Program Studi Pendidikan Guru Madrasah Ibtidaiyah
Fakultas Ilmu Tarbiyah dan Keguruan
UIN Raden Fatah Palembang
Indonesia
p-ISSN: 2527-2764
e-ISSN: 2527-4589
JIP (Jurnal Ilmiah PGMI)

Influence of Project Based Learning Model Assisted by Interactive Digital Media on Students' Critical Thinking Skill in Social Science and Science Subjects at Elementary School

Diana Isrianti[1], Yulina Ismiyanti[2]*

[1,2]Universitas Islam Sultan Agung, Central Java, Indonesia

*Correspondence adress: yulinaismiyanti@unissula.ac.id

Abstract

This research aims to examine the influence of the Project Based Learning learning model assisted by interactive digital media on the critical thinking skills in science and science subjects of fifth grade students at Al Fattah Islamic Elementary School. This research uses quantitative research methods with a Pre-Experimental Research Design type One Group Pretest-Posttest Design. The sample for this research was the fifth grade students of Al Fattah Islamic Elementary School, totaling 15 students. The data collection technique was carried out in the form of a description type test with 10 questions given during the pretest and post-test. Data analysis techniques include research instruments consisting of validity, reliability, distinguishing power and level of difficulty tests, then normality tests and paired sample t-test hypothesis tests to determine the comparison of pretest and post-test average scores. The research results show that the Project Based Learning learning model assisted by interactive digital media can improve students' critical thinking abilities. This is proven by the difference in the average score at the pretest of 44.07 and at the post-test of 86.33. In the results of the paired sample t-test, the sig value was obtained. (2-tailed), namely 0.000 < 0.05, then H0 is rejected and Ha is accepted. Thus, it can be concluded that the Project Based Learning learning model assisted by interactive digital media has an influence on the critical thinking skills of the science and science subjects of fifth grade students at Al Fattah Islamic Elementary School.

Keywords: Critical Thinking, Interactive Digital Media, Project Based Learning

Abstrak

Penelitian ini bertujuan untuk mengkaji pengaruh model pembelajaran Project Based Learning berbantuan media digital interaktif terhadap kemampuan berpikir kritis mata pelajaran IPAS siswa kelas V Sekolah Dasar Islam Al Fattah. Penelitian ini menggunakan metode penelitian kuantitatif dengan desain penelitian Pre-Eksperimental Design jenis One Group Pretest-Posttest Design. Sampel penelitian ini adalah siswa kelas V SD Islam Al Fattah yang berjumlah 15 siswa. Teknik pengumpulan data dilakukan dengan bentuk tes tipe uraian sebanyak 10 soal yang diberikan pada saat pretest dan post-test. Teknik analisis data meliputi instrumen penelitian yang terdiri dari uji validitas, reliabilitas, daya pembeda, dan tingkat kesukaran, selanjutnya uji normalitas dan dan uji hipotesis paired sample t-test untuk mengetahui perbandingan skor rata-rata pretest dan post-test. Hasil penelitian menunjukkan bahwa model pembelajaran Project Based Learning berbantuan media digital interaktif dapat meningkatkan kemampuan berpikir kritis siswa. Hal ini dibuktikan dengan perbedaan nilai rata-rata pada saat pretest sebesar 44,07 dan pada saat post-test sebesar 86,33. Pada hasil uji paired sample t-test diperoleh nilai sig. (2-tailed) yaitu 0,000 < 0,05 maka H0 ditolak dan Ha diterima. Dengan demikian dapat disimpulkan bahwa model pembelajaran Project

Volume 11 No. 1, June 2025
DOI: https://doi.org/10.19109/jip.v11i1.27297

Based Learning berbantuan media digital interaktif berpengaruh terhadap kemampuan berpikir kritis mata pelajaran IPAS siswa kelas V SD Islam Al Fattah.

Kata Kunci: *Berpikir Kritis, Media Digital Interaktif, Project Based Learning*

INTRODUCTION

Education can improve quality from not understanding to understanding and from not understanding to understanding (Amumpuni et al., 2024). Competent teachers are aware of student problems and can balance the success of a learning objective (Sukma et al., 2022). Teacher competence is the teacher's ability to manage learning in order to acquire knowledge, skills and basic values that are reflected in actions and thoughts (Laksmi et al., 2024). The realization of ideal education is active interaction between teachers and students to achieve learning goals (Ismiyanti & Afandi, 2022). Independent Curriculum (Kurikulum Merdeka) learning emphasizes fulfilling the characteristics and needs of students which provides the freedom to learn more comprehensively, meaningfully, develop their interests and talents, be free to innovate, learn independently, be creative, and have critical abilities (Oktariani et al., 2025). Critical thinking is a problem-solving skill, identifying causal information based on existing facts, then seeking solutions and re-analyzing the resulting problems (Ismiyanti & Permatasari, 2021). Nowadays, higher-order thinking skills are an obligation that students must possess. Higher-order thinking skills can support each student's ability to be a solution for each other and the surrounding environment (Martawijaya et al., 2023).

