerical achievement but also indicates a difference in the quality of cognitive processes that occur during learning. In PjBL, students are actively involved in the entire learning process, from understanding the problem, designing solutions, to reflecting on the results obtained. This process allows students to develop analytical and reasoning skills more deeply than in lecture-oriented learning. This participatory learning activity encourages students to build understanding independently and take responsibility for their learning outcomes. Thus, the increase in critical thinking skills found in this study reflects a change in students' learning patterns towards a more reflective and meaningful direction.

Project-Based Learning provides ample space for students to develop critical thinking skills through structured and challenging learning stages. Each phase in PjBL requires students to identify problems, gather relevant information, and develop solutions or products based on the data obtained (Agustian et al, 2024). PjBL is effective in fostering critical thinking skills because students are faced with authentic problems that require decision-making and logical considerations. In history learning, these challenges arise when students must select historical sources, compare various viewpoints, and develop accountable interpretations. This activity trains students not to accept information raw but to process it through a systematic thought process. Through this mechanism, PjBL contributes to the development of more mature and sustainable critical thinking patterns.

History learning has unique characteristics that inherently demand critical and reflective thinking skills. History is not only about mastering past facts but also requires the ability to understand the context, causal relationships, and social dynamics behind an event. Through PjBL, students are trained to conduct active historical inquiry by exploring sources, analyzing information, and drawing conclusions based on available evidence (Ain et al, 2025). Research indicates that the implementation of Project-Based Learning (PjBL) in history education can enhance higher-order thinking skills, as students are directly engaged in the processes of historical analysis and evaluation.. This involvement encourages students to view history as a thought process, not simply a collection of events. Therefore, PjBL plays a crucial role in strengthening the function of history learning as a means of developing critical thinking.

The findings of this study can also be explained through the perspective of constructivism theory, which emphasizes that knowledge is actively constructed by students. In PjBL, students not only receive information from the teacher but also construct their understanding through contextual and collaborative learning experiences (Kokotsaki et al., 2016). PjBL is firmly rooted in constructivism because it positions students as the primary actors in the learning process. In

history learning, this approach allows students to construct historical understanding through source exploration and critical discussions with peers. These interactions enrich students' perspectives and encourage the formation of deeper understanding. In other words, the improvement in critical thinking skills in this study is the result of an active and continuous knowledge construction process.

The results of this study align with the Revised Bloom's Taxonomy framework, which places critical thinking skills at the higher-order cognitive level. Project activities in PjBL encourage students to analyze information, evaluate the validity of arguments, and create learning products that represent their understanding (Lismayani et al., 2025). Through PjBL, students are accustomed to working at a complex cognitive level because they must integrate concepts, analyze problems, and evaluate the solutions produced. In the context of history learning, this is evident in students' ability to interpret historical events more logically and argumentatively. This process demonstrates that PjBL is able to transform history learning from memorization activities to meaningful higher-order thinking activities.

The consistency of this study's findings with those of previous studies further strengthens its validity. Found that PjBL positively impacts students' reasoning and decision-making abilities because learning requires active involvement in problem-solving (Han et al., 2015). Similar findings also state that PjBL is effective in improving critical thinking through real-world context-based learning activities (Alotaibi, 2020). These similar results indicate that the effectiveness of PjBL is not limited to a specific field but is relevant to a variety of subjects, including history. This emphasizes PjBL's position as an adaptive and applicable learning model for developing critical thinking skills. Although the control group also experienced improvements in critical thinking skills, the smaller effect size demonstrates the limitations of conventional learning in developing higher-order thinking skills. Traditional learning generally focuses on delivering material and mastering basic concepts, leaving relatively limited room for exploration and reflection.

That explain that conventional learning can still contribute to the development of critical thinking if teachers are able to manage discussions and provide challenging, stimulating questions (Chiang et al,l 2016). However, compared to PjBL, the learning experiences students gain in conventional learning tend to be less in-depth. This situation highlights the importance of innovative learning models to improve the quality of the learning process. From a practical perspective, the results of this study provide important implications for the development of history learning in secondary schools. PjBL can be used as an alternative learning strategy relevant to the demands of the Independent Curriculum and strengthening 21st-century competencies. Emphasize that 21st-century learning must integrate critical thinking, collaboration, and creativity (Nursaya'bani et al., 2025).

