Original Article

The Effect of Molding the Plasticine on Creativity in Early Childhood

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Objective: To examine the effect of molding the plasticine on creativity in early childhood by comparing creativity scores before and after the plasticine molding activity program of the control and experiment groups.

Materials and Methods: This study was a quasi-experimental research. The sample was 16 kindergarten students aged 4 to 5 years old from a private school in Bangkok. Participants were divided into a control and experiment group. There were 8 participants in each group. Participants in the experiment group attended 16 sessions of plasticine molding activity whereas the control group participated in normal activities. Each session lasted 20 minutes. The Test of Creative Thinking-Drawing Production [TCT-DP] was used to measure creativity of participants of both groups before and after taking part in this research. Descriptive statistics including frequency, percentage, median, range (min, max) were yielded. Wilcoxon Signed Ranks Tests and Mann-Whitney U Test were analyzed.

Results: There was no significant differences in creativity scores between the two groups before taking part in the program (U = 0.11, p = 0.92). In the experiment group, pre-test overall creativity score did not statistically differ from the post-test score (U = -0.95, p = 0.34). Although not statistically significant, the post-test of the experiment group was slightly higher than the pre-test score whilst the post-test score in the control group was lower than the pre-test score.

Keywords: Molding the plasticine, Creativity, Early childhood

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Childhood is signified by a wide learning period. Knowledge, skills, and abilities are dramatically developed during this period of life. About 50% of intellectual function development occurs during the first four years of life and increased by 80% by the age of six[1]. Children are more likely to live happily and properly adjusted to society, if they have adequate and proper physical and psychological development.

The National Education Act BE 1999, Section 24 stated that schools are required to train their students to have thinking skills which consist of creative thinking, reflective thinking, and critical thinking[2]. It is believed that creativity is an indicator of human qualification. An ability to think, act, and to solve problems are essential keys for creative thinking.

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Creativity exists in every human being. The human has the potential to develop and improve their creativity[3]. Creativity is an important life skill that reflects patterns of thinking, decisions making, and problem-solving. According to Torrance[4], creativity or creative thinking could lead to the discovery of new things which could be beneficial in life. Creative individuals are those who are able to adapt their ideas base on their experiences to solve problems and do so in creative ways.

Many psychologists studied creativity, and the results agreed that creativity can be trained and practiced, especially during childhood. Pre-school children, or children in their first six years of life, usually have high creativity and willingness to learn new things. Thus, it is essential to develop creativity during childhood.

Creativity can be enhanced by many means, such as art and painting, recreational activities, games, experiential activities, as well as plasticine molding activity; an activity that enables children to think

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creatively is a solid foundation for creativity development in children[5]. The main principle of promoting creativity is by allowing children to develop creative thinking skills and to seek answers independently[6].

Molding is one of the activities that helps promote creativity in an artistic way. Molding or sculpting is a three-dimension art that established the relationship between shape, space, and touch. It is an enjoyable activity that also encourages artistic expression in children[7].

Moreover, molding activity supports physical development as it helps to strengthen hands and eyes muscle[8]. It also promotes emotional development as it allowed children to express their emotion through the acts of using hands and instruments such as a hammer[9].

Plasticine molding was chosen as a tool for creativity development in this study. This study aimed to investigate whether plasticine molding had effects on creativity in children. Results from the present study would provide beneficial information to parents, teachers, as well as researchers.

Material and Method

Participants

This study employed a quasi-experiment method. The sample was recruited from a private school in Bangkok. The sample size was calculated by a statistics formula.

$$n = \frac{2\sigma^2 (Z_\beta + Z_{\alpha/2})^2}{d^2}$$

Which use of the information from the study of the effects of origami training can it have on creativity and visual-motor integration in pre-school children?

Experimental mean = 29.88, control mean = 17.88, difference = 12

Standard deviation 1 = 5.87, Standard deviation 2 = 2.23

Participants were 16 kindergarten students in a private school in Bangkok aged 4 to 5 years old. They were equally divided into experiment and control groups. Hence, there were 8 participants in each group.

Instruments

The test of creative thinking-drawing production [TCT-DP]

The TCT-DC developed by of Jellen and Urban[11]. It measured 6 categories of creativity which are Originality, Fluency, Flexibility, and Elaboration. The test consisted of drawing tasks. Participants were provided with six figural fragments and asked to complete them. Characteristics of the figural tasks were a different design, geometric and non-geometric, round and straight, singular and compositional, broken and unbroken, within and outside a given frame, placed irregularly in the space provided, and incomplete. Participants were given 15 minutes to complete the tasks. Their drawing was then scored by two testers.

Plasticine molding activity program

This program was developed by the researcher. It was comprised of 16 sessions of molding plasticine activities. Each session's duration was approximately 20 minutes. The program content was validated by five experts including a child psychologist, kindergarten teacher, pediatrician, plasticine molding teacher, and a university professor in Art Education and Early Childhood. The program focused on practice fluency, flexibility, elaboration, and original thinking.

Behavior observation

Participants' behaviors during the plasticine molding activities were observed and recorded in a record form by their parents and teacher.