A learning model is a form of long-term learning material design pattern (Kurniawan et al., 2024). There is a taxonomy of standards for teacher competency that includes requirements for appearance, process, and content. Appearance standards are linked to performance standards, specifically how teachers demonstrate their mastery of knowledge, attitudes, and skills in performing their duties as professional teachers. Content standards include the knowledge, skills, and attitudes demonstrated during training; process standards include performance criteria in the necessary knowledge, skills, and attitudes transformation activities, including facilitative carrying capacity (Tiara et al., 2024). The implementation of conventional learning models and media is a basic problem in the low quality of education with the emergence of problems in understanding material that requires complex understanding and a lack of student involvement in learning (Listiani & Madiun, 2024). It is often found that students enthusiastically follow the learning at the beginning before teaching the material, but students are not interested and lack enthusiasm after entering the material explanation section because the learning delivered by the teacher is without any meaningful learning involvement so that the learning process becomes less effective where learning is still one-way and listening to books (Amelia, 2024). Because the age of elementary school students will be more interested and motivated to learn if they are involved in the learning process (Pamungkas & Kowiyah, 2021).

Based on the results of observations and interviews with the homeroom teacher of grade V of SD Islam Al Fattah, several obstacles were found in the classroom, especially in one of the subjects of natural and social sciences (IPAS), the teacher still applies a conventional learning model, explaining learning materials that are read from books and students only listen and learning never uses learning media, especially interactive digital media that triggers boredom and students tend to be passive. As a result, students have difficulty in understanding the concepts of IPAS on the material of changes in the earth that occur in nature and the level of students' critical thinking skills is still relatively low. In accordance with the conditions conveyed by the homeroom teacher, there was only 1 student who reached the KKM score limit out of 15 students because the student did not understand the questions and had difficulty analyzing story questions and the teacher was not used to giving practice questions at the cognitive level C4-C6. This challenge requires the implementation of innovative learning models and interactive learning media to help students be more active and hone their critical thinking skills (Suharyati & Pakuan, 2024).

In accordance with the problem, a solution was found, namely using the Project Based Learning model assisted by interactive digital media that has never been applied before. This is a learning approach that involves students in creating meaningful project products for daily life (Suradika et al., 2023). Menurut (Prajoko et al., 2023) Project Based Learning learning is an inquiry-based educational technique in which students participate in knowledge production by being assigned relevant tasks and required to develop real-world products. Technology and science that are increasingly developing trigger efforts to utilize the results of technology in learning process (Astafiria & Bayu, 2021). Quality learning will be achieved if the teachers have various techniques andgood teaching and good teaching facilities and supported by an ideal learning environment (L. Ayu et al., 2021). Effective learning requires innovation in learning media. Learning media can help students understand material in a complex and deep way (Sentarik & Kusmariyatni, 2020). Multimedia is an alternative learning media with sophisticated technology that has a positive impact on teachers to design and be creative in making digital-based learning media such as digital interactive media (Heliawati et al., 2022). Choosing the right learning media is one aspect of students' critical thinking success (Luh et al., 2021). Jean Piaget's Theory The theory explains that elementary school children (aged 7 to 11 years) are able to solve real problems with logical thinking, understand an object, classify concepts and are able to overcome problems. Teachers must think again to make students feel that the learning being carried out is fun and that the teaching materials being distributed are not monotonous. (Cahyaningtyas & Ismiyanti, 2022).

Based on research that has been previously conducted by (Jannah & Madura, 2024), Project based learning can improve conceptual understanding and problem solving that fosters collaboration, critical thinking and product creativity to become active learning. Previous research has also been conducted by (Hikmawati et al., 2025) Students in the experimental class who implemented the PjBL model with a hybrid mode showed better results in HOTS compared to the control class, especially at the cognitive levels of analysis (C4), evaluation (C5), and creation (C6). The results of research conducted by (Prabawati & Agustika, 2020) shows that the integration of STEM PJBL together can become a learning innovation that can give rise to creative and critical ideas and solutions. Other research conducted by (Desyandri et al., 2024) Project Based Learning model make learning practical and effective for use in elementary school learning. Other research also conducted by (Prabawati & Agustika, 2020) stated that teachers should use the Project Based Learning model in any subject because it has been proven to be effective in facilitating understanding of learning material. Research was conducted (Anggriani et al., 2024) this finding confirms that Project Based Learning (PjBL) is a practical learning approach to form collaboration skills and foster critical thinking skills in students at the elementary school level.

Based on several previous studies that are relevant to this study, there are similarities, namely using the Project Based Learning learning model and the variables used to measure students' critical thinking skills. While the differences lie in the discussion material, research subjects, and research locations. However, there is a novelty between previous studies and this study, namely using interactive digital media to measure the same variables on critical thinking skills. This study was conducted with the aim of examining the effect of the Project Based Learning learning model assisted by interactive digital media on the critical thinking skills of students in the science subject of grade V of SD Islam Al Fattah.

