

The Effect of Implementing A Project-Based Learning Model on Critical Thinking Skills

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ABSTRACT

Background. 21st-century education demands the enhancement of critical thinking skills to face global challenges and technological advancements. One effective method is project-based learning (PBL), which involves students in complex projects to encourage exploration and real-world application of knowledge. This study aims to determine the effect of PBL on students' critical thinking skills, considering many students still struggle to analyze information critically. With PBL, students are expected to be more active and critical in learning. This research is important for improving the quality of education and serves as a foundation for developing innovative learning strategies.

Purpose. This research was conducted to determine the application of project-based learning to critical skills.

Method. The type of research carried out is Classroom Action Research. This research is more about describing data, facts and conditions in the field using three stages. The data collection techniques used are: tests, observations, interviews and documentation. The data analysis used in this research is qualitative descriptive analysis.

Results. Hasil penelitian ini menunjukkan urutan keterampilan berpikir kritis untuk kelompok MPL setelah pembelajaran, nilai rata-rata yang diperoleh dalam komponen penjelasan adalah dengan skor rata-rata 42,53 dalam kategori kurang. Nilai rata-rata tertinggi diperoleh pada komponen interpretasi dengan nilai rata-rata 52,41. Hal ini menunjukkan bahwa kelompok MPL lebih mampu dalam memahami dan menyatakan makna atau signifikansi dari pengalaman, situasi, data, penilaian, prosedur, atau kriteriats.

Conclusion. Kesimpulan penelitian ini adalah sebagai berikut. Pertama, terdapat perbedaan keterampilan berpikir kritis antara kelompok siswa yang belajar dengan model pembelajaran berbasis proyek dan model pembelajaran langsung. Kedua, terdapat perbedaan signifikan pada variabel model pembelajaran terhadap keterampilan berpikir kritis. Ketiga, terdapat perbedaan signifikan pada variabel model pembelajaran terhadap keterampilan berpikir kritis.

KEYWORDS

Critical Thinking Skills, Learning Model, Project-Based Learning

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INTRODUCTION

Education has a very important role in human life, because with education human abilities and personality can develop. Learning activities are the core of overall educational activities (Alvidrez, 2023). Teachers are a very dominant determining factor in education in general. Reading Skills understanding is a process complex, encompassing intellectual the two main abilities are mastery word meaning and thinking ability about verbal



concepts (Goodson, 2023).

Published research results highlight several key elements in the development of PjBL: Learning Project Design. An effort made by educators and students in learning and teaching activities is called learning. However, the meaning of learning is not limited to that (Dewi, 2023). The project based learning (PBL) learning model plays an important role in the learning process, especially in the 21st century. Politeness in speaking is wrong a study pragmatics and speaking about speaking is also talking regueding pragmatics (Zlatkin-Troitschanskaia, 2020). One of the 21st century skills is learning and innovation skills (Ikhlas dkk., 2023). 21st Century education is characterized by rapid technological developments, so today's learning must be in harmony with existing technology (Yusuf, 2023). One innovative learning model that is considered suitable for developing 21st century skills in students is project-based learning (Khan, 2020).

Education is one of the supporting factors for a person's value in the future, through education various competencies and skills needed in life will be produced (Cintamulya, 2020). Modern education must lead to the demands of 21st century abilities, namely graduates who think critically, communicatively, collaboratively and creatively (Ghadi, 2021). It is a big challenge for students to be able to survive in the era of the industrial revolution 4.0 (Espinosa-Pinos, 2024). Entering the era of industrial revolution 4.0 in the 21st century, all human activities are dominated by high-tech products, as if every human being cannot live without technology (Gupta, 2019). This proves that science and technology are developing very rapidly, so their impacts cannot be avoided but must be faced and mastered. Project-based learning is learning that is process-centered, relatively long-term, problem-focused, meaningful learning units that combine concepts from a number of components, be it knowledge, disciplines or fields (Eggleston, 2019). Project-based learning has enormous potential to train students' thinking processes which lead to students' critical thinking skills. Project-based learning models can improve computational thinking skills (Aliftika, 2021). The fields of science, technology, engineering and mathematics can be determining and driving factors for economic development, education programs and strong protection for a country (Bailey, 2022).

Education aims to develop the potential of students to become human beings who believe and are devoted to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens (Khoiri, 2023). The project-based learning model is learning that prioritizes the development of students' thinking abilities and has a time period for achieving it (Rahim, 2019). Education is currently increasingly developing, various kinds of reforms are being carried out in order to improve the quality and quantity of education (Moghaddas, 2019). Science process skills, critical thinking and self-confidence are life skills that play an important role in everyone's life so they need to be developed from an early age (Chen, 2024). Student competencies which include aspects of attitudes, knowledge and skills are a measure of student development and progress during learning (Atmojo, 2022).

