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The Effect of the Traditional Game of Congklak on the Cognitive Development of Children Aged 5–6 Years at RA Darussaadah Chaidir

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Abstract

Cognitive development is a crucial aspect of early childhood education as it forms the foundation for thinking, reasoning, and problem-solving skills in subsequent educational stages. One approach to stimulating children's cognitive development is through play activities, particularly by utilising traditional games that are concrete in nature and suited to children's characteristics. The traditional game of congklak is considered to have educational potential as it involves counting, logical thinking, concentration, and decision-making. This study aims to determine the effect of the traditional game of congklak on the cognitive development of 5–6-year-old children at RA Darussaadah Chaidir Adam. This study employed a quantitative approach using a quasi-experimental design with a pre-test–post-test model. The research subjects were children aged 5–6 years, all of whom were included as the study sample. Data collection was conducted through observation of the children's cognitive development, whilst data analysis utilised the t-test or Wilcoxon test, depending on the data characteristics, alongside N-Gain calculations. The results of the study indicate that the traditional game of congklak has a significant effect on enhancing the cognitive development of children aged 5–6 years. Consequently, the game of congklak can serve as an effective alternative learning medium to stimulate children's cognitive development in RA/PAUD institutions.

Keywords Traditional Games, Congklak, Cognitive Development, Early Childhood

INTRODUCTION

Cognitive development is one of the fundamental aspects of early childhood development that determines a child's readiness for the next stage of education. During the early years, particularly between the ages of 5 and 6, children are in the 'golden age' phase, where their thinking abilities develop rapidly and are highly

responsive to various stimuli provided by their surroundings. Cognitive development is not only related to logical thinking skills but also encompasses the ability to remember, solve problems, categorise, and understand cause-and-effect relationships. Therefore, early childhood education plays a strategic role in facilitating children's cognitive development optimally through meaningful learning experiences that align with their developmental characteristics (Suyadi, 2017).

Children aged 5–6 years are cognitively at the late pre-operational stage moving towards the concrete operational stage, where they begin to think symbolically but still require real objects as a medium for thinking. At this stage, children have demonstrated the ability to recognise numbers, perform simple counting, understand the concepts of 'many' and 'few', and begin to make simple predictions based on their experiences. However, children's thinking processes remain egocentric and intuitive, thus requiring concrete, contextual, and repetitive stimulation so that the concepts being learnt can be fully understood. This situation demands that educators employ learning strategies suited to the child's world, namely learning through play (Piaget in Santrock, 2018).

Cognitive stimulation provided to young children must be designed in a planned, systematic, and continuous manner to optimise the child's thinking potential. Appropriate stimulation will help children develop logical, critical, and creative thinking skills from an early age. In the context of RA/PAUD education, cognitive stimulation aims not only to enhance children's academic abilities but also to establish a strong foundation for thinking that serves as a foundation for daily life. If cognitive stimulation is suboptimal, children may face difficulties in grasping the fundamental concepts they should master at their developmental stage (Susanto, 2016).

Early years education institutions bear a significant responsibility for providing a learning environment conducive to children's cognitive development. The learning environment in question is not limited to the classroom but also encompasses the methods, media, and learning activities employed by teachers. Learning that places too much emphasis on worksheets and formal academic activities can diminish children's interest in learning and hinder natural cognitive development. Therefore, a play-based learning approach is a primary necessity in early childhood education (Mulyasa, 2018).

Play is an activity that is inseparable from the lives of young children. Through play, children gain learning experiences that are both enjoyable and meaningful. Play enables children to explore, experiment, and actively interact with

their surroundings. In an educational context, play serves as an effective medium for stimulating various aspects of a child's development, including cognitive development. Through play, children can learn basic concepts without feeling burdened, ensuring that the learning process unfolds naturally and enjoyably (Montolalu, 2015).

Traditional games are a form of play that has been passed down through generations and embody educational and cultural values. Traditional games serve not only as entertainment but also as a learning tool capable of stimulating children's cognitive, social, emotional, and motor skills. In early childhood education, traditional games hold great potential for use as a learning medium because they are simple, easy to implement, and closely aligned with children's daily lives (Ismail, 2017).