Through contextually designed history projects, students not only understand the subject matter but also develop the social and intellectual skills necessary for social life. This demonstrates that PjBL has strategic potential in improving the quality of history learning. The success of PjBL implementation is greatly influenced by teacher readiness and school environmental support. Teachers act as facilitators, designing meaningful projects, guiding the inquiry process, and providing constructive feedback. Emphasized that PjBL requires careful planning to optimally develop critical thinking skills (Fridayanti et al, 2025). Without adequate guidance, project activities risk becoming merely routine tasks without cognitive depth. Therefore, strengthening teacher competency is a key factor in ensuring the success of PjBL implementation.

The limitations of this study lie in the limited sample size and the relatively short duration of PjBL implementation. Developing critical thinking skills is a long-term process that requires practice and consistency in implementing learning strategies. Emphasizes that higher-order thinking skills develop optimally through continuous learning and a supportive learning environment (Paat et al., 2024). Further research is recommended to expand the scope of research subjects and integrate other variables such as digital literacy and learning motivation. These efforts are expected to provide a more comprehensive picture of the effectiveness of PjBL in history learning.

Conclusion

This study contributes to the development of scientific knowledge in the field of history education by strengthening empirical evidence regarding the effectiveness of PjBL in improving students' critical thinking skills. The findings show that PjBL is able to create a more meaningful learning process through the active involvement of students in inquiry, analysis, evaluation, and reflection on historical events. The main contribution of this study lies in emphasizing that history learning not only serves as a means of transferring factual knowledge but also as a strategic vehicle for developing higher-order thinking skills relevant to the demands of the 21st century. Thus, this study enriches the body of research on history learning based on innovative models oriented towards strengthening critical thinking skills in a contextual and sustainable manner. Based on the findings of this study, future research is encouraged to broaden the scope of contexts and study subjects, both across different educational levels and among students with more diverse characteristics, in order to obtain a more comprehensive understanding of the effectiveness of *Project-Based Learning* (PjBL).

Further studies are also recommended to integrate additional variables, such as digital literacy, learning motivation, and creativity, to enable a deeper analysis of the more complex relationships between PjBL and 21st-century skills. Nevertheless, this study has several limitations, including the limited sample size involving only one school and one grade level, as well as the relatively short duration of the intervention, which restricts the generalizability of the findings to broader educational contexts. In addition, the assessment of critical thinking skills in this study primarily focused on the cognitive domain and did not fully capture students' affective or dispositional aspects. From a practical perspective, the findings of this study remain relevant as a reference for educators and education policymakers in designing and implementing more innovative history instruction, particularly through strengthening teacher capacity, developing project-based instructional materials, and providing policy support that encourages the systematic and sustainable implementation of PjBL in school.

Aknowledgment

-

References

Agustian, A., & Sanusi, W. (2024). Literature Review: Implementasi Strategi Pembelajaran Berbasis Proyek (PBL) dalam Konteks Siswa Abad ke-21. *AL-IBANAH*, *9*(1), 45-56. https://doi.org/10.54801/ibanah.v9i1.253

Ain, I. Q., Sutarja, M. C., Tamam, B., Wulandari, A. Y. R., & Rakhmawan, A. (2025). Development of Interactive Media Based on the SETS Approach to Enhance Students'

Learning Outcomes. *Jurnal Literasi Digital*, *5*(2), 159–169. https://doi.org/10.54065/jld.5.2.2025.876

Anggraini, P. D., & Wulandari, S. S. (2021). Analisis penggunaan model pembelajaran project based learning dalam peningkatan keaktifan siswa. *Jurnal Pendidikan Administrasi Perkantoran (JPAP)*, *9*(2), 292-299. https://doi.org/10.26740/jpap.v9n2.p292-299

Aprilliyah, F., Indrawati, C. F. S., & Rohmah, D. (2024). Teori Belajar Taksonomi Bloom dan Implementasinya dalam Pembelajaran. *Jurnal Pengembangan dan Evaluasi Pendidikan*, *1*(3), 137-142. https://doi.org/10.61692/jpep.v1i3.370

Chiang, C. L., & Lee, H. (2016). The effect of project-based learning on learning motivation and problem-solving ability of vocational high school students. *International Journal of Information and Education Technology*, *6*(9), 709-712. https://doi.org/10.7763/IJIET.2016.V6.779

Emzir. (2019). *Metodologi Penelitian Pendidikan Kuantitatif Dan Kualitatif Edisi Revisi*. Rajawali Pers.

