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THE EFFECT OF COOKING ROLE PLAY ON FINE MOTOR DEVELOPMENT OF 3-4 YEAR-OLD CHILDREN

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Abstract

This study examines the effect of cooking role-play on the fine motor development of 3-4-year-old children in non-formal educational institutions. The urgency of this research is based on the fact that fine motor development is a crucial aspect in supporting independence, coordination, and readiness to learn in early childhood. However, in practice, activities that stimulate fine motor skills are still minimal, as most learning is based on worksheets that lack hands-on and exploratory experiences. Therefore, engaging, interactive, and age-appropriate learning strategies are needed. The main objective of this study was to determine the condition of children's fine motor skills before and after being treated through a cooking role-play, and to analyze its effect on improving these skills. This research is expected to provide an empirical overview of the effectiveness of this method as an innovative approach to improving fine motor skills. The targeted results of this study include: first, revealing the initial conditions and increasing fine motor skills of children after participating in the activity; second, finding a significant influence of cooking role play on improving fine motor skills of early childhood; and third, practical recommendations in the development of innovative game-based learning that can be utilized by educators and PAUD institutions to improve the quality of motor stimulation in early childhood. Thus, this study is expected to be a reference in enriching fun and educational learning methods, as well as supporting the optimization of motor development in children aged 3-4 years.

Keywords : Role play; Cooking; Development; Fine motor skills ; Early childhood

INTRODUCTION

Early childhood development is a crucial stage in human life because it is during this period that rapid growth occurs in various aspects of development, including physical, cognitive, socio-emotional, and motor skills. This period is often referred to as the golden age, a period in which children have a high level of sensitivity to various stimuli from their surroundings (Suyadi, 2013). At this stage, every experience a child gains will have a significant influence on development in the next stage (Santrock, 2011). According to Jean Piaget, children aged 2–7 years are in the preoperational stage, a stage in which children learn through concrete experiences, imitation, and direct interaction with their surroundings (Piaget, 1962). Therefore, learning in early childhood needs to be designed in the form of real, contextual, and enjoyable activities so that children can be actively involved. Passive learning tends to be less effective because it does not provide children with direct experience. Therefore, it is important for educators to create a learning environment rich in exploratory activities. A supportive environment will help children develop various aspects of development optimally.

One aspect of development that plays a crucial role in early childhood is fine motor skills. Fine motor skills relate to a child's ability to control small muscles, especially in the hands and fingers, to perform various manipulative activities such as picking, grasping, writing, and using small tools (Gordon, 2013). These skills are crucial because they form the foundation for various academic and daily life activities (Papalia & Feldman, 2019). Children with good fine motor skills will find it easier to independently perform activities such as writing, drawing, arranging objects, and using tools. Conversely, children with fine motor impairments tend to have difficulty in these activities. Research shows that fine motor development is closely related to school readiness and a child's future academic abilities (Dinehart, 2020). Therefore, fine motor development deserves special attention in early childhood education. Appropriate and continuous stimulation is essential to support the optimal development of these skills.

At 3–4 years of age, children's fine motor development progresses significantly. They begin to perform simple manipulative activities such as pinching small objects (pincer grasp), pouring liquids, stirring ingredients, and holding tools with greater direction and control. These abilities demonstrate improved hand -eye coordination. (Adolph & Franchak, 2017). However, this development does not occur automatically, but rather requires appropriate and repeated stimulation. If children are not given the opportunity to engage in manipulative activities, their fine motor development can be hampered. This can impact a child's ability to perform various daily activities. Lack of stimulation can cause delays in a child's fine motor development (Damayanti & Aini, 2020).

Furthermore, direct experiences involving interaction with real objects are crucial in supporting a child's motor development (World Health Organization, 2020). Therefore, children need to be given the opportunity to engage in activities that involve active hand use. However, conditions in the field indicate that many young children still experience obstacles in fine motor development. This is caused by a lack of direct, exploratory, and meaningful learning activities for children. Many learning activities are still dominated by the use of worksheets, which tend to be passive and do not involve children directly in physical activity (Suyadi, 2013). Monotonous and less varied activities can also reduce children's interest in participating in the learning process (Santrock, 2011). As a result, children do not gain sufficient experience in practicing hand-finger coordination. This condition impacts the low development of children's fine motor skills. Research shows that children who are less involved in hands-on activities tend to have lower fine motor skills (Harmon et al., 2025). Therefore, innovations in learning are needed that can provide children with direct experiences.

