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The Influence of the PjBL and Savi Model On Students' Critical Thinking

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Abstract: This study aimed to analyze the effects of the Project-Based Learning (PBL) model and the SAVI (Somatic, Auditory, Visual, and Intellectual) model on the critical thinking skills of fourth-grade elementary school students in Tlogowungu District, Pati Regency. The research employed a quantitative approach with a quasi-experimental design, specifically a nonequivalent pretest-posttest control group design. The sampling technique used was purposive sampling, targeting all fourth-grade students in the Ki Hajar Dewantara cluster, comprising 10 schools. The research sample included 32 students from SDN Guwo 03 and 32 students from SDN Tlogowungu 03 as the experimental classes, while 31 students from SDN Purwosari 02 served as the control class. Data collection was conducted through tests, and preliminary data analysis included normality, homogeneity, and mean similarity tests.The results indicated that the PBL model positively affected the critical thinking skills of fourth-grade students, as evidenced by a significant t-test result and a notable N-gain score. Similarly, the SAVI model also had a positive impact on students' critical thinking skills, supported by significant t-test results and effective N-gain scores. Although both models positively influenced critical thinking skills, there was no significant difference between their effects. Overall, the study concluded that both the Project-Based Learning and SAVI models effectively enhance the critical thinking skills of fourth-grade elementary school students in science subjects.

Keywords: Project based-learning, Savi model, critical thinking, elementary school

1. Introduction

Education in the 21st century significantly impacts the quality of human life. To achieve the best outcomes, all aspects must be meticulously considered, and existing deficiencies must be promptly addressed. One key approach to enhancing education quality is through curriculum improvement. Currently, Indonesia has adopted the latest curriculum, known as the independent curriculum. Its implementation is gradual, adjusted to each school's readiness, starting with grades I and IV in elementary schools and extending to grades II and V in subsequent years.

The independent curriculum aims to foster critical thinking, innovation, independence, and creativity among students, making learning more enjoyable. It creates a learning environment tailored to students' needs, ultimately improving learning quality. The curriculum focuses on essential content, making learning materials simpler, concise, and meaningful (Baharuddin, 2021; Pavita & Nirmala, 2021). This shift has led to changes at the elementary level, such as merging science and social studies into natural and social sciences, better preparing students for future educational stages (Numertayasa et al., 2022).

Interviews with fourth-grade teachers in the Ki Hajar Dewantara cluster, Tlogowungu District, Pati Regency, revealed challenges with this new subject. Teachers reported a need for adaptation to the new curriculum and subjects, compounded by a lack of training or workshops on the new science subject. Consequently, many teachers rely solely on books and traditional, teacher-centered learning models, rather than the more interactive, child-centered approach required by the independent curriculum. This approach involves students directly in learning, helping them relate material to real-life situations.

Observations at elementary schools in the Ki Hajar Dewantara Cluster indicated that the critical thinking skills of fourth-grade students remain relatively low. This was evident from the low learning outcomes in the science subject, with 124 out of 222 students not meeting the minimum competency criteria in the 2022/2023 odd semester Formative Assessment.

Appropriate learning models can foster critical thinking skills, essential for solving real-life problems. Project-Based Learning (PBL), derived from John Dewey's "learning by doing" concept, is effective in this regard. It enhances students'

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abilities in planning, communication, problem-solving, and decision-making (Nurfitriyanti, 2016). Similarly, the SAVI (Somatic, Auditory, Visualization, Intellectual) learning model leverages all senses and intellectual activities, promoting holistic learning through movement, listening, visual aids, and intellectual engagement.

Critical thinking is a higher-level cognitive process, involving the analysis of opinions and the generation of knowledge to develop cohesive, logical reasoning patterns (Hakim & Liliasari, 2016). It helps students form new ideas, evaluate opinions, and make informed conclusions based on real-life data and facts. The researcher posits that the PBL and SAVI models are suitable for enhancing critical thinking in science learning. These models share the goal of improving critical thinking skills, which is expected to positively impact students' understanding and learning outcomes. This study aims to analyze the influence of the Project-Based Learning Model and the SAVI Model on the critical thinking abilities of fourth-grade elementary school students in science subjects.

