

# Enhancing Fine Motor Skills and Fostering Creativity in Children through Plasticine-Based Activities

Nur Iffah<sup>1</sup>, Choirun Nisak Aulina<sup>2</sup>

<sup>1</sup> Universitas PGRI, Jombang, Indonesia; nur91iffah@gmail.com

<sup>2</sup> Universitas Muhammadiyah Sidoarjo, Indonesia; lina@umsida.ac.id

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## ABSTRACT

Some children have difficulty developing their creativity and motor skills. Children with fine motor problems may find it difficult to express their creativity. To overcome these problems, the play method using plasticine is one of the alternative solutions. Therefore, this study aims to explore the effect of plasticine play activities on improving fine motor skills and creativity in kindergarten-aged children. This study used a quantitative approach with the quasi-experiment type with a one-group pretest-posttest research design. This study only involved the experimental group. Data collection in this study used questionnaires in the form of fine motor skills instruments and creative thinking skills in children. This study involved children aged 5-6 years in group B as many as 60 students, who were then selected using a purposive sampling technique. In this study, the data were analyzed using a t-test of paired samples. The results showed that there was a significant increase in fine motor skills and creative thinking ability in children after being given treatment using the Plasticine-Based Activities method. This is evidenced by the significance value of  $0.001 < 0.05$ . However, in this study, it is recommended that kindergarten educators and parents integrate plasticine play activities in the curriculum and daily activities of children. Additional support in the form of training for educators is also needed to maximize the benefits of using plasticine in developing children's skills.

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## Corresponding Author:

Nur Iffah

Universitas PGRI Jombang ; nur91iffah@gmail.com

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## 1. INTRODUCTION

Creativity is an innate potential present in children from birth, but it requires proper education and nurturing from the environment to fully develop (Al-Munawar & Rupaida, 2020). Research by Roslianti et al. (2022) highlights the positive impact of creativity on children's development. Creative children tend to excel in various areas, including critical thinking (75%), problem-solving (60%), self-confidence (50%), motor skills (50%), language proficiency (40%), and social skills (30%). These figures suggest that creative children are more adaptable and better equipped to solve problems (Ernst & Burcak, 2019). Therefore, it is crucial for educators and parents to encourage creativity in young children through activities that foster imagination and creative expression. Without opportunities for creative expression, kindergarten-aged children may face developmental challenges (Muslimah et al., 2020).

Umah & Rakimahwati (2021) explains that kindergarten-age children who lack imagination experience low self-confidence, while less creative children face difficulties in critical thinking and problem solving (Iffah, 2021). Lacking creative children also show weaknesses in gross and fine motor skills, which can have a negative impact on their development (Iffah, 2018). One of the factors causing the lack of creativity is the dominance of learning activities by the teacher, which can make children passive in the learning process. The long-term consequences can be a decrease in motivation to learn and reduced problem-solving abilities and independence (Windasari et al., 2016). As a result, early childhood education ought to foster the development and growth of children's creative skills. Teachers can encourage children's creativity by providing a variety of materials and instruments, encouragement of self-expression, and praise and support of their work (Kustiawan et al., 2021).

Vygotsky's theory highlights the important role of adults in stimulating children's creativity (Sa'ida, 2023). Adults can be mediators who introduce new concepts, give hints, and provide support as children develop creative skills. Creative activities such as drawing, coloring, and handwork involve precise hand movements (Carbajal & Baranauskas, 2020). According to Rahimah (2021), children's fine-motor skills can be enhanced through engaging in creative activities that consist of a variety of tasks requiring excellent coordination of the fingers and hands. According to Rahimah (2021), Milind and Amrita Sonje state that children's fine-motor skills can be optimally developed through engaging in creative activities, such as painting. Thus, the exercise of children's fine-motor skills might support the growth of their creative skills.

The World Health Organization (2018) found that good fine motor development during childhood has a positive impact on children's cognitive capacities and interpersonal competencies (Suwardi, 2021). Fine motor skills comprise the abilities to engage in activities such as sketching, cutting, and shaping objects. The development of fine motor skills in children facilitates the development of children's creativity, enabling them to effectively articulate their ideas and imagination. Therefore, the development of a child's fine-motor skills has an impact not only on the maturation of their small muscles but also on their psychological growth (Sanenek et al., 2023). Parents and educators should prioritize developing of fine-motor skills during childhood in order to reduce potential delays in fine motor development.

