



The Effect of Plasticine Play-Based Intervention on Creativity Development in 5-6 Year-Old Children: A Quasi-Experimental Study

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ABSTRACT

Creativity is a fundamental ability that needs to be developed from early childhood because it plays an important role in supporting intelligence and problem-solving skills. However, the reality in the field shows that the creativity of children in group B1 of Idhata Kindergarten Palu City is still relatively low. This study aims to analyze the effect of playing with plasticine on improving children's creativity. The study used a quantitative approach with a quasi-experimental one-group pretest-posttest design. All 15 children in group B1 (9 boys and 6 girls) were the research subjects. Data collection techniques included observation, interviews, and documentation. The data were analyzed descriptively and inferentially using the t-test. The results showed a significant increase in children's creativity after being given the plasticine playing treatment. Before the treatment, the percentage of children in the Very Well Developed category was 0%, Developing category according to expectations 7%, Starting to Develop 77.7%, and Not Developed 15.3%. After the treatment, there was an increase with percentages of Very Well Developed 38%, Developing category according to expectations 51%, Starting to Develop 11%, and Not Developed 0%. The t-test results showed a calculated t value of 15.250 with a significance of 0.001 (<0.05). These findings confirm that playing with plasticine has a positive effect on children's creativity. The implications of this study emphasize the importance of using plasticine play media as a strategy for stimulating creativity in early childhood education institutions.

INTRODUCTION

Playfulness and creativity are essential elements in early childhood development, contributing significantly to cognitive, motor, social, and emotional growth. Creativity is defined as an individual's ability to generate new perspectives, approaches, or breakthroughs in addressing and resolving a situation or problem (Durrotunnisa, 2023; Durrotunnisa et al., 2022). Creative play allows children to explore, make judgments, solve issues, and use symbolic thinking, all of which are necessary components of creativity. Recent empirical studies emphasize that play-based interventions are highly effective in fostering these skills. For instance, a study by Ghanamah (2025) revealed that playful behaviors are positively linked to creative expression and self-regulation among kindergarteners (Ghanamah, 2025). Similarly,

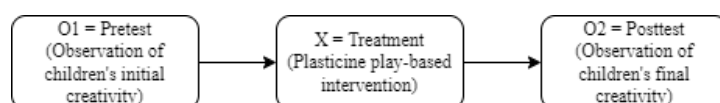
Cordero et al. (2026) demonstrated that structured, play-based interventions significantly enhance children's narrative creativity and cognitive flexibility in educational settings (Cordero et al., 2026). In the context of specific play media, the use of playdough or plasticine has been proven to effectively improve fine motor skills and support independent learning in early childhood (Wijaya et al., 2024).

Despite these established benefits, previous research has predominantly focused on general play activities (Ghanamah, 2025), cognitive flexibility games (Cordero et al., 2026), or the impact of plasticine strictly on fine motor development (Wijaya et al., 2024). There remains a significant gap in empirical literature specifically examining the direct effect of plasticine play interventions on the broader dimensions of creativity (fluency, originality, and flexibility) among 5-6 year-old children in a quasi-experimental setting. Preliminary observations at Idhata Kindergarten, Palu City, confirm this practical gap; children's creativity is still under-stimulated, as evidenced by their difficulty in combining simple forms into structured works and a lack of variation when playing. Children also struggle to solve simple problems independently and are unable to fluently answer simple questions, often relying directly on teacher assistance.

To address this specific gap, this study offers a novelty by utilizing a targeted plasticine play-based intervention to simultaneously stimulate three core aspects of creativity (fluency, originality, and flexibility) in a specific demographic of 5-6 year-old children. Therefore, the specific objectives of this study are: (1) to measure the initial level of children's creativity before the treatment, (2) to implement the plasticine play intervention in group B1 of Idhata Kindergarten, Palu City, and (3) to critically analyze the significant effect of playing with plasticine on the enhancement of children's creativity.

