



The Influence of Loose Parts PjBL vs PBL and Learning Motivation on Students' Creative Thinking

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Abstract

This study aims to analyze the influence of learning models and learning motivation on the creative thinking abilities of first-grade elementary school students at Insan Cendekia Elementary School. The method used is an experiment with a 2x2 factorial design, involving 110 students from four randomly selected classes (A, B, C, and D). This study is included in the quasi-experimental category because it uses existing classes as research subjects. Data analysis was carried out using ANOVA with the help of SPSS version 27. Data collection instruments include a creative thinking test and a learning motivation questionnaire. The results showed that the PjBL model using loose parts and the PBL model had a significant influence on students' creative thinking abilities with an F value of 140.523 and a significance level of 0.000 ($p < 0.05$). In addition, learning motivation also had a significant influence on students' creative thinking abilities ($F = 11.151$, $p = 0.001$). The interaction test between learning model and learning motivation showed an F-value of 11.072 with a significance level of 0.001, indicating a significant interaction effect. The conclusion of this study confirms the importance of both factors, specifically learning model and student learning motivation, in encouraging the development of creative thinking skills in early grade students. This finding underscores the need for adjustments to learning strategies by teachers, educational policies, and the development of learning theories that take both into account from the early stages of education.

Keywords: Creative Thinking; Learning Motivation; Loose Parts; PBL; PjBL

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INTRODUCTION

The principals play a crucial role in motivating early childhood education (PAUD) teachers through planned leadership, such as confidence-building meetings and guidance that fosters emotional teacher-child relationships (Sabariah et al., 2024). Unfortunately, creative learning is still limited to drawing and colouring, which only encompass a small portion of creative thinking (Sitorus & Nazaruddin,

2021). Creativity, however, encompasses problem-solving and innovation (Afrilianto et al., 2022). Therefore, play environments should be utilized to foster imagination, not simply imitation (Sulistian et al., 2024). Creative thinking is important to instil from an early age because it impacts intelligence and other skills (Septia, 2021). Lack of creativity development can reduce adaptability and learning motivation. Therefore, it is crucial to encourage creativity through activities that spark curiosity (Fitri et al., 2023; Restu et al., 2023). Teachers play a crucial role in creating an active and enjoyable learning environment (Isnanto, 2022), as well as mastering appropriate methods. The Project-Based Learning (PjBL) model effectively enhances creativity through solving real-life problems (Sabariah et al., 2023; Inayah et al., 2021).

The PJBL model encourages students to solve real-life problems independently and constructively (Pratiwi, 2021). PJBL fosters interest and creativity through active student engagement (Saefullah et al., 2021), although it requires a long time. The combination of PJBL with Problem-Based Learning (PBL) and loose parts media allows for student creative expression (Tunas & Purnama, 2023). The success of this approach requires effective classroom management and teacher guidance (Adchani et al., 2023). At Insan Cendekia Elementary School, the use of loose parts, supported by the rural environment and UNICEF, helps students transform their imaginations into tangible creations (Rahma et al., 2023; Tunas & Purnama, 2023).

Learning in Class 1 of Insan Cendekia still focuses on teacher-centered PBL, resulting in low student participation and learning outcomes (Pratiwi et al., 2021; Subdari et al., 2020). The drill strategy is not optimal in stimulating student creativity (Maulidah & Kamal, 2020). Alternatively, the loose parts-based PjBL model encourages exploration and meaningful learning (Herdianto et al., 2021). Learning motivation is important in enhancing student creativity and perseverance (Hasnawati et al., 2019; Utami et al., 2019). Teachers need to understand the role of motivation in order to create a learning environment that encourages active and independent students (Fitriani et al., 2020; Lestari, 2019).