Evitasari, O., & Santosa, Y. B. P. (2022). Ragam Metode Pembelajaran Kontekstual untuk Pembelajaran Sejarah. *Estoria: Journal of Social Science and Humanities*, *3*(1), 398-413. https://doi.org/10.30998/je.v3i1.1309

Fridayanti, L. A., & Tirtoni, F. (2025). Implementation of Differentiated Learning Assisted by Digital Flipbook to Improve Critical Thinking Ability of Elementary Students in Pancasila Education. *Jurnal Studi Guru Dan Pembelajaran*, *8*(1), 351–361. https://doi.org/10.30605/jsgp.8.1.2025.5580

Han, S., Capraro, R., & Capraro, M. M. (2015). How science, technology, engineering, and mathematics (STEM) project-based learning (PBL) affects high, middle, and low achievers differently: The impact of student factors on achievement. *International Journal of Science and Mathematics Education*, *13*(5), 1089-1113. https://doi.org/10.1007/s10763-014-9526-0

Janna, N. M., & Herianto, H. (2021). Konsep uji validitas dan reliabilitas dengan menggunakan SPSS

Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving schools*, *19*(3), 267-277. https://doi.org/10.1177/1365480216659

Lim, S. W., Jawawi, R., Jaidin, J. H., & Roslan, R. (2023). Learning History through Project-Based Learning. *Journal of Education and Learning (EduLearn)*, *17*(1), 67-75. https://doi.org/10.11591/edulearn.v17i1.20398

Lismayani, L., Kamid, K., & Yantoro, Y. (2025). The Effect of Project-Based Learning (PjBL) On Critical Thinking Skills as Seen from Cognitive Styles. *Journal of Mathematics Instruction, Social Research and Opinion*, *4*(3), 981-990. https://doi.org/10.58421/misro.v4i3.711

Mekarsari, R. D., & Suprijono, A. (2019). Pengaruh Model Pembelajaran Project Based Learning Terhadap Kemampuan Berpikir Kritis Siswa Kelas Xi Ips Mata Pelajaran Sejarah Di Sma Negeri Kabuh, Jombang. *Avatara: Jurnal Pendidikan Sejarah*, *8*(2). https://ejournal.unesa.ac.id/index.php/avatara

Nursaya'bani, K. K., Falasifah, F., & Iskandar, S. (2025). Strategi pengembangan pembelajaran abad ke-21: Mengintegrasikan kreativitas, kolaborasi, dan teknologi. *JIIP-Jurnal Ilmiah Ilmu Pendidikan*, *8*(1), 109-116. https://doi.org/10.54371/jiip.v8i1.6470

Paat, M., Sompotan, A. F., Pesik, A., Mokalu, Y. B., & Moroki, I. (2024). Penerapan multimedia pembelajaran berbasis masalah dalam meningkatkan hasil belajar dan keterampilan berpikir tingkat tinggi. *Jurnal Pendidikan MIPA*, *14*(1), 155-162. https://doi.org/10.37630/jpm.v14i1.1493

Sugiyono, D. (2019). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Sularmi, S., Utomo, D. H., & Ruja, I. N. (2018). *Pengaruh project-based learning terhadap kemampuan berpikir kritis* (Doctoral dissertation, State University of Malang).

Susanta, A., & Susanto, E. (2020). Efektivitas project based learning terhadap kemampuan pemecahan masalah dan berpikir kritis mahasiswa. *Jurnal Theorems*, *5*(1), 61-68. https://doi.org/10.31949/th.v5i1.2219

Syahri, A. A., & Ahyana, N. (2021). Analisis kemampuan berpikir tingkat tinggi menurut teori anderson dan krathwohl. *Jurnal Riset Dan Inovasi Pembelajaran*, *1*(1), 41-52. https://doi.org/10.51574/jrip.v1i1.16

Williamson, E. (2023). The effectiveness of project-based learning in developing critical thinking skills among high school students. *European Journal of Education*, *1*(1), 1-11. https://doi.org/103.144.227.196

Zulfannur, Z., Anifah, L., & Buditjahjanto, I. G. P. A. (2024). Pengaruh Problem Solving Skill dalam Model Pembelajaran Project Based Learning terhadap Hasil Belajar Siswa Sekolah Menengah Kejuruan. *Jurnal Studi Guru Dan Pembelajaran*, *7*(1), 409–418. https://doi.org/10.30605/jsgp.7.1.2024.3972