



Developing Early Childhood Arithmetic Cognitive Skills in Group B RA Al Istiqomah Through the Traditional Game of Congklak

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ABSTRACTS

This study aims to analyze the effect of the traditional game of congklak on the cognitive abilities of early childhood numeracy. The background of the study is that many children aged 5–6 years have difficulty recognizing numbers and understanding basic arithmetic concepts. The research method uses a quantitative approach with a quasi-experimental non-equivalent control group design. The research subjects consisted of an experimental group using congklak in learning and a control group using conventional methods. The research instruments were cognitive tests, observations, and interviews. The results showed a significant increase in the experimental group, with an average score increasing from 66 to 81.33, while the control group only increased from 77.89 to 81.05. The results of the ANCOVA test showed a significant difference (Sig. <0.001) with a Partial Eta Squared value of 0.124. These findings prove that congklak is effective as a fun, interactive learning medium, and is able to improve children's concentration and strategies. In conclusion, the traditional game of congklak can be used as an alternative for numeracy learning in early childhood education while preserving local culture.

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1. INTRODUCTION

Education has always been a center of public attention, especially in Indonesia. Education is closely related to humans in all its aspects. According to Muhartini et. al., (2023), education is a learning process usually provided to individuals who need knowledge. Early childhood education plays a crucial role in developing the foundation of cognitive abilities, particularly numeracy. Early childhood education (ECE) is the main foundation in building children's readiness to face the next level of education. In Jean Piaget's cognitive theory, at the age of 5–6 years, children enter the pre-operational stage of cognitive development (Sansena, 2022), namely the phase when children begin to be able to understand simple logical concepts, recognize numbers, and perform counting activities with concrete objects.

However, on the ground, numeracy instruction in early childhood education institutions (ECE) still tends to be conventional, focusing on memorizing numbers or using worksheets. This approach often leads to children quickly becoming bored and less actively engaged in the learning process. Furthermore, learning methods that overemphasize academic outcomes without involving play can diminish children's interest and motivation to learn (Wajabula et. al., 2021). However, in early childhood development, the learning process should be designed to be fun, interactive, and tailored to children's developmental characteristics (Munawaroh et. al., 2020). Therefore, more creative and innovative learning strategies are needed to enable children to understand numeracy concepts more meaningfully through hands-on and enjoyable learning experiences.

Traditional games are an alternative learning medium that can provide cognitive stimulation while creating a fun learning environment for young children (Wahyu & Rukiyati, 2022). One traditional game that can be utilized in learning is congklak. Congklak is a popular traditional game in Indonesia and is played using a perforated board and seeds as playing tools (Anggreini & Priyoadmiko, 2022). In this game, children indirectly engage in counting activities as they move congklak seeds from one hole to another. Furthermore, congklak also trains children's skills in strategic planning, simple problem-solving, and fine motor coordination (Nafsia et. al., 2023). This congklak playing activity aligns with the principles of early childhood learning, which emphasize that children learn most effectively through play (learning by playing), making the learning process more meaningful, active, and developmentally appropriate.

Based on initial observations at RA Al-Istiqomah, it was found that many children aged 5–6 still have difficulty understanding basic arithmetic concepts. Children tend to simply memorize numbers without truly understanding their meaning. Monotonous, worksheet-based arithmetic learning activities often lead to children quickly becoming bored, less active, and less directly involved in the learning process. This impacts cognitive development, particularly in arithmetic. Several studies have shown that traditional games can stimulate various aspects of child development, including cognitive development (Cendana & Suryana, 2021). In particular, congklak has great potential in stimulating children's numeracy skills because it combines elements of logic, fine motor skills, and social interaction (Maria Lily et. al., 2023). Therefore, it is important to innovate in providing learning that integrates traditional games as an effective medium for developing numeracy skills in early childhood.