Observations and interviews in Class 1 of Insan Cendekia revealed low motivation and learning outcomes in Indonesian, with 40% of students scoring below the Minimum Competency (KKM) of 72 and motivation reaching only 70% (Dewanti, 2021). This is influenced by teacher-centered learning methods such as lectures and question-and-answer sessions, which make students passive and less collaborative. Motivation plays a crucial role in clarifying learning objectives and increasing persistence. Students who recognize the benefits of learning are more focused, while those with low motivation tend to be easily distracted and lose interest (Yanti et al., 2021).

Previous research has shown that the PjBL model is effective in improving mathematical problem-solving skills (Afrilianto et al., 2020; Solihah et al., 2023), critical thinking (Fatimah et al., 2023), and social studies learning outcomes with the help of Quizizz (Dewanti, 2021). The use of loose parts-based PjBL has also been shown to increase student creativity and development (Azzahra et al., 2023), as well as STEAM literacy (Hastuti & Mulyono, 2023). This media helps with letter recognition (Diana et al., 2022), develops mathematical and HOTS skills (Kabu, 2021), and empowers critical thinking (Fatimah et al., 2023; Azzahra, et al., 2023; Karmana et al., 2020). Blended PBL-GI learning (Azizah & Aloysius, 2023) and conventional PBL (Mahali, 2024; Hamid et al., 2021) also show positive results.

Previous studies have shown the effectiveness of the PjBL model and the use of loose parts media in improving students' creativity, problem-solving, and critical thinking. However, the research to be conducted by the researcher has a specific focus on the effect of the combination of the loose parts-based PjBL model, the PBL model, and learning motivation on the creative thinking of first-grade students at Insan Cendekia Elementary School. Although there are similarities in the use of PjBL and loose parts as learning media, this study is different because it examines the interaction between learning models and learning motivation that has not been widely studied before. Therefore, this study is worthy of being carried out and is not a plagiarism of previous research.

This study aims to determine the effect of the loose parts-based PjBL and PBL models on the creative thinking abilities of first-grade students at Insan Cendekia, as well as the role of learning motivation (high and low) in these abilities. In addition, this study examines the interaction between

learning models and learning motivation in enhancing student creativity. Theoretically, this study enriches the understanding of how both learning models and learning motivation interact to maximize the creative thinking abilities of early grade students. Practically, these findings serve as guidelines for teachers in selecting effective and enjoyable learning strategies, while also helping students cultivate creativity from meaningful and contextual learning experiences. In addition, this study provides a basis for the government and policymakers to formulate educational policies that support innovative learning approaches, so that students can be more active, motivated, and able to produce meaningful creative work.

RESEARCH METHODS

Research Design

This study used a 2 x 2 factorial design with two-way analysis of variance (Two-Way ANOVA) to test the effect of learning strategies and learning motivation levels on student creativity. The independent variables were the learning model which cover PjBL based on loose parts and PBL and learning motivation. The dependent variable was student creativity as measured through a test with indicators of memory, understanding, application, and analysis.

Research Subject

The population consisted of 110 first-grade students at Insan Cendekia Elementary School, divided into four classes. Two classes used the loose parts-based PjBL model, while the other two used PBL. Sampling was conducted using cluster random sampling technique, whereby all students in the selected classes were included in the sample, resulting in a total of 110 students.

Research Instrument

The research instrument consists of two main components, which are a creativity test and a learning motivation questionnaire. The creativity test is composed of 25 multiple-choice items designed to measure participants' memory, comprehension, application, and analytical skills. In addition, the learning motivation questionnaire applies a Likert scale with closed-ended questions, ranging from a score of 1 (strongly disagree) to a score of 5 (strongly agree). The construction of this instrument was systematically developed based on a blueprint to ensure consistency with the intended measurement objectives.