In the context of modern education, the use of traditional games has begun to be displaced by technology-based digital games. Although digital games have high visual appeal, their excessive use can have a negative impact on children's cognitive and social development. Children tend to become passive, interact less with their surroundings, and experience a decline in their ability to concentrate. Unlike digital games, traditional games require children's active physical and mental engagement, making them more effective in stimulating children's thinking processes (Kurniati, 2019). The advantage of traditional games over digital games lies in their ability to directly involve children in the process of playing and learning. Traditional games encourage children to think, communicate, cooperate, and solve problems both independently and in groups. Furthermore, traditional games do not require complex equipment, making them easy to implement in RA/PAUD settings with limited facilities and resources. This makes traditional games an effective and economical alternative learning medium (Sukirman, 2016).

One traditional game with great potential for stimulating children's cognitive development is congklak. Congklak is a traditional game that uses a board with holes and seeds as playing pieces. The game is played by moving seeds from one hole to another according to specific rules. These activities require children to count, estimate, and devise simple strategies whilst playing (Hidayati, 2018). The game of congklak has characteristics that align with the cognitive development stage of children aged 5–6 years. Children are directly involved in counting the seeds, understanding the concept of quantity, and estimating the outcome of each move in the game. Furthermore, the game of congklak also trains children's memory in recalling the game's rules and the position of the seeds on the board. Thus, congklak

serves not only as a game but also as an effective medium for cognitive learning (Putri, 2020).

The link between the congklak game and numeracy skills is evident in children's activities when counting the number of seeds moved from one hole to another. This process helps children understand the concept of numbers, simple addition, and numerical sequences in a concrete way. Learning to count through the congklak game is carried out repeatedly and enjoyably, so that children do not feel pressured when learning basic mathematics (Rahayu, 2019). In addition to numeracy skills, the game of congklak also contributes to developing children's logical reasoning. Children are required to think strategically when deciding which moves to make in order to collect as many seeds as possible. This decision-making process trains children's logical thinking and understanding of cause and effect. Children learn that every action taken will result in specific consequences within the game (Sari, 2021).

The game of congklak also plays a role in improving children's concentration. Whilst playing, children must focus on the number of seeds, the position of the holes, and their turn to play. The concentration developed through this game is vital for young children as a foundation for participating in classroom learning activities. Children with good concentration tend to find it easier to understand instructions and complete tasks set by the teacher (Nurhayati, 2018). Children's problem-solving skills can also be stimulated through the game of congklak. Children learn to face challenges within the game, seek solutions when encountering difficulties, and evaluate the strategies they employ. This process helps children develop reflective and adaptive thinking skills from an early age. Thus, congklak not only trains basic cognitive abilities but also higher-order thinking skills in line with children's developmental stages (Widodo, 2020).

Previous studies have consistently demonstrated that traditional games contribute positively to the cognitive development of young children. However, a closer examination of the literature reveals that many of these studies remain broad and generalized, without specifically positioning the congklak game as a primary independent variable in influencing the cognitive development of children aged 5–6 years. In addition, empirical investigations focusing on the implementation of congklak within RA (Raudhatul Athfal) contexts are still relatively limited, indicating a need for more context-specific and evidence-based research (Rahmawati, 2021).

A more critical research gap can be identified in the lack of comprehensive studies that explicitly connect the mechanics and learning processes of the congklak

game with key indicators of cognitive development, such as numeracy skills, logical reasoning, concentration, and problem-solving abilities. Most prior research tends to examine cognitive development as a general construct, without breaking it down into measurable and specific sub-components. Furthermore, there is still limited exploration of how traditional game-based learning aligns with developmentally appropriate practices in early childhood education, particularly within culturally embedded learning environments like RA institutions (Handayani, 2022). Another notable gap lies in the scarcity of quasi-experimental or intervention-based studies that measure cognitive development outcomes before and after the structured implementation of traditional games, thereby limiting the strength of causal inferences in existing research.

Based on these gaps, this study offers a clear novelty by focusing specifically on the traditional congklak game as the main intervention variable and examining its direct effect on distinct cognitive development indicators in children aged 5–6 years. Unlike previous studies, this research adopts a more structured and measurable approach by linking the stages and rules of the congklak game to concrete cognitive skills, including counting ability, logical sequencing, sustained attention, and problem-solving strategies. Additionally, this study contributes novel empirical evidence from the RA educational setting, which has been underrepresented in prior research. The integration of cultural elements with cognitive development indicators also represents an innovative approach, positioning congklak not only as a traditional game but as a pedagogical tool grounded in local wisdom and play-based learning principles.

Therefore, the aim of this study is to determine the effect of the traditional congklak game on the cognitive development of children aged 5–6 years at RA Darussaadah Chaidir Adam. This research is expected to provide both theoretical and practical contributions. Theoretically, it enriches the body of knowledge in early childhood education, particularly in the domain of culturally responsive and play-based learning. Practically, it offers valuable insights for teachers in selecting engaging, effective, and developmentally appropriate learning media. Based on this framework, the hypothesis proposed in this study is that the traditional congklak game has a significant effect on the cognitive development of children aged 5–6 years.