METHODS

A quantitative approach with a quasi-experimental research type through a one-group pretest-posttest design was used in this study (Arikunto, 2019). This design evaluates the effect of playing with plasticine on early childhood creativity by comparing the conditions before and after the treatment. The research design scheme is formulated as follows:



The research was conducted in Group B1 of Idhata Kindergarten, Palu City. The research subjects were 15 children (9 boys and 6 girls), selected using the total sampling technique. The research period lasted for four weeks, including a pretest, two treatment sessions (90 minutes each), and a posttest.

Data collection techniques included observation, interviews, and documentation. The primary research instrument was an observation sheet equipped with a specific assessment rubric to measure three core aspects of creativity:

1. Fluency (the ability to answer simple questions): Scored as Very Well Developed (BSB) if answering >2 questions, Developing According to Expectations (BSH) for 2

questions, Starting to Develop (MB) for 1 question, and Not Yet Developing (BB) for 0 questions.

2. Originality (creating works based on ideas or concepts from materials that have been provided): Scored as BSB if creating >2 original works, BSH for 2 works, MB for 1 work, and BB for 0 works.
3. Flexibility (the ability to solve simple problems): Scored as BSB if children explore and solve problems independently with creative alternatives, BSH if trying alternatives with minimal direction, MB if needing continuous assistance, and BB if unable to try solving the problem.

Data analysis was carried out in two stages. First, descriptive analysis was used to calculate the percentage and average scores of children's creativity before and after the treatment. Second, inferential statistical analysis was conducted to test the hypothesis using the Paired Sample t-test via IBM SPSS 25 software. Before the t-test, a prerequisite normality test was performed using the Shapiro-Wilk method, which is appropriate for a sample size of less than 50. The hypothesis criteria state that if the significance value is < 0.05 , H_0 is rejected and H_1 is accepted, indicating a significant effect of playing with plasticine on children's creativity.

RESULT

This research was conducted in four Sunday with details : week First implementation *pretest*, week second and third implementation *treatment* (treatment) play plasticine), and week fourth implementation *posttest*. From the results data observations obtained in the field before the use of plasticine media, has presented in the table under here, there are 3 aspects observed creativity as following.

Table 1. Summary of Observation Results Ability Children's Creativity Before Treatment

Category	Fluency Aspect	Originality Aspect	Flexibility Aspect	Average %
BSB	0%	0%	0%	0%
BSH	7%	7%	7%	7%
MB	73%	80%	80%	77.7%
BB	20%	13%	13%	15.3%

Based on the results of observations before being given treatment in the form of playing with plasticine, the level of creativity of children in Group B1 of Idhata Kindergarten, Palu City was still relatively low. This can be seen from the three aspects of creativity observed, namely fluency, originality, and flexibility, most of which were in the Beginning to Develop (MB) category. The percentage of the fluency aspect in the MB category reached 73%, while the originality and flexibility aspects were each 80%. In addition, there were still children who were in the Not Yet Developing (BB) category, namely 20% in the fluency aspect and 13% in the originality and flexibility aspects. Meanwhile, the Developing According to Expectations (BSH) category only reached 7% in all aspects and no children had yet reached the Very Well Developing (BSB) category. These data indicate that children's creativity before the use of plasticine media still requires further stimulation and development so that children's abilities in creative thinking can develop optimally

Table 2. Summary of Observation Results Ability Children's Creativity After Treatment

Category	Fluency Aspect	Originality Aspect	Flexibility Aspect	Average %
BSB	60%	27%	27%	38%
BSH	33%	60%	60%	51%
MB	7%	13%	13%	11%
BB	0%	0%	0%	0%