Table 1. Research instruments

No	Aspect	Statement
1	Smoothness	I easily generate a lot of ideas when given a problem.
2	Smoothness	I can name many different ways to complete a task.
3	Smoothness	I often think of many alternative solutions when facing a problem.
4	Smoothness	I am able to come up with ideas quickly without thinking too much.
5	Smoothness	I have no trouble finding multiple answers to a question.
6	Authenticity	I often give different ideas from my friends.
7	Authenticity	My ideas are usually unique and rarely found by others.
8	Authenticity	I like trying new ways that have never been done before.
9	Authenticity	I dare to propose unusual and creative solutions.
10	Authenticity	I believe my idea can bring something new and different.
11	Details	I am able to explain my ideas in great detail.
12	Details	I always add important details to make my ideas easy to understand.
13	Details	I can describe my ideas completely and clearly.
14	Details	I often add examples that clarify my ideas.
15	Details	I am able to develop basic ideas into more complex ideas.
16	Flexibility	I am able to see problems from many different perspectives.

No	Aspect	Statement
17	Flexibility	I can provide several different solutions to one problem.
18	Flexibility	I easily move from one idea to another different idea.
19	Flexibility	I enjoy trying different approaches to solving problems.
20	Flexibility	I am open to new ideas and ready to change my way of thinking.
21	Smoothness	I am able to continue to generate new ideas even though the previous ideas are not perfect.
22	Authenticity	I like looking for previously unheard-of ways to complete a task.
23	Details	I pay attention to small details in developing my ideas.
24	Flexibility	I adapt easily to changing ideas in discussion groups.
25	Smoothness	I can generate a lot of relevant answers in a short time.

Data Collection Techniques

Data were collected using a learning motivation test and questionnaire. Before use, the instrument was piloted to ensure validity and reliability. Content validity was examined by checking the items' conformity to the grid, while reliability was measured using the KR-20 formula. The treatment duration in this study lasted eight weeks, with a frequency of twice a week, each session lasting 90 minutes, applied consistently across the four classes of research subjects. The PjBL model, learning begins with identifying a problem or project topic, followed by planning and collecting learning resources individually and in groups, including the use of loose parts as a medium for creative exploration. Students develop ideas, complete the project in stages, then present the results and conduct reflections with the teacher and peers. Meanwhile, in the PBL model, learning begins with the presentation of a challenging real problem, followed by problem identification, information collection, solution development through group discussions, with the teacher as a facilitator until the solution is implemented and evaluated.

Data Analysis Technique

Data were analyzed using a two-way ANOVA to examine the effects of learning strategies and learning motivation on students' creativity. Prior to conducting the analysis, the Kolmogorov–Smirnov test for normality and Levene's test for homogeneity were performed with the assistance of SPSS version 27. Data validity was ensured through intensive observation and peer review processes.

RESULTS AND DISCUSSION

Results

The Research Result section presents the overall findings obtained from the implementation of the experimental design conducted in this study. The results are systematically organized to demonstrate the rigor of the analysis and to ensure that the conclusions drawn are based on valid and reliable data. To maintain the credibility of the findings, the analysis began with the validation and reliability testing of the research instrument used to measure students' learning motivation. Following this stage, both descriptive and inferential statistical analyses were performed, including normality and homogeneity tests, to confirm that the data met the required assumptions for further hypothesis testing. The subsequent hypothesis testing then aimed to determine the significance of the intervention's effect on students' motivation, thereby providing empirical evidence of the model's effectiveness in enhancing the learning outcomes.

Instrument validity and reliability test motivation study

The accuracy of the instrument directly determines the credibility of the data obtained, making this stage a crucial foundation for the entire study. Therefore, a series of validity and reliability tests were performed to verify that each item consistently reflected the intended motivational construct and could be

confidently used for further statistical analysis. According to the data obtained in this study, the results of the validity test Motivation Learning as seen in Table 2.