Fine motor skills play a crucial role in developing children's independence from an early age. These abilities enable children to independently perform various daily activities, such as eating, dressing, tidying up toys, and using simple tools (Papalia & Feldman, 2019). Furthermore, fine motor skills also play a role in supporting the development of other aspects, such as cognitive and socio-emotional skills. Children with good fine motor skills tend to be more confident in carrying out activities. Conversely, children who experience difficulties in fine motor skills may have difficulty adapting to the learning environment. Fine motor development is influenced by various factors, both internal factors such as nervous system maturity, and external factors such as the environment and stimulation provided (Nurhidayah, 2022). Therefore, learning strategies are needed that can provide optimal stimulation and are tailored to the child's needs.

One approach that can be used to improve fine motor skills is play-based learning. This approach emphasizes play activities as the primary tool in the early childhood learning process. Through play, children can learn naturally without pressure, making the learning process more enjoyable and meaningful (Bodrova & Leong, 2015). One effective form of play is role-playing, in which children imitate activities found in everyday life. Role-playing allows children to develop various aspects of development simultaneously. Research shows that role-playing can simultaneously improve children's cognitive, social, and motor skills (Whitebread et al., 2021). Therefore, role-playing can be an effective learning medium for improving fine motor skills.

Role-playing is a form of symbolic play that allows children to imitate roles, situations, and activities found in everyday life. According to Jean Piaget, role-playing falls within the symbolic play stage, where children use their imagination to represent real experiences in the form of play (Piaget, 1962). Meanwhile, Lev Vygotsky stated that role-playing plays an important role in children's cognitive and social development, because through social interactions in play, children learn to understand rules, roles, and develop thinking and language skills (Vygotsky, 1978). In the context of early childhood education, role-playing is an effective means of developing various aspects of development, including motor, cognitive, language, and social-emotional, because children are actively, concretely, and meaningfully involved in the learning process (Bodrova & Leong, 2015).

One form of role-playing relevant to children's lives is cooking role-playing. Cooking activities involve various manipulative movements such as picking up ingredients, pouring, stirring, holding utensils, and arranging equipment. This activity provides children with hands-on experience in actively using their hands and fingers and trains hand-eye coordination (Montessori, 1967). Research shows that cooking role-playing can significantly improve fine motor skills in early childhood (Muzaini, 2024). This is supported by research that states that cooking activities can improve small muscle strength and motor coordination in children (Harmon et al., 2025). Thus, cooking role-playing is an effective and contextual learning alternative. In addition to providing benefits for motor skills, cooking role-playing also contributes to children's social and emotional development. Through this activity, children learn to cooperate, share roles, and communicate with peers. Children also learn about responsibility and independence in completing tasks (Erikson, 1963). Furthermore, successful cooking activities can boost children's self-confidence. Play activities that involve social interaction can help children develop optimal social-emotional skills (Nurhidayah, 2022). This demonstrates that cooking role-playing has holistic benefits for children's development.

However, in practice, the implementation of cooking role-playing in learning remains suboptimal, especially for children aged 3–4 years in non-formal educational institutions. Most learning still focuses on conventional methods that lack hands-on practical activities. Furthermore, previous research has been general in nature and has not specifically examined cooking as a primary medium for developing children's fine motor skills. The indicators used are also general and have not been adapted to concrete activities like cooking. This indicates a gap in research that requires further study.

Based on the above description, this study aims to analyze the effect of cooking role-play on the fine motor skills of children aged 3–4 years, specifically in non-formal educational institutions. This study is expected to provide an empirical overview of the effectiveness of cooking role-play in improving children's fine motor skills. Furthermore, this study is also expected to serve as a reference for educators in selecting learning strategies appropriate to the characteristics of early childhood. Thus, this study is expected to provide both theoretical and practical contributions to the field of early childhood education.

PROBLEM-SOLVING APPROACH

The problem-solving approach in this study uses a quantitative approach with a quasi-experimental method (*quasi-experimental design*). The research design used is *a Nonequivalent Control Group Design* , which is a design involving two groups, consisting of an experimental group and a control group. Both groups were given a pretest to determine the initial condition of children's fine motor skills before treatment was given. The experimental group was given treatment in the form of cooking role-play activities, while the control group followed learning activities as usual without being given treatment in the form of cooking role-play. After the entire series of treatments were completed, both groups were given a posttest to determine changes in children's fine motor skills and to compare the results between the experimental group and the control group.