METHODS

This study employed a quantitative approach using a quasi-experimental pretest-posttest design to determine the effect of the traditional congklak game on

the cognitive development of 5–6-year-old children at RA Darussaadah Chaidir Adam. The research subjects were all children in the 5–6-year-old age group, selected as the sample using a saturation sampling technique, given the limited population size (Arikunto, 2016). The research instrument consisted of a cognitive development observation sheet covering indicators of basic numeracy skills, logical thinking, concentration, and problem-solving abilities in children (Susanto, 2016). The research procedure comprised a preparation stage, the implementation of the congklak game activity as the intervention, and an evaluation stage involving the administration of a post-test to measure changes in the children's cognitive abilities. Data were analysed using a t-test or the Wilcoxon test, depending on the data characteristics, and supported by N-Gain calculations to determine the level of improvement in the children's cognitive development (Sugiyono, 2019).

FINDINGS AND DISCUSSION

The results of this study were obtained by measuring the cognitive development of children aged 5–6 years before and after they were given the treatment in the form of the traditional congklak game. Measurements were conducted using a cognitive development observation sheet covering indicators of basic numeracy skills, logical thinking, concentration, and problem-solving. The initial data (pre-test) indicated that, generally, the children's cognitive development was in the moderate category, suggesting that their cognitive abilities had not yet developed optimally prior to the traditional game-based learning intervention (Susanto, 2016).

Based on the pretest results, the majority of children still struggled to perform simple calculations independently, were inconsistent in following logical reasoning, and were easily distracted during learning activities. This suggests that the cognitive stimulation provided previously was not fully aligned with the learning characteristics of young children, who require concrete and enjoyable activities (Suyadi, 2017). Following the structured implementation of the traditional congklak game within learning activities, the post-test results showed a significant improvement across all indicators of children's cognitive development. The children appeared better able to understand number concepts, perform simple calculations more fluently, and demonstrated improved ability to devise simple strategies whilst playing. Furthermore, the children also showed better concentration levels and were able to complete the play activities until the end (Rahayu, 2019). A detailed comparison of the children's cognitive development pretest and posttest results is presented in Table 1 below.

Table 1. Pre-test and Post-test Results
Children's Cognitive Development (Scale 1–4)

No	Cognitive Development Indicators	Pre-test (Mean)	Post-test (Mean)	Difference
	Basic numeracy skills	2.10	3.35	1.25
	Logical thinking skills	2.30	3.45	1.15
	Concentration and focus	2.25	3.50	1.25
	Simple problem-solving	2.05	3.30	1.25
	Overall average	**2.18**	**3.40**	**1.22**

Notes:
Score 1 = Very Poor,
Score 2 = Poor,
Score 3 = Good,
Score 4 = Very Good

Table 1 shows that there was an increase in the average cognitive development score for children across all measured indicators. The highest increase was observed in the indicators of basic numeracy skills and concentration, which showed a score difference of 1.25. This indicates that the congklak game is highly effective in stimulating numeracy skills and maintaining children's focus during learning activities (Putri, 2020).

Before conducting the difference test, the normality of the pre-test and post-test data was first tested to determine the statistical analysis technique to be used. The results of the normality test showed that the data were normally distributed, so the analysis continued using a paired t-test. The results of the normality test are presented in Table 2 below.

Table 2. Results of the Normality Test
Pre-test and Post-test Data

Variable		Normality Test	Sig. (p)	Notes
Pre-test	20	Shapiro-Wilk	0.086	Normal
Post-test	20	Shapiro-Wilk	0.072	Normal

Based on the results of the normality test, the significance value (p) > 0.05, so the data is deemed to be normally distributed and meets the criteria for a paired t-test. The results of the paired t-test on the children's cognitive development pretest and posttest scores are presented in Table 3 below.

Table 3. Results of the Paired Sample t-Test
Children's Cognitive Development

Variable	Mean	Std. Dev	t-value	Sig. (p)
Pre-test	2.18	0.42		
Post-test	3.40	0.38	9.214	0.000

The t-test results show that the significance value (p) of 0.000 is less than 0.05, so it can be concluded that there is a significant difference between the pretest and posttest scores for children's cognitive development. Thus, the traditional game of congklak has been shown to have a significant effect on improving the cognitive development of children aged 5–6 years at RA Darussaadah Chaidir Adam (Sugiyono, 2019).