Table 2. Results of the learning motivation validity test

Item	R Count	R Table (5%)	Criteria
I easily generate a lot of ideas when given a problem.	0.740	0.158	Valid
I can name many different ways to complete a task.	0.529	0.158	Valid
I often think of many alternative solutions when facing a problem.	0.638	0.158	Valid
I am able to come up with ideas quickly without thinking too much.	0.534	0.158	Valid
I have no trouble finding multiple answers to a question.	0.656	0.158	Valid
I often give different ideas from my friends.	0.410	0.158	Valid
My ideas are usually unique and rarely found by others.	0.604	0.158	Valid
I like trying new ways that have never been done before.	0.541	0.158	Valid
I dare to propose unusual and creative solutions.	0.187	0.158	Valid
I believe my idea can bring something new and different.	0.656	0.158	Valid
I am able to explain my ideas in great detail.	0.740	0.158	Valid
I always add important details to make my ideas easy to understand.	0.529	0.158	Valid
I can describe my ideas completely and clearly.	0.638	0.158	Valid
I often add examples that clarify my ideas.	0.534	0.158	Valid
I am able to develop basic ideas into more complex ideas.	0.656	0.158	Valid
I am able to see problems from many different perspectives.	0.410	0.158	Valid
I can provide several different solutions to one problem.	0.604	0.158	Valid
I easily move from one idea to another different idea.	0.541	0.158	Valid
I enjoy trying different approaches to solving problems.	0.187	0.158	Valid
I am open to new ideas and ready to change my way of thinking.	0.656	0.158	Valid
I am able to continue to generate new ideas even though the previous ideas are not perfect.	0.740	0.158	Valid
I like looking for previously unheard-of ways to complete a task.	0.529	0.158	Valid
I pay attention to small details in developing my ideas.	0.638	0.158	Valid
I adapt easily to changing ideas in discussion groups.	0.534	0.158	Valid
I can generate a lot of relevant answers in a short time.	0.656	0.158	Valid

Based on the comparison between the calculated R value and the R table value, it can be concluded that all the questions for the learning motivation variable are valid. Thus, from the results of the validity test Motivation The study conducted resulted in the conclusion that the results were valid. Reliability test Motivation The results of the research conducted using the SPSS 27 program can be seen in Table 3.

Table 3 Results of learning motivation reliability testing

Reliability Statistics	Value
Cronbach's Alpha Part 1	.856
Cronbach's Alpha Part 2	.838
Total N of Items	
Correlation Between Forms	.962
Spearman-Brown Coefficient	
- Equal Length	.981
- Unequal Length	.981
Guttman Split-Half Coefficient	.980

Based on the results of reliability testing with the SPSS 27 program, the alpha coefficient value is known to be 0.980. Thus, the calculated alpha value is greater than the R table, R value or $0.980 > 0.158$, meaning that the instrument Motivation Learning is stated to be reliable and can be used as a data collection tool. Overall, the descriptive statistical data regarding the learning method, Motivation Learning and learning outcomes can be seen in the following Table 4.

Table 4 Descriptive statistics

Dependent variable: creative thinking				
Method	Motivation to learn	Mean	Standard Deviation	N
Loose Parts Based PjBL	Tall	70.1852	6.77119	27
	Low	76.1071	5.34263	28
	Total	73.2000	6.72860	55
PBL	Tall	62.6111	1.91400	18
	Low	62.6216	1.89079	37
	Total	62.6182	1.88061	55
Total	Tall	67.1556	6.52602	45
	Low	68.4308	7.70343	65
	Total	67.9091	7.24100	110

Statistical data from SPSS 27 calculations on 110 students showed significant differences between learning methods, learning motivation, and learning outcomes. The Loose Parts-Based PjBL model produced an average learning score of 73.20 with a standard deviation of 6.73, higher than the PBL model which had an average of 62.62 and a standard deviation of 1.88. In the PjBL class, the number of students with high learning motivation was 27 people and low 28 people, while in the PBL class, only 18 students had high learning motivation and 37 students had low learning motivation. In total, there were 45 students with high learning motivation, while those with low learning motivation reached 65 students. Based on the research results, it can be concluded that the Loose Parts-Based PjBL Model produces better and more equitable learning outcomes than the PBL Model, with an average value of 73.20 and a standard deviation of 6.73 in PjBL, and an average of 62.62 with a standard deviation of 1.88 in PBL. Learning motivation is also higher in the PjBL class (27 students with high motivation, 28 with low) compared to PBL (18 with high, 37 with low), indicating that PjBL is more effective in increasing student motivation. In addition, students with high learning motivation (N = 45) show better creative thinking skills than those with low motivation (N = 65), confirming the importance of motivation in supporting creativity. Overall, the implementation of both models can be optimized as needed to develop students' creative thinking to the maximum.