From these opinions, it can be concluded that project based learning is active, innovative and fun learning that uses projects/activities as its goal and ultimately produces real work that can be demonstrated such as reports, essays and completion of written assignments. In thematic learning, the projects carried out by students can be in the form of group projects in the form of reports which are carried out over a certain period of time, then displayed or presented.

RESEARCH METHODOLOGY

The type of research carried out is Classroom Action Research. This research is more about describing data, facts and conditions in the field using three stages (Samala, 2023). The data

collection techniques used are: tests, observations, interviews and documentation. The data analysis used in this research is qualitative descriptive analysis (Satriawan, 2022).

The research instrument used is collecting, interpreting and synthesizing information used to measure learning achievement in terms of knowledge skills, intelligence, personality, ability or talent using tests such as observation, interviews, and using critical thinking skills (Rahmawati, 2022).

RESULT AND DISCUSSION

The results of the descriptive analysis show that the average value of critical thinking skills for students who take part in learning using a project-based learning model is better than those who take part in learning using a direct learning model. This can be seen in Table 1 below.

Table 1. Description The value of critical thinking skills

Statistics	KBK	
	DLS	PBLM
Mean	54,40	62,37
Median	55	60
Mode	55	65
Reach	45	40
Mark	30	45
➤ Min		
Mark	75	85
➤ Maximum		
Deviation	11,67	10,52
➤ Standard		
Variance	136,03	110,65

Based on the data shown in Table 1, two things can be explained, namely first, the average KBK value between the learning model groups is 62.37 with a standard deviation of 11.05 which is in the adequate category for the MPBP group and \bar{x} is 54.40 with a standard deviation of 11.66 which is in the insufficient category for the MPL group.

These results indicate that descriptively the qualifications of the average value of critical thinking skills for the two groups are different. It can be seen that in general the average value of critical thinking skills for the MPBP group is relatively better compared to the MPL group, however, the results of this study show the value of critical thinking skills MPBP and MPL have not yet achieved adequate standards of success (only qualifying quite critically). This is because developing students' critical thinking skills requires quite a long time so that students really master the abilities that correspond to aspects of critical thinking skills (Nurhidayati, 2024).

Based on the critical thinking skills test that has been given, an overview of the average student scores for each component is obtained.

Table 2. Average Value for Each Components of Critical Thinking Skills

No	KBK components	Average Score			
		PBLM	Qualification	DLS	Qualification
1.	Interpretation	67,10	Enough	52,4 1	Enough
2.	Inference	62,40	Enough	48,2 8	Not enough
3.	Explanation	58,20	Enough	42,5 3	Not enough
4.	Evaluation	51,86	Enough	44,8 3	Not enough
5.	Analysis	71,20	Good	47,4 1	Not enough

For the MPBP group after learning, the lowest average score was obtained in the evaluation component with an average score of 51.86 in the poor category. This indicates that the MPBP group has weaknesses in terms of skills in assessing the logical strength of inferential relationships in between statements, questions, concepts or descriptions (Saimon, 2023). Meanwhile the highest average value was obtained in the analysis component with an average value of 71.20 in the good category. This indicates that the MPBP group is more capable of identifying inferential relationships between statements, questions, concepts or descriptions whose aim is to express experiences, reasons for information or opinions (Gupta, 2019). Analytical skills include examining data and detecting arguments

The order of critical thinking skills for the MPL group after learning, the average score obtained in the explanation component was with an average score of 42.53 in the poor category. This shows that the MPL group has weaknesses in terms of the ability to state the results of their reasoning, justify reasoning from a conceptual, methodological and contextual perspective, and present reasoning in the form of strong arguments. The highest average score was obtained in the component interpretation with an average value of 52.41. This indicates that the MPL group is more capable in understanding and expressing the meaning or significance of experiences, situations, data, assessments, procedures or criteria.

This shows that there are differences in learning achievement between groups of students who study with the project-based learning model (MPBP) and the direct learning model (MPL). This is in accordance with theoretical studies which state that the project-based learning model is one of the appropriate innovative learning models. used in learning because it can develop cognitive abilities (Pinto-Llorente, 2022). Because this model involves thinking skills in completing tasks, based on challenging questions/problems, which involves students in designing, solving problems, making decisions, gives students the opportunity to work independently over a certain period and leads to realistic products or presentations. The learning process becomes centered on students and teachers can optimize their roles as facilitators and mediators. Based on the characteristics and stages of the project-based learning model, it appears that the project-based learning model can

guide students to develop all their skills and abilities in the learning process. The learning process becomes student-centered and teachers can optimize their role as facilitators and mediators.

CONCLUSION

Based on the research results and discussion, it can be broken down into three research conclusions which are answers to the three problems raised in this research. These conclusions are as follows. First, there are differences in critical thinking skills between groups of students who study with project-based learning models and direct learning models. Second, there are significant differences in learning model variables on critical thinking skills. Third, there are significant differences in learning model variables on critical thinking skills.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

Author 4: Formal analysis; Methodology; Writing - original draft.

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