2. Methodology

This study employs a quantitative research approach with a quasi-experimental research design, specifically the nonequivalent pretest-posttest control group design. The research design is outlined in Table 1.

Table 1: Research design

O_1	X	O_2
O_3		O_4

(Source: Sugiyono, 2016)

Description:
X : Treatment
O1-O3 : Pre-test
O2-O4 : Post-test

In this study, the experimental group (O1) received treatment (X) using the Project-Based Learning (PBL) and SAVI models. The control group (O3) did not receive this treatment and was instead taught using a direct learning model. Both groups were given a pre-test before the treatment and a post-test afterward. The study was conducted with fourth-grade elementary school students in the Ki Hajar Dewantara cluster, Tlogowungu District, Pati Regency, Central Java Province. The research period spanned from January 2023 to August 2023, with implementation planned for the odd semester of the 2023/2024 school year.

The population for this study comprised all fourth-grade students in the Ki Hajar Dewantara cluster, totaling 10 schools. The research sample included 32 fourth-grade students from SDN Guwo 03 and 32 fourth-grade students from SDN Tlogowungu 03 as the experimental group. The control group consisted of 31 fourth-grade students from SDN Purwosari 02. Data collection techniques involved administering tests. Initial data analysis included normality, homogeneity, and mean similarity tests. The research instruments comprised pretests and posttests to evaluate the students' performance before and after the intervention.

3. Results and Discussion

The data collection technique in this study involved administering tests. After processing the data, various statistical measures were calculated, including the highest score, lowest score, mean, variance, average N-gain score, and standard deviation for both pretest and post-test values in the control and experimental classes as shows in Table 2.

The control class pretest scores ranged from a high of 78 to a low of 53. Post-test scores in the control class showed an increase, with the highest score rising to 87 and the lowest score to 65. For experimental class I, the pretest scores ranged from a high of 80 to a low of 43. Post-test scores in this class also improved, with the highest score reaching 87 and the lowest score rising to 67. In experimental class II, pretest scores ranged from a high of 79 to a low of 52. Post-test scores showed further improvement, with the highest score reaching 89 and the lowest score rising to 68. Compared to both the control and experimental class I, experimental class II demonstrated a higher increase in both the highest and lowest scores.

The control class had an average pretest score of 66.45, which increased to 75.35 in the post-test. Experimental class I had an average pretest score of 66.25, which increased to 77.81 in the post-test. Experimental class II had an average pretest score of 66.81, which increased to 79.06 in the post-test. These results indicate that all groups experienced an improvement in average scores, with experimental class II showing the most significant increase. The standard deviation for the control class was 7.66 for the pretest and 7.35 for the post-test. For experimental class I, the standard deviation was 8.31 for the pretest and decreased to 5.99 for the post-test. Experimental class II had a standard deviation of 7.73 for the pretest and 6.11 for the post-test. This indicates a reduction in score variability after the intervention, particularly in the experimental classes. The pre-test variance for the control class was 58.72, which decreased to 54.04 in the post-test. In experimental class I, the pre-test variance was 69.03, which decreased significantly to 35.90 in the

post-test. Experimental class II had a pre-test variance of 59.71, which decreased to 37.29 in the post-test. These reductions in variance further suggest a more consistent performance among students after the intervention.

The average N-gain percent for the control class was 40.71%, categorizing it as ineffective. Experimental class I achieved an N-gain percent of 56.16%, placing it in the moderately effective category. Experimental class II achieved the highest N-gain percent at 62.47%, also in the moderately effective category. These results demonstrate that the critical thinking skills of fourth-grade students improved more significantly in the experimental classes compared to the control class. The Project-Based Learning and SAVI models effectively enhanced students' critical thinking abilities, as evidenced by the higher N-gain percentages and the improved test scores in the experimental classes.