Normality Test

Normality test of the distribution of data on the learning outcome test scores of the group of students given PjBL Model Based on Loose Parts and the test scores of the learning outcomes of the group of students who were given PBL using the print out results *One-Sample Kolmogorov-Smirnov Test*. The calculation results using SPSS 27 obtained a summary as in the following Table 5.

Table 5 One-sample kolmogorov-smirnov test

N	110
Normal Parameters (a, b)	
– Mean	.0000000
– Standard Deviation	7.36640993
Most Extreme Differences	
– Absolute	.098
– Positive	.068
– Negative	-.061
Test Statistics	.068
Asymp. Sig. (2-tailed) (c)	.200 (d)
Monte Carlo Sig. (2-tailed) (e)	
– Sig.	.236
– 99% Confidence Interval	
Lower Bound	.225
Upper Bound	.247

The calculation results using the SPSS program above obtained below the overall value of Asymp. Sig. (2-tailed) $> \alpha$ (0.05) which is 0.0247 > 0.05 , then H_a is accepted. So, the sample is normally distributed.

Homogeneity test

The homogeneity test or the test of equality of two variances aims to determine whether the two data are homogeneous or not by comparing the two variances. The homogeneity test is carried out on the distribution of data from both groups, namely the experimental group and the control group simultaneously, the aim is to determine whether the variance of the data from both groups is homogeneous or not. The test used is the homogeneity of variance test. The homogeneity test is carried out by analyzing the Test of Homogeneity of Variance through the SPSS 27 program. The homogeneous requirement is if the probability (Sig) > 0.05 and if the probability (Sig) < 0.05 then the data is not homogeneous. Results of the Homogeneity Test Against Creative Thinking of 1st Grade Students of Insan Cendekia Elementary School briefly presented in Table 6.

Table 6 Homogeneity test

	Levene Statistics	df1	df2	Sig.
Creativity				
Based on Mean	.643	1	108	.425
Based on Median	.379	1	108	.540
Based on Median and with adjusted df	.379	1	102.914	.540
Based on trimmed mean	.659	1	108	.419

Based on Table 6 it is known that the data on Creative Thinking of 1st Grade Students of Insan Cendekia Elementary School has a p of 0.425 > 0.05 so that the data has the same variance or is homogeneous.

Hypothesis testing

This research hypothesis was tested using a two-way analysis of variance. The researcher used SPSS 27 to perform the two-way analysis of variance test calculations. In SPSS 27, the hypothesis test is obtained from the results of Tests of Between-Subjects Effects. The printout provides detailed results for Hypotheses 1, 2, and 3. A summary of these calculation results is presented in the following Table 7.

Table 7 Summary of two-way analysis of variance calculation results tests of between-subjects' effects

Dependent variable: creative thinking					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3561.358a	3	1187.119	58.426	<.001
Intercept	474628.243	1	474628.243	23359.716	<.001
Method	2855.182	1	2855.182	140.523	<.001
Motivation to learn	226.571	1	226.571	11.151	.001
* Learning Motivation Method	224.968	1	224.968	11.072	.001
Error	2153.733	106	20.318		
Total	512996.000	110			
Corrected Total	5715.091	109			

Data analysis to test the first hypothesis shows that the null hypothesis (H_0), which states there is no significant difference in the creative thinking of 1st grade students of Insan Cendekia Elementary School between the use of the Loose Parts-Based PjBL Model and PBL, is tested against the alternative hypothesis (H_a) which states there is a significant difference. The calculation results using SPSS 27 show a significance level value of 0.001, which is smaller than 0.05. Thus, H_0 is rejected and H_a is accepted, which means there is a significant influence of the use of both learning models on the creative thinking of 1st grade students of Insan Cendekia Elementary School.