By comparing the pretest and posttest results for the two groups, researchers were able to determine the effect of cooking role-playing activities on the fine motor development of children aged 3–4 years. This approach was chosen because it provided objective, systematic, and measurable data regarding the effectiveness of the treatment. Furthermore, the use of a control group allowed researchers to obtain a stronger picture of the causal relationship between cooking role-playing and the development of fine motor skills in early childhood.

STATE OF THE ART AND NEWNESS

Previous research has shown that manipulative activities and role-playing, particularly cooking, are effective in improving fine motor skills in early childhood. Many studies were conducted in formal settings and used general indicators, making them less specific to cooking activities. This research focuses on children aged 3-4 years in a non-formal institution (Ghoenshoe Tutoring), with more contextual and specific indicators related to cooking activities. The quantitative approach and the use of a cooking role-play-based learning model are key innovations, making the results more specific and directly relevant to children's daily lives.

METHOD

This research design is a quantitative study with a quasi-experimental approach (**quasi-experimental design**) using a **Nonequivalent Control Group Design** . This study involved two classes, one class as the experimental group and one class as the control group. Both groups were given a pretest before treatment to determine the initial fine motor skills of children aged 3–4 years. The experimental group was given a cooking role-play activity, while the control group participated in the usual learning process at the institution without receiving this treatment. After the treatment was completed, both groups were given a post-test to determine the effect of the cooking role-play activity on the fine motor development of children aged 3–4 years. The pre- and post-test data were then analyzed to determine differences in fine motor development between the experimental and control groups.

Table 3.1 Research Design

Group	Pretest	Treatment	Posttest
S	O_1	X_1	O2
K	O_1	-	O2

Source: (erma handayani. 2021)

Information:
K : Experimental group
S : control group
O1: Pretest
O2 : Posttest
X1 = Treatment

The population in this study was all children aged 3-4 years who participated in learning activities at a non-formal educational institution, namely Private Tutoring Ghoenshoe_24, during the research period. According to

Sugiyono (2023), a population is a generalization area that includes all subjects with certain characteristics according to the research objectives. In this context, the population includes all children aged 3-4 years who are registered as active participants and require stimulation in fine motor development through concrete and fun play activities. This selection aims to obtain a complete picture of the effect of cooking role-play on the fine motor skills of early childhood in this non-formal environment.

The sample in this study was 18 children aged 3-4 years who were divided into two groups, the experimental group and the control group. The experimental group consisted of 9 children who were given treatment , while the control group consisted of 9 children who were not given treatment . The sampling technique used was saturated sampling, that is, all members of the population were taken as samples. According to Sugiyono (2023), saturated sampling is carried out if the number of research subjects is small and allows for the observation of all members of the population as a whole. This sample selection aims to make the research results more accurate and represent the actual conditions of the population of children aged 3-4 years at the institution.

Population and Sample Data Table

Group	Amount
S	9
K	9
Amount	18

DATA COLLECTION TECHNIQUE

The data collection techniques in this study consisted of two main methods, namely observation and documentation. These two techniques were used complementary to each other so that the data obtained was more complete, accurate, and accountable. According to Sugiyono (2023), observation is a data collection technique carried out directly to obtain primary data regarding children's fine motor skills, with pre-developed indicator guidelines. Observations were conducted on the experimental and control groups at the pretest and posttest stages using a fine motor skills observation sheet that had been prepared based on the research indicators. The pretest observation aimed to determine the children's initial abilities, while the posttest observation was conducted to determine changes in fine motor skills after the experimental group received treatment in the form of cooking role-play activities.

Meanwhile, documentation techniques were used to collect supporting data from various documents related to activities and results during the research process, such as activity reports, photographs, or other documents relevant to the observation process and results. This documentation helped strengthen the primary data from the observations and provided a comprehensive overview of the activity process and children's development during the research. The dependent variable research instrument was measured through observation of the fine motor skills of children aged 3–4 years, which include the ability to pick up small objects, hold tools, pour, stir, and arrange equipment. The observation instrument used a guideline sheet containing indicators and observed behaviors, with the assessment on the observation sheet using a Likert frequency scale with categories 4 = Very often, 3 = Often, 2 = Sometimes, and 1 = Rarely. The validity of the instrument was tested through validity tests and its reliability was tested so that the data obtained was accurate and reliable. Instrument Validity Testing is a measure that indicates the levels of validity and legitimacy of an instrument. Anderson stated that a test is valid if it measures what it is intended to measure (Arikunto, 2013). The validity test used in this study uses the Product Moment correlation formula with the help of Microsoft Excel. The formula used is as follows.