METHOD

This study uses a quantitative research method with a Pre-Experimental Design research design of the One Group Pretest-Posttest Design type. This study was conducted to examine the effect of the Project Based Learning learning model assisted by interactive digital media on students' critical thinking skills. Pre-Experimental Design research contains external variables that also influence the formation of dependent variables where the sample is not selected randomly (Jupriyanto et al., 2023).

DOI: https://doi.org/10.19109/jip.v11i1.27297

In the One Group Pretest-Posttest Design research design, the research subjects were given a pretest first before the treatment, then the subjects were given treatment using the Project Based Learning learning model assisted by interactive digital media, after the treatment was given, a post-test was given to the subjects to find out the effects of the treatment and compare it with the situation before the treatment was given. The population in this study were all fifth grade elementary school students with details of class VA totaling 16 students and class VB totaling 15 students. The research sample used was all students of class VB with a sampling technique of Non-Probability Sampling with saturated sampling. Non-Probability Sampling is a sampling technique that does not provide equal opportunities for each member of the population to become a member of the sample. The data collection technique is in the form of an essay test with 10 questions. The test instrument is arranged based on a grid that includes indicators of critical thinking skills at the cognitive level C4-C6 (Anggraeni et al., 2021).

To analyze data, of course there are good and appropriate measuring tools in the research that will be used (Kurniawan et al., 2024). Before processing the data, a construction test is required to determine the level of validity, reliability, differentiating power, and level of difficulty of a test instrument to be used as a reference during the pre-test and post-test (Fu'adiah, 2022). Pretest is used to measure the initial conditions before the treatment is given, while the post-test is used to measure whether there is a change in ability after the treatment is given. The comparison between the pretest and post-test can determine whether the treatment given is very effective on the variables studied (Hakim et al., 2023). The data obtained from the results of the pretest and post-test will be processed using statistical tests on the initial data including normality tests which are then continued with final data analysis including normality tests, and paired sample t-test hypothesis tests to compare two paired samples on variables taken when different situations and circumstances. The Pre-Eksperimental Design does not a homogeneity test because this research is intended for one experimental class only. The paired sample t-test is used to examine whether there is a difference in the average between before and after treatment is given (Sevani & Ramadan, 2023). The expected analysis results show a significant difference between the pretest and post-test scores, which indicates that the use of the Project Based Learning learning model assisted by interactive digital media has an effect on students' critical thinking skills.

RESULT AND DISCUSSION

This research is quantitative research with a Pre-Experimental Design type of One Group Pretest-Posttest Design research. This research aims to examine the influence of the Project Based Learning learning model assisted by interactive digital media on the critical thinking skills in science and science subjects of fifth grade students at Al Fattah Islamic Elementary School. Before the data collection process, there is a construction test (instrument trial) that must be carried out so that it can be used as a research data test instrument during the pretest post-test. The construction test instrument consists of test questions in the form of descriptions totaling 10 questions. Instrument testing is used to determine validity, reliability, distinguishing power, and level of difficulty as a reference for pretest and post-test questions that are suitable for use.

Data collection was carried out using the One Group Pretest-Posttest Design type. The sample for this research was all students in class VB at Al Fattah Islamic Elementary School, totaling 15 students. The research was carried out by giving a pretest first then being given treatment using the Project Based Learning learning model assisted by interactive digital media, then giving a post-test to compare the situation after being given treatment. The data that has been obtained from the results of the pretest and post-test scores is processed appropriately to determine the results of the problem formulation regarding the independent variables and dependent variables that the researcher used.

Validity test was processed using Microsoft Excel and SPSS V.25.0 for Windows. The tested question instrument consisted of 15 essay questions. Validity test shows how well an instrument can

be used in research. The validity test results showed that 10 questions were valid and 5 questions were said to be invalid.

Table 1. Validity Test Result

No.	Koef.Korelation	T Count	T Table	Information
1.	0,721	3,603	2,179	Valid
2.	0,728	3,679	2,179	Valid
3.	0,812	4,827	2,179	Valid
4.	0,831	5,171	2,179	Valid
5.	0,466	1,824	2,179	Not Valid
6.	0,693	3,334	2,179	Valid
7.	0,546	2,260	2,179	Valid
8.	0,367	1,367	2,179	Not Valid
9.	0,713	3,526	2,179	Valid
10.	0,678	3,196	2,179	Valid
11.	0,423	1,618	2,179	Not Valid
12.	0,644	2,917	2,179	Valid
13.	0,776	4,268	2,179	Valid
14.	0,515	2,084	2,179	Not Valid
15.	0,329	1,208	2,179	Not Valid

The results of the reliability test obtained showed a value of 0.886 that the research instrument was interpreted as having very high criteria and was said to be reliable.