According to the American Academy of Pediatrics (2020), fine motor disorders affect approximately 10-15% of children in their early childhood. The challenges in motor development impede the educational process, leading to a range of consequences, including sluggish writing and diminished motivation to learn. Additionally, the child's personality is impacted, showing feelings of inferiority, reluctance, and frequent anxiety when confronting the surroundings (Harsismanto et al., 2021). (Nugroho et al., 2021) suggests that Piaget's theory of children's fine motor development follows their cognitive development. Thus, parents, caregivers, and educators must encourage children to play, move, and participate in various physical activities to foster motor development. This ability is related to children's creativity due to high fine-motor skills that allow them to draw and create (Zakaria et al., 2021).

Kamaruddin et al. (2023) discovered that many media, including plasticine play, may increase children's creativity and fine motor skills. By playing with plasticine, children can stimulate their creativity without limits and develop their fine motor skills by rolling, pinching and shaping the plasticine (Sofiah & Katoningsih, 2023). Playing with plasticine is a beneficial learning activity that encourages the development of children's creativity and fine motor skills, while also offering various other advantages for child development (Isnaini & Katoningsih, 2022).

Playing with plasticine allows children to create, interact and learn in a fun and memorable way. Children's imagination and creativity are stimulated by plasticine, which also helps children develop fine motor skills by rolling and shaping the plasticine (Laelina, 2023). However, there are some drawbacks, such as the possibility of sticking plasticine, which is difficult to clean, plasticine getting dirty, and the risk of children consuming plasticine that is harmful to health. Children who play with plasticine have greater mental flexibility. Through this exercise, they can design, build and change concepts and shapes, which are important skills for the development of creativity.

Several studies have supported the link between plasticine use and children's fine motor development. For example, research by Case-Smith and O'Brien (2015) identified significant

improvements in children's fine motor skills after they engaged in plasticine play (Seo, 2018). However, plasticine can only be used as part of an OT intervention, and cannot be a substitute for an occupational therapist, nor can plasticine be tailored to a child's individual needs.

The combined approach of developing children's fine motor skills and creativity using plasticine play activities creates opportunities for children to learn while playing, making the learning process more interesting and effective (Sutapa et al., 2021). In this way, this research can provide valuable insights into how to best enhance children's fine motor skills and creativity through a plasticine play approach that can be adapted for various educational contexts. This study examines the positive effects of plasticine play in improving creativity and fine motor skills in early childhood. This study aims to investigate the changes in children's creativity and fine motor skills after participating in plasticine play activities. This research is expected to provide insight into the effectiveness of plasticine play in enhancing comprehensive early childhood development.

## 2. METHODS

### 2.1 Research Design

This study employs a quantitative experimental design. The pre-experimental one-group pretest-posttest design was utilized in this study to investigate the temporary effects of plasticine activities on increasing children's fine motor skills and creativity through Plasticine-Based Activities. The focus of this study is limited to one group of subjects, namely children, and allows them to observe changes before and after the intervention without the need for a control group.

**Table 1.** Research procedure

Pretest	Treatment	Posttest
T1	X	T2

Note:

T1: Pretest before being given treatment

X: Treatments provided through Plasticine-Based Activities

T2: Posttest after treatment

### 2.2 Data Collection Technique

The research data comprised quantitative information regarding fine motor skills and creativity, presented in the form of observation documents. The primary sources of data consist of the juvenile participants who engaged in activities utilizing plasticine. Additional data may come from literature related to child development, previous research, and literature on art education. The population in this study is 30 kindergarten-aged children involved in plasticine-based activities. The sample will be selected using a purposive sampling technique, taking into account the children's varied ages and backgrounds. In the purposive sampling technique, participants are selected based on characteristics that are considered important for the study, such as age, gender, and level of previous experience in plasticine activities.

### 2.3 Data Collection Instruments

Data was collected using observation sheets. The instruments used were: 1) Children's fine motor skills instruments with eye coordination dimensions of 3 items, manipulative skills dimensions of 5 items, cutting dimensions of 2 items, dimensions of using tools of 3 items, dimensions of controlling fine movements of 2 items, 2) Creativity instruments with fluent thinking dimensions are 2 items, flexible thinking dimensions are 3 items, elaborative thinking dimensions are 5 items, original thinking dimensions are 3 items, and redefinition dimensions are 2 items.

## 2.4 Data Analysis Techniques

This study employed paired samples t-test to evaluate the data and assess the impact of plasticine play activities on the enhancement of children's fine motor skills and creativity. In this context, two groups were compared: a group that participated in the plasticine activity program and a control group that was not involved in the activity to determine which method was most effective in improving children's fine motor skills and creativity.

## 3. FINDINGS AND DISCUSSION

This study involved conducting data analysis using both descriptive and statistical methods. Descriptive data analysis is described in Table 2 and 3.