The second hypothesis test was conducted to determine whether there was a significant difference in creative thinking between first-grade students of Insan Cendekia Elementary School who had high learning motivation and those who had low learning motivation. The null hypothesis (H_0) stated that there was no significant difference, while the alternative hypothesis (H_a) stated that there was a significant difference. Based on the results of SPSS 27 calculations, the significance value obtained was 0.001, less than 0.05. Therefore, H_0 was rejected and H_a was accepted, which means there was a significant influence of learning motivation on creative thinking of first-grade students of Insan Cendekia Elementary School between the high and low motivation groups.

The third hypothesis test aims to determine whether there is a significant interaction between the use of Loose Parts-Based PjBL Model and PBL with learning motivation towards creative thinking of grade 1 students of Insan Cendekia Elementary School. The null hypothesis (H_0) states that there is no significant interaction, while the alternative hypothesis (H_a) states that there is a significant interaction. Based on the calculation results using SPSS 27, a significance value of 0.001 is obtained, which is smaller than 0.05. Therefore, H_0 is rejected and H_a is accepted, which means there is a significant interaction between learning methods and learning motivation towards creative thinking of grade 1 students of Insan Cendekia Elementary School.

Discussions

The findings indicate that integrating PjBL and PBL models, supported by loose parts materials, effectively stimulates students' engagement and enhances their creative thinking processes. This combination allows learners to explore real-world problems through hands-on experimentation, reflection, and collaboration, thereby fostering divergent thinking and innovation. The use of loose parts materials provides flexibility and openness in learning activities, encouraging students to construct, deconstruct, and reconstruct ideas in various forms that support the development of creativity.

Influence PjBL model based on loose parts and PBL to students' creative thinking.

Based on statistical analysis conducted using SPSS version 27 software with the Test of Between-Subjects Effects, the F value was obtained at 140.523 with a significance level of 0.000 ($p < 0.05$). This finding indicates a significant influence between the Loose Parts-Based PjBL Model and PBL on the creative thinking abilities of first-grade students of Insan Cendekia Elementary School. The rejection of the null hypothesis (H_0) and the acceptance of the alternative hypothesis (H_a) indicate that both learning models have a significant effect in developing students' creativity. These results indicate that the application of these two learning models not only influences creative thinking, but also produces significant differences in influence patterns, as evidenced by the high F value, so that each model makes a different contribution to students' creative development.

The Loose Parts-Based PjBL model provides a more flexible learning approach and allows students to explore and experiment freely using unstructured, open-ended materials. This approach stimulates students' imagination and creativity in innovative problem-solving, thus greatly supporting the development of creative thinking. In contrast, PBL has a more directed learning structure, where students are given specific problems to solve systematically. Although PBL can also stimulate creativity, its focus is more on solving pre-defined problems, so the space for free exploration is more limited. Thus, Loose Parts-Based PjBL provides greater opportunities for students to develop creative ideas and solutions independently.

The difference in the influence of these two learning models is supported by the results of statistical analysis that showed a very low significance value (0.000), which confirms that Loose Parts-Based PjBL is more effective in developing students' creative thinking than PBL. PjBL provides broad freedom of exploration and encourages students to find various creative solutions using various materials that they can manipulate. In contrast, PBL, although effective in developing critical and analytical thinking skills, its influence on creativity tends to be more limited because the learning is more structured and focused on solving specific problems. Therefore, selecting the right learning model is very important in facilitating the optimal development of student creativity (Solihah et al., 2023; Susbiyanto et al., 2019).