Table 2. Reliability Statistics

Cronbach's Alpha	N of Items
.886	15

The differentiating power test that has been tested has several differentiating power classifications including 6 questions with good criteria, 6 questions with sufficient criteria, and 3 questions with poor criteria. Meanwhile, the results of the difficulty level of the questions show different criteria, namely in the difficult criteria there are 2 questions, in the medium criteria there are 10 questions, and in the easy criteria there are 3 questions. The recapitulation of the instrument trial results shows that there are 10 questions that will be used as research data instruments during the pretest and post-test.

Table 3. *Pretest* and *Post-test* Data

No	Data Criteria	Value Data	
		Pretest	***Post-Test***
1.	Number of samples	15	15
2.	Mean	44,07	86,33
3.	Median	43	86
4.	Variant	548,352	47,810
5.	Minimum value	16	77
6.	Maximum value	84	100
7.	Standard deviation	23,417	6,914

Based on the results of the table above, there is a difference in the average scores obtained between before and after being given treatment. The average score obtained before treatment was

DOI: https://doi.org/10.19109/jip.v11i1.27297

given to the pretest score was 44.07. Meanwhile, after being given treatment, the average post-test score obtained was 86.33. The minimum score during the pretest was 16, while the minimum score during the post-test was 77. Furthermore, the maximum score during the pretest was 84, while the maximum score during the post-test was 100. So it can be said that the Project Based Learning learning model is assisted by digital media. interactive has a significant influence on students' critical thinking abilities.

The data tested from the results of the pretest and posttest of students' critical thinking skills required testing whether the distribution of the data used was normal distribution using the One Sample Shapiro-Wilk test with the help of the SPSS application.

Table 4. Initial Data Normality Test Results

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Nilai_Pretest	.133	15	.200*	.915	15	.162

Initial data was obtained from the results of the pretest scores carried out before the treatment was given at the start of learning. If the research data is assumed to be normally distributed, then testing is carried out to see whether the data distribution is normally or not normally distributed. If the sig value. > 0.05 then the data is considered normally distributed. Meanwhile, if the sig value. < 0.05 then the data is not normally distributed. The results of the normality test on the initial data obtained a significance value (sig) = 0.162, meaning that it can be concluded that the sig value is 0.162 > 0.05, so the data is said to be normally distributed.

Table 5. Final Data Normality Test Results

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Nilai_Pretest	.153	15	.200*	.946	15	.470

In the final data analysis, a normality test is also required to determine whether the data is normally distributed or not. The results of the final data normality test obtained show that the sig. namely 0.470. So it can be concluded that the sig value. 0.470 > 0.05, which means the data is normally distributed.

Furthermore, the final data analysis was also carried out statistical processing of the paired sample t-test to answer the problem formulation whether there was an influence between before and after the treatment was given. The hypothesis criterion for the paired sample t-test is if the sig value. (2-tailed) > 0.05 then H0 is accepted and Ha is rejected. Meanwhile, if the sig value. (2-tailed) < 0.05 then H0 is rejected and Ha is accepted.

Table 6. Paired Sample *T-test* Results

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Nilai_Pretest - Nilai_Posttest	-42.267	16.888	4.361	-51.619	-32.914	-9.693	14	.000

Based on the data obtained above, it shows that the sig. (2-tailed) namely 0.000 < 0.05. So H0 is rejected and Ha is accepted, so it can be concluded that there is an influence of the Project Based Learning learning model assisted by interactive digital media on the critical thinking abilities of the science and science subjects of fifth grade students at Al-Fattah Islamic Elementary School.

There are several indicators of critical thinking skills used by researchers in the learning process, namely providing simple explanations, analyzing facts needed to solve problems, drawing conclusions, assessing statements in solving problems, and providing logical explanations. Critical thinking skills are the main goal in education because they help students face a problem that must be influenced by skilled and trained thinking skills (Cholifah et al., 2023). A person who has critical thinking skills always provides alternative solutions based on existing (real) information data and analysis that has been collected (Winarso et al., 2023). The combination of various concepts in cognitive methods and bloom's taxonomy of learning can improve students' critical thinking processes at the cognitive level. The cognitive level of high-level thinking of students (High Order Thinking Skill) is level C4-C6. The results obtained during the pretest and posttest between before and after being given the Project Based Learning learning model treatment assisted by interactive digital media showed a high level category of students' critical thinking understanding significantly.