### 3.1 Descriptive Analysis

**Table 2.** Descriptive Analysis of Creative Thinking Dimensions

Dimensions of Creative Thinking	Pretest		Posttest		Gain
	Mean	Stdev	Mean	Stdev	Mean
Fluency	2.51	0.780	4.21	0.883	1.700
Flexible Thinking (Flexibility)	2.28	0.684	3.98	0.691	1.700
Elaborative thinking (Elaboration)	2.17	0.588	3.53	0.499	1.360
Originality	2.32	0.692	4.09	0.707	1.770
Redefinition	2.11	0.596	2.74	0.515	0.630
Creative Thinking Overall	2.278	0.668	3.71	0.659	1.432

The findings regarding data exposure, as presented in Table 2, indicate that the Creative Thinking variable experienced an increase in value. This is evident from the increase in the mean pretest score from 2.278 to 3.71. Students' levels of creative thinking increased by 1.432 points following their participation in the Plasticine Play Method. According to these findings, students' creative thinking increases significantly as a consequence of their participation in learning using the plasticine play method.

**Table 3.** Descriptive Analysis of Fine Motor Skill Dimensions

Dimensions of Fine Motor Skills	Pretest		Posttest		Gain
	Mean	Stdev	Mean	Stdev	Mean
Eye-Hand Coordination	3.19	0.882	4.27	0.783	1.08
Manipulative Skills	2.29	0.786	3.88	0.687	1.59
Cutting	2.89	0.690	3.93	0.591	1.04
Using Tools	3.09	0.794	4.11	0.695	1.02
Controlling fine movements	2.76	0.698	3.74	0.599	0.98
Fine Motor Skills Overall	2.844	0.77	3.986	0.671	1.142

The findings regarding data exposure, as presented in Table 3, indicate that the Fine Motor variable experienced an increase in value. This is evident from the increase in the mean pretest score from 2.844 to 3.986. Students' levels of creative thinking increased by 1.142 points following their participation in the Plasticine Play Method. According to these findings, students' fine motor skills increase significantly as a consequence of their participation in learning using the plasticine play method.

### 3.2 Hypothesis Test

This study tested creative thinking characteristics with children's fine motor skills using paired sample t tests. The creative thinking variable is explained in Table 5, while the fine motor skills of children are explained in Table 4.

**Table 4** Hypothesis Test of Creative Thinking Dimension

Dimensions of Creative Thinking	t-count	t-table	sig	Description
Fluency	2.729	2.000	0.000	Significant
Flexible Thinking (Flexibility)	2.731	2.000	0.000	Significant
Elaborative thinking (Elaboration)	2.389	2.000	0.012	Significant
Originality	2.799	2.000	0.000	Significant
Redefinition	1.659	2.000	0.208	Not Significant
Creative Thinking Overall	2.461	2.000	0.001	Significant

The paired sample t test indicates that the overall dimension of the Creative Thinking variable has a t-count value of  $2.461 > 2.000$  and a significance value of  $0.001 < 0.05$ , as shown in Table 5. This discovery indicates that students' creative thinking increases significantly following their participation in learning using the plasticine play method.

**Table 5** Hypothesis Test of Fine Motor Skill Dimension

Dimensions of Fine Motor Skills	t-count	t-table	sig	Description
Eye-Hand Coordination	2.341	2.000	0.019	Significant
Manipulative Skills	2.851	2.000	0.000	Significant
Cutting	2.301	2.000	0.011	Significant
Using Tools	2.281	2.000	0.000	Significant
Controlling fine movements	2.241	2.000	0.029	Significant
Fine Motor Overall	2.403	2.000	0.001	Significant

The paired sample t-test indicates that the overall dimension of the Fine Motor Skills variable has a t-count value of  $2.403 > 2.000$  and a significance value of  $0.001 < 0.05$ , as shown in Table 6. This discovery indicates that students' creative thinking increases significantly following their participation in learning using the plasticine play method.

### Discussion

#### Fostering Creativity in Children through Plasticine-Based Activities

This study's findings indicate that children's creativity increased significantly when did plasticine-based activities. The paired sample t test reveals a substantial increase in the overall dimension of the creative thinking variable, as indicated by a t-count value of  $2.461 > 2.000$  and a significance value of  $0.001 < 0.05$ . In addition, in the dimension of creative thinking, the average pretest results were 2.278 and the average posttest results were 3.71. Therefore, in the dimension of creative thinking, there was an increase of 1.432. Research conducted by Maisarah et al., (2020) shows that although early childhood creativity can be improved through the use of the plasticine clay play method, there are still some questions about the sustainability of this improvement in the long term. Although the development of the percentage of learning completeness showed a significant increase from cycle to cycle, there is a need to evaluate whether this improvement is temporary or sustainable. In addition, there is a different

opinion from research conducted by Anggraini & Yuwono (2022) which suggests that although art activities, including playdough, can improve early childhood creativity, their effectiveness may vary depending on factors such as the child's background and the learning context. The findings presented by Sartika & Cahyo (2023), meanwhile, highlight the potential of playdough to foster children's creativity, but further research is needed to understand its long-term effects on children's development. In this context, although playdough can be considered as an effective tool in stimulating children's creativity, further research needs to be done to understand more deeply its impact and how its implementation can be optimized for maximum results.