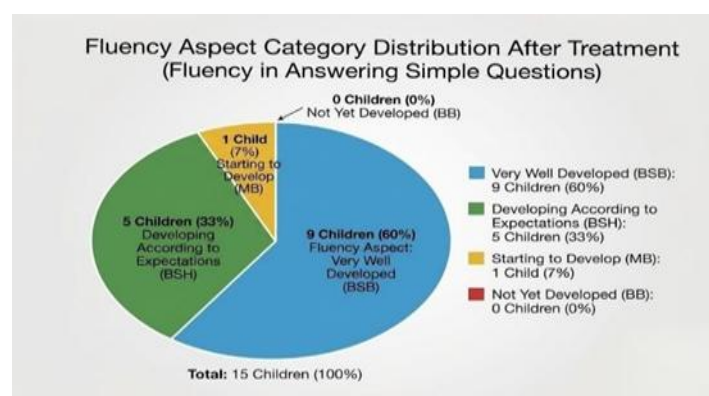
Based on the descriptive analysis from Table 1 and Table 2, there was a substantial improvement in children's creativity following the plasticine play-based intervention. Before the treatment, the majority of the children were in the Starting to Develop/MB (77.7%) and Not Yet Developing/BB (15.3%) categories, with only 7% Developing According to Expectations/BSH and 0% Very Well Developed/BSB. After the treatment, the creativity levels shifted significantly: 38% of the children reached the Very Well Developed category, 51% were Developing According to Expectations, 11% were Starting to Develop, and 0% remained in the Not Yet Developing category.

Table 3. Test Of Normality

	Shapiro-Wilk Statistic	Df	Sig.
Before Treatment	,850	15	,018
After Treatment	,914	15	,158

Based on Table 3, results of the normality test (test of normality) can known mark df For before and after treatment is 15, then That It means insufficient data sample of 50. Use Shapiro-Wilk technique detects normality in study this, can it is said Already right. Then from table above also, it is known mark significance For activity before treatment of 0.18 and the sig value for activity after given treatment 0.158. Because the value is sig for second treatment is >0.05 then can concluded that the result data study before and after treatment normally distributed.

DISCUSSION

**Figure 1.** Fluency Aspect Category Distribution After Treatment

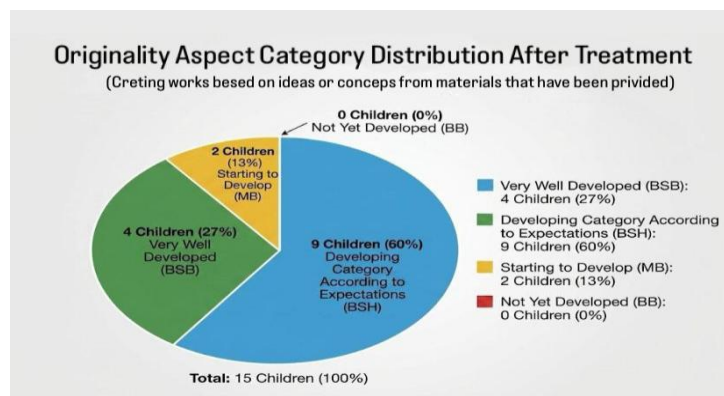


Figure 2. Originality Aspect Category Distribution After Treatment

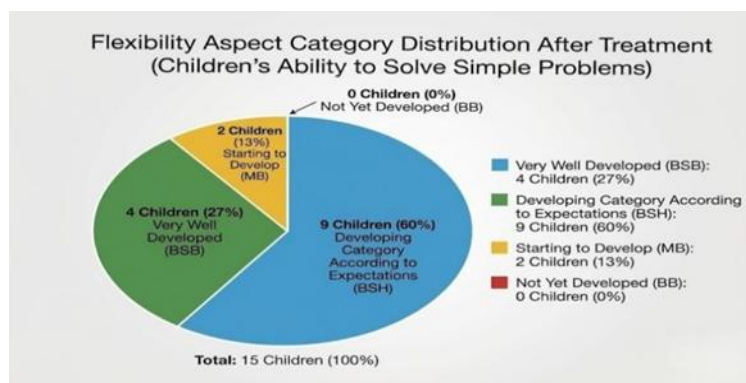


Figure 3. Flexibility Aspect Category Distribution After Treatment

The present study demonstrates that a plasticine play-based intervention significantly enhances the creativity of 5-6 year-old children, specifically in the core aspects of fluency, originality, and flexibility. These findings align with and expand upon a robust body of recent empirical literature emphasizing the critical role of play and tactile materials in early childhood creativity development.