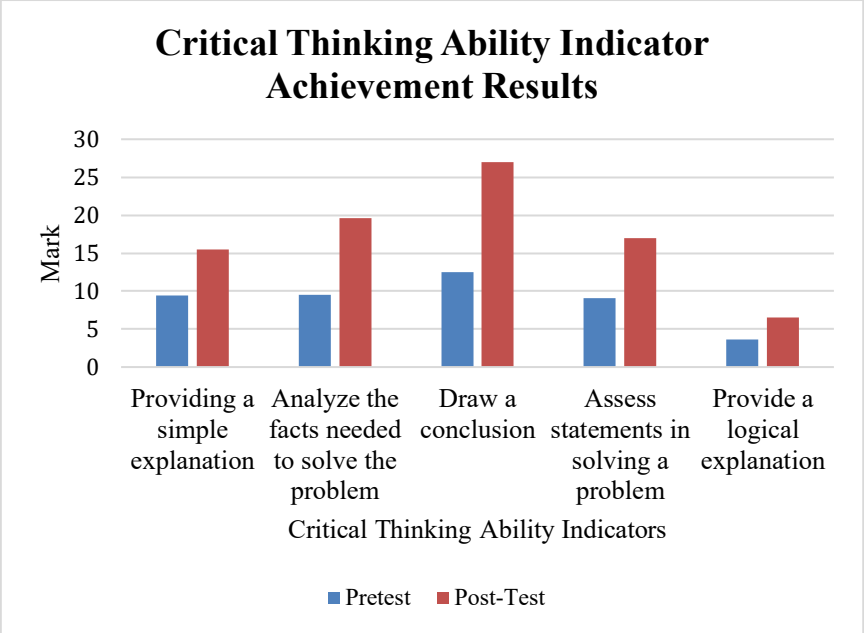

Figure 1. Critical Thinking Ability Indicator Achievement Chart

Based on the graph above, it shows the results of achieving students' critical thinking skills, each indicator varies between the pretest and post-test results. Students' critical thinking abilities in the pretest results were lower compared to the post-test results. The difference between these two results states that the application of the Project Based Learning learning model assisted by interactive digital media has an effect on students' critical thinking abilities.

The first indicator provides a simple explanation so that students are able to formulate a question. The pretest questions were numbered 3, 10, and the post-test questions were numbered 1, 8. The results during the pretest obtained an average score of 9.4, while the average results during the post-test increased to 15.5. So it can be concluded that after treatment with the Project Based Learning learning model assisted by interactive digital media, it provides significant results on students' critical thinking abilities. The effect of treatment on the 1st indicator is providing a simple explanation, in line with research that has been carried out by (Fitriani et al., 2020) which proves that indicators that provide simple explanations get the highest scores compared to other indicators. The integration of the project-based learning model encourages students to be enthusiastic in learning and provides

DOI: https://doi.org/10.19109/jip.v11i1.27297

opportunities to identify solutions to problems.

The second indicator, namely analyzing the facts needed to solve the problem, is given in pretest questions number 1, 6, and post-test questions are number 4, 10. It shows that the average score at the pretest is 9.5 and at the post-test increased until it reached an average value of 19.6. This means that during the post-test after the treatment is given, students are better able to analyze and consider the truth of the statement with the results of the statement. The research results on the 2nd indicator are in line with research conducted by (Aristin & Purnomo, 2022), states that the Project Based Learning model helps students learn by connecting previous knowledge with new knowledge so that they can achieve meaningful understanding and be able to analyze in finding answers to the problems given.

The third indicator is drawing conclusions, students can draw conclusions by deduction according to the statement information explained. It was given in pretest questions number 4, 5, 7, and post-test questions were in numbers 2, 5, 9. Students' ability to draw conclusions during the pretest could not be fully understood regarding the statements given and the average score obtained was 12. 5. Meanwhile, during the post-test, students' ability to draw conclusions increased significantly and the average score obtained reached up to 27. The influence of the results of the 3rd indicator is in line with research conducted by (Winarti et al., 2022), states that the Project Based Learning learning model can improve students' critical thinking skills between pre-cycle, cycle I and cycle II. The achievement results get a good category where students are able to conclude the problems presented in the questions.

The fourth indicator is assessing statements in solving a problem. Students are able to evaluate a statement to prove the truth of the problem argument. Given in pretest questions number 2, 9, and post-test questions in numbers 6, 7. The results of student achievement during the pretest were 9.1, while during the post-test it reached up to 17. This means that during the pretest the students were less capable in assess a problem in the question. However, during the post-test, students' ability to assess a problem was achieved according to the truth of the statement. The research results on the 4th indicator are in line with research conducted by (Salmah et al., 2025) found that students who apply concepts in practical settings tend to develop a deeper understanding and are more proficient at evaluating outcomes than those who rely solely on memorization.

In the fifth indicator, providing a logical explanation, students are able to provide systematic reasons for the conclusions drawn. It was given in pretest question number 8 and post-test question was in number 3. The average score during the pretest was 3.6, where the students' ability to provide logical explanations was still lacking and minimal regarding the problem topic. Meanwhile, the average score during the post-test increased to 6.5, meaning that students were able to explain in detail the arguments obtained in the statement questions. The influence of the results on the 5th indicator is in line with research conducted by (Suradika et al., 2023) which states that the impact of implementing the Project Based Learning model is being able to enable students to think critically in solving problems by providing responses based on the originality of ideas related to the material they have studied.