Previous research has demonstrated that traditional games have a positive effect on children's cognitive development. However, research specifically highlighting the effectiveness of congklak as a medium for numeracy learning in early childhood education institutions is still limited. Therefore, this study focuses on answering the following questions: (1) How can congklak games develop the cognitive aspects of children aged 5–6 years? (2)

How does congklak games influence children's numeracy skills? (3) How effective is congklak as a medium for numeracy learning at RA Al-Istiqomah? (This research is expected to help improve the quality of learning, develop more effective teaching methods, and improve student learning outcomes. It is hoped that students can improve their cognitive skills. Teachers can also utilize a variety of learning methods, such as the traditional congklak game, and answer important questions regarding the influence of traditional congklak games on the cognitive development of group B children at RA Al-Istiqomah, as well as the effectiveness of using congklak as a stimulation tool for group B children aged 5–6 years at the institution.

2. METHODS

The method used in this study is a quantitative method with a *quasi-experimental* design research type with *Nonequivalent Control Group Design* where this study involved two groups, namely the experimental group or those given treatment and the control group that was not given the treatment ([Şahin & Ozturk, 2022](#)). Both groups were given a pre-test and post-test to measure their cognitive development, especially in counting before and after being given treatment ([Susilawati et. al., 2021](#)), this quasi-experimental design allows researchers to directly observe the influence of the traditional congklak game on the cognitive abilities of counting children in group B3 at RA Al-Istiqomah.

The research was conducted at RA Al Istiqomah in the even semester of the 2024/2025 academic year with the population and sample of all children in group B3 as the experimental group and B2 as the control group. The treatment given was in the form of a traditional congklak game to improve the cognitive counting of children in the experimental group (B3). First, the researcher invited the children to get to know the congklak game, then the researcher invited the children to play the traditional congklak game with a demonstration of playing while counting by taking congklak seeds from one hole and moving them while counting the number of seeds, then the researcher gave simple questions to the children such as the concept of simple addition using congklak seeds.

The instruments used in this study were test sheets because they were more suitable for measuring children's cognitive abilities in counting before and after treatment, as well as observation sheets to see the child's initial condition before being given treatment ([Hasiana, 2021](#)). Data collection techniques include unstructured interviews aimed at an initial study of the problems to be studied and to obtain more accurate data regarding respondents ([Ardiansyah et. al., 2023](#)). In this study, the instrument used was a test sheet containing questions asked to children to measure the extent of their understanding of the concept of numbers and children's cognitive abilities and participatory observation, where researchers were directly involved in the observed activities, which also functioned as research sources. Researchers practiced directly playing congklak and interacted with children as teachers, while observing their counting abilities, thus allowing researchers to observe children's development directly.

In this study, the independent variable is the congklak game, while the dependent variable is the cognitive ability of children to count which is measured by Descriptive Statistics to describe the results of the pre-test and post-test by calculating the Mean or average after which a test is carried out to analyze the results. The test chosen is the Paired Sample T-test, which is a test used to compare the average of two groups of related or paired data and the

T-Test, which is to determine whether there is a significant difference between groups based on the variables measured.

3. RESULTS AND DISCUSSION

This study aims to develop children's cognitive numeracy skills through the traditional game of congklak in Group B at RA Al-Istiqomah. The research involved children aged 5–6 years who were divided into two groups, namely the experimental group and the control group. Measurements were conducted twice, before the treatment (pre-test) and after the treatment (post-test), using a cognitive numeracy assessment sheet. The instrument contained several simple questions related to early numeracy concepts, particularly simple addition using concrete objects. Through this assessment, children were asked to count objects, recognize numbers, and perform basic addition activities using visual and manipulative materials. This approach was intended to measure children's ability to understand numerical concepts in a concrete and meaningful way according to their developmental stage.

The measurement results showed a significant increase in the average scores between the pre-test and post-test in both the experimental and control groups. The experimental group initially obtained an average pre-test score of 66.00, while the control group obtained an average pre-test score of 77.89. After the implementation of the learning activities, the average post-test score of the experimental group increased to 81.33, whereas the control group reached an average score of 81.05. This improvement indicates that children's cognitive numeracy abilities developed during the learning process. The use of the traditional congklak game provided children with opportunities to practice counting while moving the seeds from one hole to another, which indirectly strengthened their understanding of number concepts and simple addition. These findings illustrate that learning activities integrated with traditional games can effectively support the development of children's numeracy skills, as shown in **Figure 1**.