Consistent with our results, recent studies confirm that play-based interventions, including Project-Based Learning (PBL), are powerful catalysts for creative and cognitive flexibility, as well as gross and fine motor skills in educational settings (Cordero et al., 2026; Ghanamah, 2025; Muji et al., 2025). Specifically, manipulating open-ended and tangible materials like playdough or plasticine has been proven to significantly improve fine motor skills, which serve as a foundational mechanism for broader creative expression (Wijaya et al., 2024; Yarim et al., 2026). The intrinsic link between fine motor coordination and cognitive outcomes is further corroborated by research showing that structured motor activities and tactile arts optimize selective attention and problem-solving capabilities in early childhood (Frikha & Saad Alharbi, 2023; Polsley et al., 2022; Shorouk et al., 2025).

Our findings regarding the improvement of divergent thinking—such as fluency and originality—are supported by Cankaya et al. (2023), who highlighted that "loose parts" and malleable play objects foster cognitive development by allowing multiple, unstructured uses. Similarly, (Willemsen et al. (2024) and Khorkova et al. (2025) found that integrating creative problem-solving tasks and movement-based methods into the curriculum significantly boosts both motor and cognitive creativity. The physical, hands-on manipulation inherent in plasticine play also mirrors the cognitive benefits derived from tangibly programmable educational tools

and STEAM models, which actively engage children's "learning by doing" to enhance hands-on performance and creativity (Sapounidis et al., 2025). Furthermore, the environmental and social context of play plays a mediating role; as noted by (Sicim Sevim, 2025), environmental supportiveness acts as a crucial antecedent for children's creative thinking processes. The role of supportive environments, whether in the classroom or through home creativity support, is vital for nurturing these lifelong skills (Hsiao et al., 2025; Verger et al., 2024).

Theoretical and Practical Implications

Theoretically, this study enriches the literature on early childhood development by providing empirical evidence that specific, tactile interventions (plasticine) bridge the gap between fine motor manipulation and divergent cognitive processes (fluency, originality, and flexibility). Practically, these findings offer actionable insights for kindergarten teachers and curriculum designers. Educators should transcend traditional 2D paper-and-pencil tasks and intentionally integrate 3D, open-ended materials like plasticine or project-based learning activities into daily learning routines to stimulate independent problem-solving and creative thinking.

Limitations and Recommendations for Future Research

Despite the significant findings, this study has several limitations. First, the research utilized a one-group pretest-posttest quasi-experimental design without a control group, which limits causal generalizations. Second, the sample size was relatively small (15 children) and restricted to a single kindergarten. Finally, the intervention period was brief (four weeks). Therefore, future research should employ randomized controlled trials (RCTs) with larger and more diverse sample sizes, incorporate control groups, and extend the intervention duration. Additionally, future studies could compare the efficacy of plasticine play with other open-ended media (e.g., loose parts or digital tangible tools) to determine the most effective strategies for fostering early childhood creativity.

CONCLUSION

Based on the results of the study on the effect of playing with plasticine on children's creativity in Group B1 of Idhata Kindergarten, Palu City, it can be concluded that plasticine play activities significantly improved children's creativity through the stages of preparation, implementation, and assessment. Improvements were observed in fluency, originality, and flexibility. Before treatment, most children were in the "starting to develop" (77.7%) and "not yet developing" (15.3%) categories. After treatment, creativity increased, with 38% categorized as "developing very well" and 51% as "developing as expected," while no children remained in the "not yet developing" category. The hypothesis test using the t-test showed a calculated t-value of 15.250 with a significance level of 0.001 ($p < 0.05$), indicating that H_0 was rejected and H_1 was accepted. Therefore, playing with plasticine had a highly significant effect on improving children's creativity. Practically, these findings imply that kindergarten teachers and curriculum developers should actively incorporate 3D tactile media like plasticine into regular learning activities to stimulate divergent thinking and independent problem-solving. For future research, it is recommended to conduct studies comparing the efficacy of

plasticine with other play-based media (such as loose parts or digital educational tools) and testing its impact across different early childhood age groups.

DECLARATIONS

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