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

Information:

r_{xy} = correlation coefficient between variable X and variable Y, the two variables that are correlated.
n = respondents
$\sum XY$ = The sum of the multiplication of x by y
X^2 = square of x
Y^2 = square of y

With the testing criteria, if rhitung ≥ r tabel with α = 0.05, then the measuring instrument is declared valid. Conversely, if rhitung < r tabel, then the measuring instrument is invalid. Reliability testing is conducted to determine the level of consistency of the research instrument. An instrument is considered reliable if it produces consistent results when used to measure the same object. In this study, instrument reliability was tested using the **Cronbach's Alpha coefficient** , as the instrument is an observation sheet with a rating scale of 1–4. According to Sugiyono (2023), an instrument is considered reliable if it has a high reliability coefficient value. The Cronbach's Alpha formula is :

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum S_i^2}{S_t^2}\right)$$

Information:
α = reliability coefficient
k = number of instrument items
ΣSi^2 = the sum of the variances of each item
St^2 = total variance

STATISTICAL HYPOTHESIS

A statistical hypothesis can be defined as a statement about the condition of a population whose truth will be tested based on data obtained from a research sample. The statistical hypotheses to be tested in this study are as follows:

Pretest Statistical Hypothesis:

$$H_0 : \mu_{pretest} \geq \mu_{posttest}$$

$$H_1 : \mu_{pretest} < \mu_{posttest}$$

Posttest Statistical Hypothesis:

$$H_0 : \mu_{pretest} \geq \mu_{posttest}$$

$$H_1 : \mu_{pretest} < \mu_{posttest}$$

Pretest Hypothesis
H_0: There is no difference in the fine motor skills of children aged 3–4 years between the experimental group and the control group during the pretest.
H_1: There is a difference in the fine motor skills of children aged 3–4 years between the experimental group and the control group during the pretest.

Posttest Hypothesis
H_0: There is no difference in the fine motor skills of children aged 3–4 years between the experimental group and the control group after being given treatment.
H_1: There is a difference in the fine motor skills of children aged 3–4 years between the experimental group and the control group after being given treatment.

The research procedure used a quasi-experimental quantitative approach (*quasi-experimental design*). The research design used was *Nonequivalent Control Group Design* . The steps included administering a pretest to measure fine motor skills before treatment, implementing cooking role-play activities for several meetings as treatment, then administering a posttest to assess the development of fine motor skills after treatment. Data collection was carried out through observation using instruments that measure fine motor skill indicators such as picking up

small objects, holding tools, pouring, stirring, and arranging. Data analysis was carried out through several stages, namely normality test, homogeneity test to determine differences in pretest and posttest values in each group, and Independent Sample t-test to determine differences in posttest results between the experimental group and the control group. Research Data: The results of the study showed an increase in children's fine motor skills after participating in the cooking role-play activity, as evidenced by the difference in scores between the pretest and posttest. The mean values and distribution of the data were statistically analyzed, and the results indicated a significant increase in children's fine motor skills.

Hypothesis Testing: Hypothesis testing in this study was conducted using the Independent Samples t-test because the study involved two independent groups, namely the experimental group and the control group. This test aims to determine whether there is a difference in the average fine motor development between the two groups, both during the pretest and posttest. Through this test, the effect of cooking role-playing activities on the fine motor skills of children aged 3–4 years can be determined.

The formula for the Independent Samples t-test is as follows.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{(n_1-1)s_1^2+(n_2-1)s_2^2}{n_1+n_2-2}\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$$

Information:
t = value of the t-test statistic
$\bar{X}_1$ = mean of experimental group
$\bar{X}_2$ = mean of control group
s_1^2 = variance of the experimental group
s_2^2 = control group variance
n_1 = number of samples in the experimental group
n_2 = number of control group samples

The criteria for hypothesis testing are if the significance value (Sig. (2-tailed)) < 0.05, then H_0 is rejected and H_1 is accepted, which means there is a significant difference between the experimental group and the control group. Conversely, if the significance value (Sig. (2-tailed)) > 0.05, then H_0 is accepted and H_1 is rejected, which means there is no significant difference between the two groups.