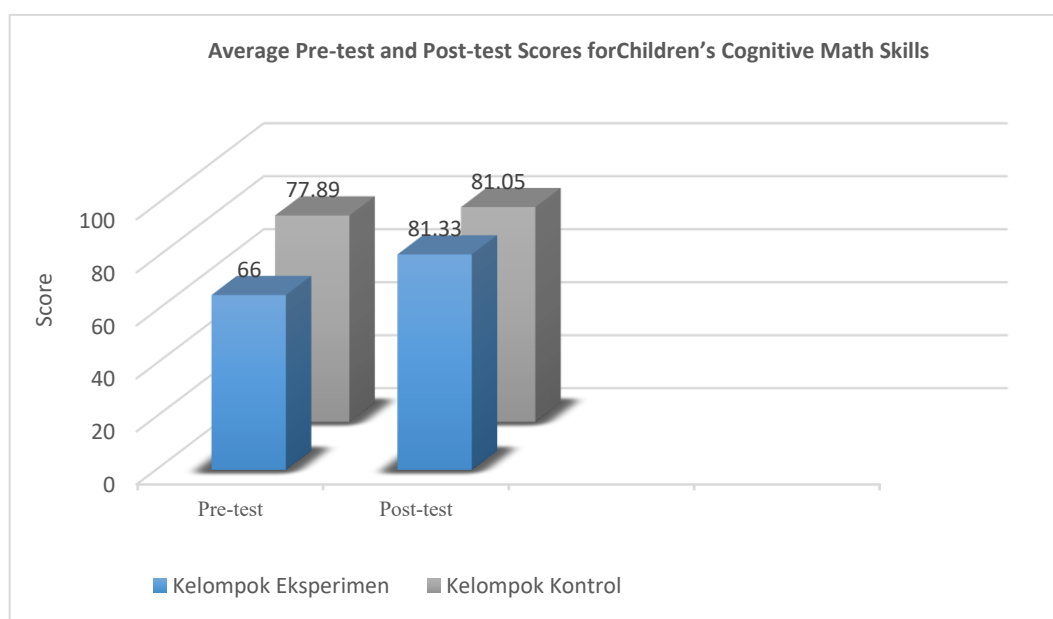


Figure 1. Result Pre-test and Post-test.

Before conducting the first test, the author conducted a normality test to determine which test would be used. The results of the normality test are as follows, as shown in **Table 1**.

Table 1. Data Normality Test Results

		Tests of Normality					
		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Kelompok	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	Eksperimen	.174	15	.200 [*]	.964	15	.755
	Kontrol	.217	19	.019	.908	19	.069
Posttest	Eksperimen	.163	15	.200 [*]	.889	15	.064
	Kontrol	.151	19	.200 [*]	.916	19	.094

Normality test Based on the results of the SPSS output of the normality test, the Sig. value is known for each pre-test data of the experimental group at (sig = 0.075 > 0.05) and the control group at (sig = 0.069 > 0.05) and the post-test of the experimental group at (sig = 0.064 > 0.05) and the control group at (sig = 0.094 > 0.05) therefore it can be concluded that in general based on the Shapiro-Wilk significance value in each group is greater than 0.05. This means that the normality assumption is met Based on the results of this normality test, normal then the researcher continued using the paired sample test which showed a significant difference between the pre-test and post-test of the experimental group. The final stage involved the ANCOVA test, which was used to evaluate the difference in final ability after treatment between the experimental and control groups, by controlling the post-test score. The analysis showed that the average post-test score of the experimental group (81.33) was slightly higher than the score of the control group (81.05). The Levene's test showed a significance value of 0.292 (>0.05), indicating homogeneity of variance between the two groups. In the Between-Subjects Effect Test, the significance value for the group variable was 0.044 (<0.05), indicating a significant difference between the experimental and control groups in the post-test results after accounting for the pre-test scores. The Partial Eta-Square value of 0.124 indicates that the treatment effect is in the moderate category.