Plasticine gives children the opportunity to develop their creative and adaptive abilities in a variety of situations. During plasticine play, children must plan and execute their creative ideas, evaluate the results, and possibly enrich their work with additional elements. This activity allows them to learn with a procedural approach, along with effective learning strategies. In a study by Laelina, (2023), it was found that the use of creative activities such as plasticine play can enhance children's creativity in a learning context. The results showed that children who engaged in creative activities had better adaptability to various learning situations. Therefore, plasticine play can be regarded as an effective approach for fostering the development of children's creativity.

### **Enhancing Fine Motor Skills in Children through Plasticine-Based Activities**

This study's findings indicate that children's fine motor skills increased significantly when did plasticine-based activities. The paired sample t test reveals a substantial increase in the overall dimension of the creative thinking variable, as indicated by a t-count value of  $2.403 > 2.000$  and a significance value of  $0.001 < 0.05$ . In addition, in the dimension of fine motor skills the average pretest result was 2.844 and the average posttest result was 3.986, therefore in the dimension of fine motor skill there was an increase of 1.142. According to a study conducted by Sutapa et al. (2021), playing with plasticine has been found to enhance the fine-motor skills of children between the ages of 4 and 5. This is evident from the rise in scores on the observation sheet utilized as a tool for data gathering. Furthermore, the utilization of the classroom action technique (PTK) in this research also demonstrated efficacy in enhancing children's fine-motor skills (Iffah, 2018). The descriptive statistical analysis revealed a notable enhancement in children's fine motor skills subsequent to their engagement in plasticine play activities. Other studies have also shown the effectiveness of plasticine-based activities in improving children's fine motor skills. Andayani & Wijayanti, (2022) and Al Anwari et al., (2021) found that plasticine play activities significantly improved children's fine motor skills, with Andayani noting improvements in eye-hand coordination and hand smoothness (Tadoranggi et al., 2022) further supported these findings, reporting a 90% improvement in children's fine motor skills through plasticine play. These studies together emphasize the potential of plasticine-based activities in enhancing the development of fine motor skills in children. Therefore, it is advisable to increase the utilization of learning techniques that incorporate physical activities, such as engaging in plasticine play, in early childhood education to enhance their dexterity.

The effects of enhancing fine motor skills and promoting creativity in children through plasticine-based activities has been found to be significant. The results showed a consistent improvement in children's fine motor skills after participating in plasticine-based activities on a regular basis. In addition, the study also proved that the activity stimulated the development of children's creativity, as shown by their increased ability to produce more diverse and original artwork. These findings provide strong scientific support for the importance of integrating plasticine activities in children's learning approaches, not only as a means of entertainment, but also as an effective strategy to improve fine motor skills and develop their creative potential holistically.

#### 4. CONCLUSION

Overall, this study suggests that regular usage of plasticine-based activities can benefit children's development, particularly in terms of developing fine motor skills and sparking creativity. This is proved by a significant increase in Creativity in Children through Plasticine-Based Activities, as measured by a paired sample t-test with a t-count value of  $2.461 > 2.000$  and a significance value of  $0.001 < 0.05$ , and a significant increase in fine motor skills, as measured by a paired sample t-test with a t-count value of  $2.403 > 2.000$  and a significance value of  $0.001 < 0.05$ . The results proved that the children involved in this activity showed improved ability in controlling fine movements, such as rolling, shaping, and smoothing plasticine. In addition, they also showed improvement in their creative expression through more varied and unique artworks. The implications of this study can be used as a basis for the development of more effective and holistic educational programs, which pay attention not only to the cognitive but also the motor and creative aspects of child development. However, this study also underscores the need for further research to explore additional variables that may influence outcomes, such as environmental factors and individual differences in response to plasticine activities. Therefore, recommendations for future research include a deeper understanding of the environmental context in which children grow up, as well as more detailed research to understand the role of individual factors in determining the extent of effectiveness of plasticine-based activities in each child.

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