RESULTS AND DISCUSSION

This research was conducted at the non-formal **Ghoenshoe Tutoring Institute** with the aim of determining the effect of cooking role-play on the fine motor development of children aged 3-4 years at the non-formal Ghoenshoe Tutoring Institute_24. This research involved two groups: an experimental class and a control class. The experimental class received treatment, while the control class received no treatment. The implementation of the research activity began with the pretest stage, namely in the first activity, several spices and ingredients available in the kitchen were provided, including salt, sugar, peppercorns, and tea bags, provided in a bowl and the child's activity was to transfer these ingredients to another empty bowl. The purpose of this activity was to determine the initial fine motor skills of children before treatment. The pretest results were used as initial data to compare the development of children's fine motor skills after being given a cooking role-play activity. After treatment, a posttest was conducted to assess the children's fine motor development. At this stage, the children transferred salt, sugar, peppercorns, and tea bags into a bowl using a three-finger pinching technique: thumb, index finger, and middle finger. Observations showed that most children performed the activity more smoothly, although some still needed guidance and occasionally dropped materials while transferring them.

Figure 1. Implementation of activities in the Control class

Figure 2. Implementation in the Experimental class

Based on the observation results, children's fine motor development was measured using a Likert frequency scale with a score category of 4 (100%) = very often, a score of 3 (75%) = often, a score of 2 (50%) = sometimes, and a score of 1 (25%) = rarely. At the pretest stage, most children in the control and experimental classes still showed a frequency of fine motor skills in the category of sometimes to often. After being given treatment in the form of cooking role-play activities, the posttest results showed an increase in the frequency of fine motor skills. Most children were able to perform the activities of picking, holding, moving, pouring, and stirring more frequently and more precisely than before being given treatment. This is indicated by the increase in the average posttest score in the experimental class compared to the control class. Furthermore, the pretest and posttest data were analyzed through validity tests, reliability tests, normality tests, homogeneity tests, and hypothesis tests using the Independent Sample t-test with the help of the IBM SPSS Statistics application. The results of the research instrument and data testing are presented as follows. The feasibility of the research instrument was analyzed through validity tests. The results of the validity tests are presented in Table 4.1 below;

4.1 Instrument Validity Test Results

items	rhitung	rtable	conclusion
1	0.77084138	0.468	Valid
2	0.75085179	0.468	Valid
3	0.52250489	0.468	Valid
4	0.49053542	0.468	Valid
5	0.52234176	0.468	Valid
6	0.77468835	0.468	Valid
7	0.77532984	0.468	Valid
8	0.77532984	0.468	Valid
9	0.51407740	0.468	Valid
10	0.64048987	0.468	Valid
11	0.72488244	0.468	Valid
12	0.79656109	0.468	Valid
13	0.62173975	0.468	Valid

Based on Table 4.1, all instrument items have calculated r values greater than the table r, thus being declared valid and suitable for use in research. Furthermore, the results of the reliability test are presented in Table 4.2 below.

Table 4.2 Reliability Test Results

items	1	2	3	4	5	6	7	8	9	10	11	12	13
variants	0.19	0.5	0.25	0.19	0.28	0.5	0.25	0.25	0.44	0.25	0.28	0.53	0.36
number of variants	4,277777778												
Cronbach	24.44												

Based on Table 4.2, the Cronbach Alpha value is at 24.44, which indicates that the instrument has good consistency and is declared reliable. After the instrument is declared valid and reliable, a normality test is carried out, the results of which are presented in Table 4.3 below.

Table 4.3 Normality Test Results

Tests of Normality				
CLASS		Shapiro-Wilk		
		Statistics	df	Sig.
RESULTS	PRETEST K (CONTROL)	0.934	9	0.557
	POSTTEST K (CONTROL)	0.838	9	0.055
	PRETEST S (EXPERIMENT)	0.925	9	0.434
	POSTTEST S (EXPERIMENT)	0.873	9	0.132

Based on Table 4.3, the significance value (Sig.) for the experimental and control groups, both in the pretest and posttest, is greater than 0.05. Thus, it can be concluded that the data in this study is normally distributed, thus meeting the requirements for further testing. Furthermore, a homogeneity test was also conducted to determine the similarity of variance between groups, as presented in Table 4.4 below.