The findings of this study are consistent with previous studies, such as those conducted by Mulyono & Agustin, (2020), who emphasized that the implementation of Project-Based Learning can enhance student creativity through open-ended projects that provide freedom in developing ideas. Furthermore, Patience (2023) found that the use of loose parts in elementary learning enhances student creativity by providing full control over the exploration and solution creation process. Meanwhile, Ulfah & Okyranida (2021) showed that although PBL can develop critical thinking skills, its influence on creativity is more limited compared to models that allow free experimentation such as Loose Parts-Based PjBL. Thus, Loose Parts-Based PjBL is proven to be superior in supporting the development of creativity of first-grade students at Insan Cendekia Elementary School.

The influence of learning motivation on students' creative thinking

Based on the results of statistical analysis using SPSS version 27 with the test of between-subjects' effects, the F value was obtained at 11.151 with a significance level of 0.001 ($p < 0.05$). This finding indicates a significant influence between high learning motivation and low learning motivation on the creative thinking abilities of first-grade students at Insan Cendekia Elementary School. The rejection of the null hypothesis (H_0) and the acceptance of the alternative hypothesis (H_a) indicate that learning motivation plays an important role in determining the level of student creativity. This confirms that the variable of learning motivation not only influences student participation in the learning process but also contributes

significantly to the development of creative thinking abilities, which is an important aspect in the cognitive development of early childhood.

Further analysis revealed that students with high learning motivation tend to demonstrate superior creative thinking skills compared to those with low learning motivation. Intensively motivated students are more active in completing assignments, boldly put forward new ideas, and are able to find various alternative solutions to problems. High learning motivation facilitates open-mindedness and innovation, allowing students to explore various possibilities in the learning process. Conversely, students with low learning motivation tend to be less actively engaged, which impacts their ability to think creatively and critically. This lack of interest has the potential to hinder students' overall cognitive potential.

The results of this study align with educational theory, which emphasizes the importance of motivation as an internal factor influencing the learning process and the development of creativity. High learning motivation provides a strong impetus for students to actively participate and develop creative ideas independently. Conversely, low learning motivation can lead to a passive attitude, thus hindering exploration and innovation in thinking. Therefore, learning motivation plays a role not only as a driver of participation but also as a key factor in optimizing the creative thinking process. Therefore, efforts to increase learning motivation are crucial in learning strategies oriented towards developing student creativity.

This finding is supported by previous research, such as that of Putra et al. (2021), who found that intrinsic motivation significantly contributes to students' creative thinking abilities. Their research showed that students with high motivation tend to be better at developing creativity compared to students with low motivation. A study by Uyun & Diana (2023) also confirmed that high learning motivation is positively correlated with increased student creativity, especially motivation derived from internal interests and desires. Furthermore, Mulyani & Subandi (2020) emphasized that motivation plays a crucial role in encouraging creative exploration and experimentation. Based on these findings, educators need to create a learning environment that can increase student motivation so that creative thinking can develop optimally, positively impacting overall learning outcomes.

Interaction between learning models and learning motivation on students' creative thinking

Based on the results of data analysis using SPSS software version 27 through the test of influence between subjects (Test of Between-Subjects Effects), the F statistic value obtained was 11.072 with a significance of 0.001, which is smaller than the significance level of 0.05. This finding indicates a significant influence between the learning model and learning motivation on the creative thinking abilities of grade 1 students of Insan Cendekia Elementary School. The rejection of the null hypothesis (H_0) and the acceptance of the alternative hypothesis (H_a) confirms that there is a meaningful interaction between the two variables in influencing students' creative thinking. This emphasizes the importance of considering both factors simultaneously in the learning process to achieve optimal results in developing students' creativity.

Furthermore, the analysis results show that the PjBL and PBL models have different but significant impacts on students' creative thinking. Both models provide a conducive learning environment for the development of creativity, albeit with different approaches; PjBL is more exploratory and provides ample space for students to develop creative ideas, while PBL focuses more on systematic problem-solving. In addition, high learning motivation plays an important role in encouraging active student participation, courage in expressing ideas, and initiative in finding creative solutions. Conversely, students with low learning motivation tend to be less active and less initiative in developing their creative thinking skills even though they are given the same learning model.