Procedure

The participants' creativity score was taken before and after their participation in the program. Before the children's afternoon nap, the participants in the control group took part in normal activities whilst those in the experiment group attended plasticine molding activities.

Data analysis

The data were analyzed using PASW 18.0 (SPSS Inc., Chicago, Illinois, US). Demographic data were presented using descriptive statistics. Mann-Whitney U test was employed to test the difference in score between two groups. Wilcoxon's signed-rank test was used to compare pre- and post-test score in the same group.

Ethical consideration

This study was conducted with the approval of the Siriraj Institutional Review Board [SIRB], Faculty of Medicine, Siriraj Hospital, Mahidol University; ISB No. 801/2557 (EC4).

Results

Preliminary analysis revealed that there was

Table 1. Comparison of creativity score between groups

	Mean ± SD		*p*-value
	Experimental (n = 8)	Control (n = 8)	
Fluency			
Pre	1.25±1.28	2.25±1.16	0.47
Post	2.25±1.49	2.75±1.17	
p-value	0.004	0.920	
Flexibility			
Pre	2.75±2.96	0.13±0.35	0.20
Post	2.25±4.46	0.13±0.35	
p-value	0.047	0.920	
Elaboration			
Pre	12.25±9.33	9.15±6.13	0.43
Post	12.25±8.45	9.25±6.02	
p-value	0.736	0.798	
Originality			
Pre	3.38±2.50	2.69±2.13	0.11
Post	3.38±1.77	2.13±1.13	
p-value	0.264	0.299	
Total			
Pre	19.63±0.47	19.13±8.44	0.26
Post	20.13±12.09	14.25±7.44	
p-value	0.340	0.921	

no statistical difference in creativity scores between the two groups prior to their participation in the program ($U = 0.11$, $p = 0.92$). In the experiment group, pre-test overall creativity score was not statistically different from the post-test score ($U = -0.95$, $p = 0.34$). However, the post-test score was slightly higher than the pre-test score as shown in Table 1.

Although the overall score was not statistically different, Fluency and Flexibility scores at post-test were significantly different from pre-test. At post-test measurement, Fluency was higher ($Z = -2.86$, $p = 0.004$) while Flexibility was lower ($Z = -0.199$, $p = 0.047$) than pre-testing as illustrated in Table 1.

Discussion

Creativity scores before and after the program were not statistically different but the average creativity scores after the treatment program were higher than before taking part in the program. This can also be seen from behavior observation. It was observed that participants in the experiment group tended to express their opinions verbally rather than through artworks. Although this was a desirable behavior, it was difficult to measure by the instruments used in the present study.

The Office of the National Education[2] suggested that an appropriate amount of time for activity for children ranges from 12 to 20 minutes. Each session in the program in this study was approximately 20 minutes. It was possible that some participants were distracted during the session. The activity pattern itself might have affected the non-significant result.

Although the activities intended to develop creativity but some activities were more challenging for children in this age group.

Chainarong Jaroenpanochkul[12] mentioned suitable activities for promoting creativity; the activities included drawing, coloring, printing, molding, and crafting as well as molding. Molding stimulated muscle use in different ways than that used in drawing or coloring skills. Molding required more muscle use and concentration. This can be seen from results of a study conducted by Pakakan Noiniam (2013)[13] which found that participants aged 4 to 5 years old who took part in clay molding activity showed more use of small muscle. On the other hand, this might affect the non-significant result. The development of children's muscles at this age were not fully developed. Thus, even though the children could use their hands to pull, tear, and cut plasticine into simple forms but still struggled to create more complicated shapes.

However, there were some limitations due to the nature of the program as a group-based activity. Some participants may not have felt comfortable sharing their ideas in a group setting, and they could copy other participants instead of creating an original idea. Although the plasticine molding activity made a difference in the creativity score of the experimental group, it yielded no statistical significance. It did promote creativity development and may have helped to improve or sustain creativity skills in comparison to not being stimulated by the activity.

However, the sample in this study was relatively small, further research should be considered using a larger sample size. Also, the researcher may create a program with easier activities, shorter time period per session, or perform research with children in an older age group.

Conclusion

This study examined the effects of plasticine molding activity on the creativity of kindergarten pupils aged 5 to 6 years old. The results revealed non-significant differences between creativity score before and after participation in the program. However, the mean score after taking part was slightly higher while the post-test score of the control group was lower. Along with the participants' behaviors observed during the sessions, it could be said that plasticine molding program in this research facilitated creativity improvement.

Recommendation

Further research should create the shorter and easier Plasticine molding activity program in this age group, or use this program in older children. To encourage children to participate, the researcher should have given some reward such as snacks or star stickers during activity. In addition, further research should emphasize molding activities rather than drawing.

What is already known on this topic?

Creativity could be trained. Plasticine molding is one of the activities that facilitates creativity development since it encourages expression in forms of shape, space, and touch.

What this study adds?

Attending a creativity promotion activity might increase creativity while participating in ordinary activity might lessen creativity.

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Potential conflicts of interest

None.

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