Table 4.4 Results of Homogeneity Test

Tests of Homogeneity of Variances					
		Levene Statistics	df1	df2	Sig. [a]
RESULTS	Based on Mean	2,619	3	31	0.068
	Based on Median	1,773	3	31	0.173
	Based on Median and with adjusted df	1,773	3	24,080	0.179
	Based on trimmed mean	2,550	3	31	0.074

Based on Table 4.4, a significance value of 0.068 ($p > 0.05$) was obtained, thus it can be concluded that the variance of both groups is homogeneous. After the data was declared normally distributed and homogeneous, the hypothesis was tested using the t-test. The results of the pretest t-test are presented in Table 4.5 below.

Table 4.5 Pretest T-Test Results

Group Statistics					
CLASS		N	Mean	Standard Deviation	Std. Error Mean
MARK	Pretest-Control	9	24.78	1,394	0.465
	Pretest-Experiment	9	28.33	1,658	0.553

Independent Samples Test									
		t-test for Equality of Means							
		t	df	Significance		Mean Difference	Standard Error Difference	95% Confidence Interval of the Difference	
				One-Sided p	Two-Sided p			Lower	Upper
MARK	Equal variances assumed	-4,923	16	<,001	<,001	-3,556	0.722	-5,087	-2,025
	Equal variances not assumed	-4,923	15,542	<,001	<,001	-3,556	0.722	-5,090	-2,021

Based on the Group Statistics table, the average pretest score for the control class was 24.78, while the average pretest score for the experimental class was 28.33. Furthermore, based on the results of the independent sample t-test, a significance value (2-tailed) of <0.001 (<0.05) was obtained, so there was a significant difference between the pretest scores for the control class and the experimental class. Furthermore, the results of the posttest *t-test* are presented in Table 4.6 below.

Table 4.6 Posttest T-Test Results

Group Statistics					
CLASS		N	Mean	Standard Deviation	Std. Error Mean
MARK	Posttest-Control	9	47.11	0.782	0.261
	Posttest-Experiment	9	48.67	0.866	0.289

Independent Samples Test									
		t-test for Equality of Means							
		t	df	Significance		Mean Difference	Standard Error Difference	95% Confidence Interval of the Difference	
				One-Sided p	Two-Sided p			Lower	Upper
MARK	Equal variances assumed	-4,000	16	0.001	0.001	-1,556	0.389	-2,380	-0.731
	Equal variances not assumed	-4,000	15,835	0.001	0.001	-1,556	0.389	-2,381	-0.730

Based on the Group Statistics table, the average posttest score for the control class was 47.11, while the average posttest score for the experimental class was 48.67. Furthermore, based on the results of the independent sample t-test, a significance value (2-tailed) of 0.001 < 0.05 was obtained, so there was a significant difference between the posttest scores for the control class and the experimental class.

DISCUSSION

Based on the research results, it was found that cooking role-playing activities had an effect on the fine motor skills of children aged 3–4 years. This finding was proven through the results of statistical analysis using the Independent Samples t-test and the difference in the average scores between the control class and the experimental class after being given treatment. At the pretest stage, the results of the Independent Samples t-test showed a significance value (2-tailed) of <0.001 ($p < 0.05$). These results indicate that there was a significant difference between the initial abilities of children in the control class and the experimental class. The average pretest score of the control class was 24.78, while the average pretest score of the experimental class was 28.33. This indicates that the initial fine motor skills of children in both groups were not completely equal before being given treatment. Nevertheless, both groups were still given learning activities according to the designed treatment so that the effect of cooking role-playing activities on children's fine motor development could still be observed through the posttest results.