These findings align with Vygotsky's theory, which states that children acquire knowledge not only through maturity but also through active interaction with their environment through traditional congklak games (Habsy et. al., 2023). Play in this context provides a space for children to construct knowledge through active interactions with various stakeholders, such as traditional congklak games, which offer numerous benefits, particularly in numeracy. This is because children can learn about number concepts (Puspitasari, 2022). Furthermore, regarding numeracy development in children aged 5-6 years, Piaget stated that the characteristics of cognitive development in the pre-operational stage include the ability to group similar objects and count numbers 1-20 (Sansena, 2022). Thus, traditional congklak games can be an effective learning medium in supporting early childhood numeracy development through play activities appropriate to their stage of cognitive development.

In a study using the traditional congklak game as a learning medium, it was found that children showed high enthusiasm throughout the learning process. Children appeared more active in responding to questions, participating in activities, and demonstrating greater curiosity when using the congklak game. They also appeared to enjoy the process of learning

while playing, making the learning atmosphere more enjoyable and interactive. In fact, some children spontaneously repeated the game several times because they felt interested and challenged to complete it. This suggests that the use of traditional games can increase children's engagement in the learning process, particularly in understanding numeracy concepts in a more concrete and enjoyable way. In the control group using conventional methods, researchers provided treatment according to the methods commonly used at the school where the study was conducted.

However, there were quite clear differences between the experimental and control groups in the learning process. In the control group, children learned to count using the finger counting method, which is simpler and less involving play activities. Meanwhile, in the experimental group, children learned using the congklak game as a learning aid provided by the researcher. The use of the congklak board and colorful congklak seeds made the children more interested and remained engaged throughout the activity. Furthermore, through the activity of moving congklak seeds from one hole to another, the children indirectly carried out the process of counting, recognizing quantities, and understanding the concept of numbers more concretely. This shows that the use of traditional game media such as congklak can provide a more interesting, active, and meaningful learning experience for early childhood..

Thus, this discussion shows that the traditional congklak game is an innovative learning method, proven not only statistically but also in practice to have a real positive impact in improving children's numeracy cognitive abilities. The use of traditional congklak games and active interaction between teachers and children is the key to the success of this method.

4. CONCLUSION

Based on the results of quantitative data analysis, it can be concluded that the traditional congklak game can develop children's cognitive numeracy at RA Al-istiqomah. Traditional congklak games have the potential to develop cognitive aspects of children aged 5-6 years in class B3 (experimental group). The increase in the average learning outcomes in the experimental group involved in the congklak game shows this. The Paired Sample T-test showed a significant difference between the pre-test and post-test scores in the experimental group, with the average score increasing from 66.00 to 81.33. This increase indicates that the congklak game can stimulate children's cognitive development, especially in learning to count.

The traditional congklak game has a positive impact on the cognitive development of numeracy in early childhood. The results of data analysis showed a very strong relationship between the pre-test and post-test results, with a correlation value of 0.931. This high correlation value indicates that there is an increase in children's numeracy skills after being given treatment through the traditional congklak game. In addition, the t-test results showed a significance value of $p < 0.001$, which means that the congklak game has a significant influence on improving the numeracy skills of children aged 5–6 years. These findings indicate that learning activities packaged through traditional games can provide effective cognitive stimulation for early childhood, especially in understanding the concept of numbers and counting activities in a more concrete and enjoyable way.

The traditional congklak game has also been proven effective in stimulating the cognitive numeracy abilities of children aged 5 to 6 years. This is evidenced by the results of the ANCOVA test which showed an average post-test score of 81.33 in the experimental group, while the control group obtained an average score of 81.05. Although the difference in

average scores does not appear too large, the results of the Tests of Between-Subjects Effects analysis showed a significance value of 0.044 (<0.05), which indicates a significant difference in final learning outcomes between the experimental and control groups after taking into account the pre-test scores. Thus, it can be concluded that the use of congklak games as a learning medium can provide a positive and effective influence in stimulating cognitive numeracy abilities in early childhood.

Therefore, it can be concluded that the implementation of the traditional congklak game in class B3 RA Al Istiqomah is a strategy that can be utilized by educators to help stimulate and develop the cognitive abilities of children aged 5-6 years in educational institutions.

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