The Project Based Learning learning model assisted by interactive digital media has a significant influence on students' critical thinking abilities. Learning with the Project Based Learning model and the use of interactive digital media is a new experience for students. Choosing the right learning model and media can encourage students to be actively involved in learning, there is interaction and communication between teachers and students, learning is comfortable and enjoyable so that it makes students focus and can understand the learning taking place, grows students' skills, and can influence understanding of critical thinking skills. student. The findings of this research are in line with the results of previous research presented by (Salmah et al., 2025) it can be concluded that the implementation of the PjBL model integrated with STEM has been proven to enhance students' HOTS. This is because the use of the Project Based Learning model supports more active

and meaningful learning. The use of digital media in learning encourages students' experience and understanding of learning in the digital era.

Other previous research that is relevant to this research is research conducted by (Wibowo et al., 2024) shows that the results of Project Based Learning using interactive video learning media are very effective in improving students' critical thinking skills. This is because the Project Based Learning model provides opportunities for students to be directly involved in solving problems shown in the product results at the end of the lesson. Apart from that, learning using interactive video media can improve the quality of learning and develop students' critical thinking skills. Thus, it can be concluded based on the results of previous research that the Project Based Learning learning model assisted by interactive digital media has an effect on the critical thinking abilities of the science and science subjects of fifth grade students at Al Fattah Islamic Elementary School.

Learning with the PjBL model is recognized as collaborative learning, actively involving students in learning because of its student-centered, contextual, and comprehensive nature so that it can develop their critical thinking skills (Sari et al., 2025). The research conducted by the researcher is strengthened by constructivism theory. Menurut Thobroni (2015) constructivism theory is to give freedom to students to learn new things and develop their abilities and skills. So this theory supports the Project Based Learning learning model because students are actively involved in building their own knowledge (Fitri, 2020). In addition, Jean Piaget's theory also supports the use of interactive digital media. Jean Piaget's theory suggests that intellectual cognitive development changes as the child grows older (K. Ayu et al., 2024). The concept of using learning media is adapted to technological advances in the 21st century.

The innovation of the PjBL model has the attraction of students to learn and collaborate actively, creating good learning stimuli and responses so that there is an increase in their critical thinking skills. The implementation of interactive digital media in the learning process triggers a new understanding of students towards the generalization of technology and the emergence of active student reactions to understand the material. This is the existence of the Project Based Learning learning model assisted by interactive digital media is very important to help students be active during learning, build good cooperation, stimulate understanding of the material, and increase critical thinking skills. Using this model requires a conducive classroom to achieve the desired end product of learning.

CONCLUSION

The Based on the results of research and discussion, the use of the Project Based Learning learning model assisted by interactive digital media in science and science subjects is very effective in improving students' critical thinking skills. This is proven by the average score obtained during the pretest was 44.07. Meanwhile, the average score at the post-test was 86.33. While the differences lie in the discussion material, research subjects, and research locations. There is a novelty from this study, namely using interactive digital media.

The limitations in this study are the limited time in conducting the research and the lack of data sources used are challenges that must be overcome. Therefore, there are recommendations for further researchers to conduct research with a longer period of time involving many samples, variables, and expanding data sources in order to obtain more comprehensive information. With these steps, the Project Based Learning model assisted by interactive digital media contributes to increasing interactive learning quality and strengthening critical thinking skills effectively.

REFERENCES

Amelia, R. (2024). Developing digital teaching module with problem-based learning integrated to virtual lab on electricity. XI(1), 50–68. https://doi.org/10.30659/pendas.11.1.50-68

DOI: https://doi.org/10.19109/jip.v11i1.27297

Amumpuni, R. S., Semarang, U. N., Semarang, U. N., Rukmini, D., Semarang, U. N., Haryanti, R. P., & Semarang, U. N. (2024). Linking thought and text : The relationship between critical thinking and reading performance. 14(June), 40–48. https://doi.org/10.25273/pe.v14i1.22400

Anggraeni, N. P. S. D., Bayu, G. W., & Sudatha, I. G. W. (2021). HOTS-based Instrument for Assessing Students Science Learning Outcomes in Elementary School. 5(2), 231–241. https://doi.org/https://doi.org/10.23887/jisd.v5i2.35143

Anggriani, M. D., Intansari, I., & Indriani, L. (2024). Project-based learning: Cultivating collaborative skills in science education. 13(5), 184–190. https://doi.org/https://doi.org/10.33578/jpfkip-v13i5.p184-190

Aristin, N. F., & Purnomo, A. (2022). Improving Critical Thinking Skill Through Team-based Projects , is it Effective ? 6(3), 586–594. https://doi.org/https://doi.org/10.23887/jere.v6i4.48090

Astafiria, N. S., & Bayu, G. W. (2021). Digital Learning Media Assisted by Quizizz Application (METALIQ) on Science Content of Ecosystem Topic for Sixth Grade Elementary School. 5(3), 485–497. https://doi.org/https://doi.org/10.23887/jisd.v5i3.39539

Ayu, K., Fransiska, W., Suarni, N. K., & Margunayasa, I. G. (2024). Perkembangan Kognitif Siswa pada Penggunaan Media Pembelajaran Digital Ditinjau dari Teori Jean Piaget : Kajian Literatur Sistematis. 9(2), 466–471. https://doi.org/http://dx.doi.org/10.51169/ideguru.v9i2.839

Ayu, L., Sawitri, R., Wayan, A. I., & Yuda, I. (2021). Monopoly Media : Efforts to Increase the Activity of Elementary School Students in Learning Animals Movement Organs. 5(2), 250–259.