The interaction between learning models and learning motivation is an important novelty and a major contribution of this study. The results of the analysis indicate that the influence of learning models on students' creative thinking abilities does not stand alone, but is strongly influenced by the students' level of learning motivation. In other words, the effectiveness of learning models such as PjBL or PBL will be maximized if students have high learning motivation. Students with high learning motivation are more active, enthusiastic, and able to utilize these learning models to develop their creativity optimally.

Conversely, if students' learning motivation is low, then even if the learning model applied is good, students' creative thinking abilities tend to be limited or not develop optimally. Therefore, this study emphasizes the importance of considering these two factors simultaneously, so that the applied learning strategies can be adjusted to students' motivation levels to produce more effective and comprehensive creativity development. This is a significant theoretical and practical contribution to the world of education, particularly in the development of adaptive learning models and student motivation.

This research is supported by the results of a study by Dewanti (2021), which examined the interaction between learning models and motivation on student creativity. They found that constructive learning models such as PjBL and PBL were more effective in enhancing creative thinking in students with high learning motivation. High learning motivation strengthens the positive influence of active and PBL models on creative thinking skills. Furthermore, Azizah & Aloysius (2023) stated that active learning models are more successful in encouraging the development of creative thinking in students with high intrinsic motivation. These findings confirm that learning motivation is a key factor that can strengthen or limit learning outcomes, particularly in the aspect of creativity. Students with high learning motivation tend to be able to explore their creative potential more optimally in the context of active learning.

Azzahra et al. (2024) research confirms that learning motivation and learning models not only directly influence student creativity, but their interaction is a crucial factor in developing creative thinking skills. Students with high motivation who participate in PjBL or PBL are able to develop creativity more optimally than students with low motivation. Thus, exploratory learning models such as PjBL and PBL effectively enhance creativity when accompanied by high learning motivation. Therefore, an optimal learning process must simultaneously consider the learning model and student motivation levels to achieve active engagement and creative outcomes. Theoretically, this research enriches educational science, particularly regarding the effectiveness of Loose Parts-Based PjBL and PBL in developing creativity. Practically, the results provide guidance for educators, schools, and parents in creating a learning environment that supports the optimal development of student creativity.

CONCLUSION

Based on the results of research on first-grade students of Insan Cendekia Elementary School regarding the influence of Loose PjBL and PBL models on creative thinking skills, several main points can be concluded. First, the Loose Parts-Based PjBL Model proved to be more effective in improving student creativity than PBL. This shows that a project-based learning approach with varied and contextual media can stimulate creative thinking more optimally. Second, student learning motivation has a significant influence on the development of creativity, where students with high motivation show better creative thinking skills than students with low motivation. Third, the main novelty of this study is the discovery of a significant interaction between learning models and learning motivation, which shows that the effectiveness of learning models is greatly influenced by the level of student motivation. In other words, the combination of an appropriate learning model and high learning motivation is key to maximizing the development of student creativity. The practical implications of these findings encourage educators to implement the Loose Parts-Based PjBL Model more and develop strategies to increase student learning motivation. Schools and parents are also expected to provide support in the form of facilities and an environment conducive to creative learning. This research provides a theoretical contribution in strengthening the understanding of the dynamic relationship between learning methods and motivation, and opens up opportunities for further research to explore more deeply the influence of these factors on student creativity.

Although this study provides important findings regarding the influence of Loose Parts-Based PjBL and PBL models on the creativity of first-grade students at Insan Cendekia Elementary School, several limitations exist. The sample size, which was drawn from only one school and one class, limits the generalizability of the results. The short duration of the learning process also does not guarantee long-term effectiveness. Furthermore, the instruments used to measure creativity and learning motivation have

limitations in capturing these aspects comprehensively. Other factors such as environmental support and teacher characteristics have not been examined, so further research is needed to broaden the scope and validity of the findings.

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