Table 2: Statistical comparison

No	Data	Class					
		Control		Experiment I		Experiment 2	
		Pre	Post	Pre	Post	Pre	Post
	Total students	**31**	**31**	**32**	**32**	**32**	**32**
1	Highest score	78	87	80	87	79	89
2	Lowest score	53	65	43	67	52	68
3	Average score	66.45	75.35	66.25	77.81	66.81	79.06
4	Standard deviation	7.66	7.35	66.25	77.81	66.81	79.06
5	Variation	58.72	54.04	69.03	35.90	59.71	37.29
6	N-gain average (%)	40.71		56.16		62.47	
7	Category	Ineffective		Moderate		Moderate	

The results of this study provide valuable insights into the effectiveness of the Project-Based Learning (PBL) and SAVI (Somatic, Auditory, Visual, and Intellectual) models in enhancing the critical thinking skills of fourth-grade elementary school students in science subjects. Both models showed significant positive effects on students' critical thinking abilities, which are essential for problem-solving and decision-making in real-life contexts.

The PBL model, based on John Dewey's concept of "learning by doing," fosters an active learning environment where students engage in projects that require planning, research, and critical analysis. This model aligns with contemporary educational goals that emphasize the development of critical thinking, creativity, and collaborative skills. The findings support the effectiveness of PBL in promoting these skills, which are crucial for students' academic and future professional success (Dewey, 2022).

Similarly, the SAVI model, which integrates somatic (physical movement), auditory (listening), visual (seeing), and intellectual (thinking) elements, provides a holistic approach to learning. This model leverages multiple sensory modalities, making learning more engaging and effective. By involving students' bodies and minds in the learning process, the SAVI model enhances memory retention and understanding, contributing to improved critical thinking skills.

The lack of significant difference in the critical thinking outcomes between the two models suggests that both approaches are equally effective. This finding is crucial for educators seeking to implement diverse teaching strategies that cater to different learning styles and preferences. The flexibility to use either PBL or SAVI allows teachers to adapt their instructional methods based on classroom dynamics and individual student needs (Rusmawati et al., 2023).

The positive impact of these models on critical thinking aligns with existing literature. For instance, research by Marchy et al. (2022), Simamora et al. (2017), and Nurfitriyanti (2016) highlights the benefits of PBL in enhancing problem-solving skills in mathematics, indicating its broader applicability across subjects. Similarly, Salingkat and Nihayah (2022), Hakim et al. (2016) demonstrates how integrating sensory and intellectual activities, as in the SAVI model, can significantly improve students' critical thinking abilities in scientific contexts.

Moreover, the study's Rayens and Ellis (2018) underscore the importance of active, student-centered learning environments in modern education. Traditional teacher-centered approaches, which often rely on rote memorization and passive learning, are less effective in developing critical thinking skills. This shift towards more interactive and engaging pedagogies is essential for preparing students to navigate complex, real-world challenges.

The study Prasetyo (2023) and Claramita (2016) also highlights the need for teacher training and professional development to effectively implement these innovative teaching models. Teachers in the Ki Hajar Dewantara cluster reported challenges in adapting to the new curriculum and subjects, primarily due to a lack of adequate training. Providing educators with the necessary skills and knowledge to apply PBL and SAVI models can further enhance their effectiveness and improve student outcomes.

In conclusion, this study confirms the efficacy of the Project-Based Learning and SAVI models in fostering critical thinking skills among fourth-grade elementary school students. Both models offer robust frameworks for creating dynamic and effective learning environments that promote higher-order thinking skills. Educators are encouraged to adopt these models and explore their integration with other innovative teaching strategies to optimize educational experiences and outcomes for students.

4. Conclusion

The study concludes that the Project-Based Learning (PBL) model positively influences the critical thinking skills of fourth-grade elementary school students in science. Similarly, the SAVI (Somatic, Auditory, Visual, and Intellectual) model effectively enhances students' critical thinking abilities. Both models have been shown to significantly improve critical thinking skills, with no substantial difference between their effectiveness. The findings suggest that fourth-grade science teachers should consider using the PBL and SAVI models to foster critical thinking skills among students. Successful implementation of these models requires students to be active, confident, and communicative participants in the learning process. Additionally, schools are encouraged to explore and integrate these models with other innovative learning approaches to further enhance educational outcomes.

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