After the treatment was given, the posttest results showed an increase in fine motor skills in both groups. Based on the results of the Independent Samples t-test, a significance value (2-tailed) of 0.001 ($p < 0.05$) was obtained, which indicated a significant difference between the control class and the experimental class after the learning process took place. The average posttest score in the control class was 47.11, while the average posttest score in the experimental class reached 48.67. Although the average difference between the two groups was not too large, the results of statistical tests showed that the difference was significant, so that cooking role-playing activities had an effect on improving the fine motor skills of children aged 3–4 years. The improvement in fine motor skills indicates that the cooking role-play activity can provide effective stimulation for the coordination of small muscles in children's hands and fingers. During the activity, children perform various activities such as picking up ingredients, holding cooking utensils, pouring ingredients, stirring, and putting away utensils after use. These activities align with the fine motor skill indicators used in this study, namely the ability to pick up small objects, hold simple tools, pour ingredients, stir, and put away utensils. Theoretically, the results of this study align with Jean Piaget's theory that children aged 2–7 years are in the preoperational stage, a stage where children learn through concrete experiences, imitation, and play. At this stage, children more easily grasp concepts when directly involved in real-life activities. Cooking role-play provides children with the opportunity to learn while engaging in various activities that involve hand-eye coordination, thus optimally developing fine motor skills. The findings of this study also support Lev Vygotsky's theory, which emphasizes the crucial role of play in child development. Through role-playing, children have the opportunity to interact with their environment, use various play equipment, and complete tasks independently or with friends. These activities not only improve fine motor skills but also train children's coordination, concentration, and independence during the learning process.

The results of this study align with Muzaini's (2024) research, which states that cooking role-playing games are effective in improving fine motor skills in early childhood. Furthermore, Harmon et al.'s (2025) research also explains that activities involving direct object manipulation can improve coordination of small hand muscles in children. Activities such as picking, pouring, stirring, and holding cooking utensils provide concrete learning experiences, allowing children to repeatedly practice fine motor skills. This aligns with the characteristics of early childhood learning, which emphasizes learning activities through direct experience (*learning by doing*). Based on the overall research results, it can be concluded that cooking role-playing has a significant effect on the fine motor skills of children aged 3–4 years. This effect is evident from the increase in the average score after treatment and the results of statistical tests that show a significance value of $0.001 < 0.05$. Therefore, cooking role-playing activities can be used as an effective learning alternative to stimulate the fine motor development of early childhood because it can provide an active, concrete, and enjoyable learning experience.

CONCLUSION

Based on the results of research on the effect of cooking role play on the fine motor skills of children aged 3–4 years at Ghoenshoe_24 Private Tutoring, it can be concluded that cooking role play activities have a significant influence on children's fine motor skills. This is proven through the results of statistical analysis using the Independent Samples t-test which shows a significance value (Sig. 2-tailed) of 0.001, smaller than the significance level of 0.05. Thus, the alternative hypothesis (H_1) is accepted and the null hypothesis (H_0) is rejected, so it can be stated that there is a significant difference between the experimental group and the control group after being given treatment. The results also showed an increase in the average fine motor skill scores in both groups. The average pretest score for the control class was 24.78, while the experimental class was 28.33. After the cooking role-play activity, the average posttest score for the control class increased to 47.11, while the experimental class reached 48.67. These results indicate that the experimental group achieved better results than the control group after participating in the cooking role-play activity.

This improvement in fine motor skills occurs because role-playing cooking activities provides children with the opportunity to engage in various activities that involve coordinating small hand muscles, such as picking up ingredients, holding utensils, pouring, stirring, and putting away utensils after use. These activities provide concrete, engaging, and child-friendly learning experiences, enabling children to learn through direct experience. This is in line with child development theory, which emphasizes the importance of activity-based learning and play as a means to develop various aspects of development, including fine motor skills. Based on these results, it can be concluded that cooking role-play is an effective alternative learning activity for stimulating fine motor skills in children aged 3–4 years. Therefore, this activity can be implemented as part of the learning process in early childhood education institutions to support optimal fine motor development.

SUGGESTION

1. For Teachers
   Teachers are expected to implement cooking role-play activities as an alternative learning method to improve children's fine motor skills. These activities can be presented in an engaging manner and tailored to the child's characteristics and developmental stage. This way, children can gain an active, enjoyable, and meaningful learning experience.
2. For Educational Institutions
   Educational institutions are expected to provide facilities and infrastructure to support cooking role-play activities. Support in the form of safe media and play equipment will help teachers create more effective learning. This is expected to optimize the fine motor development of young children.
3. For Further Researchers
   Future researchers are advised to expand this study with a larger sample size and more diverse research locations. Furthermore, research could examine the influence of cooking role-playing on other aspects of child development. Thus, the results could provide broader benefits in the field of early childhood education

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