Cahyaningtyas, A. P., & Ismiyanti, Y. (2022). Pelatihan Pembuatan Flipbook Interaktif Bagi Guru-Guru SD Negeri Desa Gentansari dan Twelagiri Universitas Islam Sultan Agung , Semarang , Indonesia. 3(4), 1112–1119.

Cholifah, T. N., Umah, N. K., Pendidikan, F. I., Islam, U., Rahmat, R., Artikel, I., Match, I. C., Kritis, B., Cholifah, T. N., Pendidikan, F. I., Islam, U., Rahmat, R., & Education, J. (2023). Pengaruh Metode Pembelajaran Index Card Match Terhadap Kemampuan Berpikir Kritis Siswa SD. 11(2), 45–51. https://doi.org/10.37081/ed.v11i2.4555

Desyandri, Kharisna, F., Amini, R., & Erita, Y. (2024). E-book Based on Project Based Learning Assisted by Kvisoft Flipbook Maker Blended Learning in Elementary Schools. 8(1), 148–155. https://doi.org/https://doi.org/10.23887/jisd.v8i1.68407

Fitri, Y. (2020). Implementasi Penerapan Teori Konstruktivisme Dalam Proses Pembelajaran Di Sekolah Dasar. 3(4), 1300–1307.

Fitriani, R., Surahman, E., Azzahrah, I., Biologi, J. P., Siliwangi, U., Biologi, J. P., Siliwangi, U., Biologi, J. P., Siliwangi, U., & Proyek, P. B. (2020). Implementasi pembelajaran berbasis proyek untuk meningkatkan kemampuan berpikir kritis siswa. 11. https://doi.org/10.25134/quagga.v11i1.1426.Received

Fu'adiah, D. (2022). Developing Test Instrument of Quantitative Reasoning Skills for Grade 6 SD / MI Students. IX(1), 45–67. https://doi.org/10.30659/pendas.9.1.45-67

Hakim, A., Efwinda, S., Damayanti, P., Syam, M., Mutmainah, O., & Norsaputra, A. (2023). Improving Climate Literacy Of High School Students Through Physics Teaching Materials Based On Stem. 12(4), 526–537. https://doi.org/10.15294/jpii.v12i4.43188

Heliawati, L., Lidiawati, L., Adriansyah, P. N. A., & Herlina, E. (2022). Jurnal Pendidikan IPA Indonesia Ethnochemistry-Based Adobe Flash Learning Media Using Indigenous Knowledge

To Improve Students ' Scientific Literacy. 11(2), 271–281. https://doi.org/10.15294/jpii.v11i2.34859

Hikmawati, Taufik, M., Ardhuha, J., Muliadi, Rahayu, S., Doyan, A., & Faresta, R. A. (2025). The Effect of Project-Based Learning Model with Hybrid Mode on Higher Order Thinking Skills and Social Attitudes of Prospective Physics Teacher Students. 13(1), 141–155.

Ismiyanti, Y., & Afandi, M. (2022). Pendampingan Guru Sekolah Dasar Dalam Pembuatan Media Pembelajaran Berbasis Kearifan Lokal. 6(1), 8–12.

Ismiyanti, Y., & Permatasari, N. D. (2021). The effect of pictorial story media on critical thinking of grade 4 SDN 1 Pendem. Jurnal Ilmiah Pendidikan Dasar, VIII(2), 118–128. https://doi.org/10.30659/pendas.8.2.118-128

Jannah, U. R., & Madura, U. (2024). STEM : Project based learning to enhance conceptual understanding of two-dimensional shapes and and develop the pancasila student profile. 14(November), 138–154. https://doi.org/10.25273/pe.v14i2.21314

Jupriyanto, Yustiana, S., Sari, Y., & Pratiwi, E. I. (2023). The Effect of Environmental Approach on Critical Thinking Ability in Elementary School Students' Science Content. X(1), 61–71. https://doi.org/10.30659/pendas.10.1.61-71

Kurniawan, F. H., Bintartik, L., & Malang, U. N. (2024). Comparison of snowball throwing and jigsaw learning models on science learning outcomes regarding human blood circulation in elementary schools. XI(2), 187–203. https://doi.org/10.30659/pendas.11.2.187-203

Laksmi, J. N. A., Mawardi, & Wasitohadi. (2024). Development of peer tutoring-based training to improve elementary school teacher competence in making merdeka curriculum lesson plans. XI(2), 265–283. https://doi.org/10.30659/pendas.11.2.265-283

Listiani, I., & Madiun, U. P. (2024). Prospective teachers ' creativity in constructing learning media in project brain-based learning (PjBBL) model. 14(March 2025), 156–170. https://doi.org/10.25273/pe.v14i2.22127

Luh, N., Cahyani, P., & Jayanta, I. N. L. (2021). Digital Literacy-Based Learning Video on the Topic of Natural Resources and Technology for Grade IV Elementary School. 5(3), 538–548.

Martawijaya, M. A., Rahmadhanningsih, S., Swandi, A., Hasyim, M., & Sujiono, E. H. (2023). The Effect Of Applying The Ethno-Stem-Project-Based Learning Model On Students ' Higher-Order Thinking Skill And Misconception Of Physics Topics Related To Lake Tempe , Indonesia. 12(1), 1–13. https://doi.org/10.15294/jpii.v12i1.38703

Oktariani, Rochintaniawati, D., Riandi, Nahadi, Siti, H., Munawaroh, H., Baruri, A., Virijai, F., & Sari, Y. (2025). Implementation of The Merdeka Belajar Kurikulum Merdeka Curriculum to Improve The Quality of Prospective Chemistry Teachers. 13(2), 365–378.

Pamungkas, G. P., & Kowiyah. (2021). The Influence of Open Ended Learning Mathematical Problem Solving Ability Model on. 5(3), 395–402. https://doi.org/https://doi.org/10.23887/jisd.v5i3.37596

Prabawati, P. L. S., & Agustika, G. N. S. (2020). Project-Based Learning Based On Stem (Science , Technology , Engineering , And Mathematics) Enhancing Students Science Knowledge Competence. 4(4), 621–629. https://doi.org/https://doi.org/10.23887/jisd.v4i4.26670

Prajoko, S., Sukmawati, I., Maris, A. F., & Wulanjani, A. N. (2023). Model With Stem Approach On Students ' Conceptual Understanding And Creativity. 12(3), 401–409. https://doi.org/10.15294/jpii.v12i3.42973

Salmah, U., Suwasono, P., Kurniawan, R., & Swapno, S. M. M. R. (2025). Implementation of PjBL-STEM Learning to Improve Students ' Higher Order Thinking Skills in Direct Current

Electricity. 13(2), 534–549. https://doi.org/https://dx.doi.org/10.24815/jpsi.v13i2.44826

Sari, S. P., Nugraheni, D., Hamimi, E., Pratiwi, N., & Habiddin. (2025). Development of Project Based Learning STEAM based Water Purifier Educational Kit on Water Pollution to Train Critical Thinking Skills. 13(1), 233–253. https://doi.org/https://doi.org/10.24815/jpsi.v13i1.42151

Sentarik, I. K., & Kusmariyatni, N. (2020). Media Pop-Up Book pada Topik Sistem Tata Surya Kelas VI Sekolah Dasar. 4(2), 197–208.

Sevani, O., & Ramadan, Z. H. (2023). The Effectiveness of Project-Based Learning Model in Increasing Understanding of Mathematical Concepts in Fourth-Grade Elementary School Students. 7(3), 469–476. https://doi.org/https://doi.org/10.23887/jere.v7i3.66664

Suharyati, H., & Pakuan, U. (2024). Manajemen of Independent Curriculum Teaching Modules with Style Materials. 14(June), 14–26. https://doi.org/10.25273/pe.v14i1.18780

Sukma, R., Ismiyanti, Y., & Ulia, N. (2022). Pengaruh Blended Learning dengan Model Flipped Classroom Berbantuan Video terhadap Hasil Belajar Kognitif Kompetensi IPA Kelas V The Effect of Blended Learning with Video-Assisted Flipped Classroom Model on Cognitive Learning Outcomes of Science Competenc. IX(2), 142–156. https://doi.org/10.30659/pendas.9.2.142-156

Suradika, A., Dewi, H. I., & Nasution, M. I. (2023). Project-Based Learning And Problem-Based Learning Models In Critical And Creative Students. 12(1), 153–167. https://doi.org/10.15294/jpii.v12i1.39713

Tiara, A., Saputri, W., & Wacana, K. S. (2024). Development of claroline based training design for elementary school teachers in composing learning media. XI(1), 114–127. https://doi.org/10.30659/pendas.

Wibowo, S. A., Nuro, F. R. M., & Lestari, D. N. (2024). Project-Based Leraning With Interactive Video Media to Improve Students' HOTS. Jurnal Bidang Pendidikan Dasar, 8(2), 105–113. https://doi.org/http://dx.doi.org/10.21067/jbpd.v8i2.10334

Winarso, A., Siswanto, J., & Roshayanti, F. (2023). Pengembangan Perangkat Pembelajaran pada Materi Interaksi Makhluk Hidup dengan Lingkungan Ditinjau dari Kemampuan Pemecahan Masalah dan Berfikir Kritis Siswa SMP Negeri 2 Moga. 4(1), 16–27.

Winarti, N., Maula, L. H., Amalia, A. R., & Pratiwi, N. L. A. (2022). Penerapan Model Pembelajaran Project Based Learning Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Kelas III Sekolah Dasar. 8(3), 552–563.