To determine the level of effectiveness in improving children's cognitive development, an N-Gain analysis was conducted. The results of the N-Gain calculations are presented in Table 4 below.

Table 4. Results of the N-Gain Analysis
Children's Cognitive Development

Cognitive Development Indicators	Pre-test	Post-test	N-Gain	Category
Simple arithmetic	2.10	3.35	0.63	Medium
Logical thinking	2.30	3.45	0.62	Moderate
Concentration	2.25	3.50	0.67	M oderate
Problem-solving	2.05	3. 30	0.61	Moderate
Average	2.18	3.40	0.63	Moderate

The results of the N-Gain analysis indicate that the improvement in children's cognitive development falls within the moderate category. This suggests that the traditional game of congklak is sufficiently effective in enhancing the cognitive

abilities of children aged 5–6 years. This improvement reflects that learning based on traditional games is capable of providing meaningful learning experiences that align with the developmental stages of young children (Hake, 1999).

B. Discussion

The research results show that the traditional game of congklak has a significant influence on the cognitive development of 5–6-year-old children at RA Darussaadah Chaidir Adam. The increase in cognitive development scores observed following the intervention indicates that playing congklak serves as an effective stimulus for developing children's thinking skills. This finding confirms that learning delivered through concrete and meaningful play is more readily accepted by young children than abstract or teacher-centred learning (Suyadi, 2017).

In particular, the most notable improvement was observed in children's basic numeracy skills and concentration. This can be interpreted as the congklak game requiring children to repeatedly count the seeds and continuously pay attention to the flow of the game. This process trains children to understand the concepts of numbers, sequences, and quantities in a concrete manner. Carrying out counting activities in a playful setting makes children more relaxed and motivated, allowing their cognitive abilities to develop without pressure (Susanto, 2016).

The findings of this study align with Jean Piaget's theory of cognitive development, which states that children aged 5–6 years are in the pre-operational stage transitioning to the concrete operational stage, where children's thinking processes remain heavily reliant on tangible objects and direct experience. The game of congklak provides a concrete medium in the form of a board and seeds, enabling children to explore directly. Thus, children can build cognitive understanding through the manipulation of real objects, in line with the principles of constructivism in learning (Piaget in Santrock, 2018).

Furthermore, the improvement in children's logical thinking and problem-solving skills indicates that the game of congklak not only trains basic cognitive skills but also encourages children to think strategically. Children learn to plan their moves, predict outcomes, and evaluate the decisions made during the game. This process aligns with Vygotsky's view, which emphasises the importance of social interaction and meaningful activities in developing higher-order cognitive functions in children (Vygotsky in Salkind, 2019).

The findings of this study also reinforce the concept of learning through play in early childhood education. Play serves not only as a form of entertainment but

also as a learning medium capable of integrating various aspects of a child's development. When children are actively engaged in the game of congklak, they not only learn to count but also develop concentration, memory, and self-control. This demonstrates that traditional games possess high educational value when utilised appropriately in the learning process (Mulyasa, 2018).

When compared with previous research, these findings align with the results of Rahayu's (2019) study, which stated that traditional games have a positive influence on improving the cognitive abilities of young children, particularly in the areas of numeracy and logic. Another study conducted by Putri (2020) also found that the use of the congklak game can significantly improve children's numeracy and concentration skills. The similarity of these results indicates that the congklak game demonstrates consistent effectiveness across various contexts of early childhood education.

However, this study differs from previous research, particularly in terms of its application and the cognitive indicators measured. This study does not merely focus on numeracy skills but also comprehensively examines logical thinking, concentration, and problem-solving abilities. Consequently, this study makes an additional contribution to enriching the empirical literature on the traditional game of congklak as a cognitive learning medium in RA institutions.

The implications of these findings suggest that the traditional congklak game can serve as an effective alternative learning strategy in RA/PAUD education. Teachers can utilise the congklak game as an integrated learning medium within daily learning activities, particularly to stimulate children's cognitive development. Besides being easy to implement, the congklak game also does not require significant costs and can be adapted to the school's facilities and infrastructure (Kurniati, 2019).

Furthermore, the application of the congklak game in RA learning can help teachers create a learning atmosphere that is enjoyable, interactive, and child-centred. Children become more active, enthusiastic, and directly involved in the learning process. This has a positive impact not only on cognitive development but also on children's overall learning attitudes. Thus, the congklak game has great potential to support the optimal achievement of learning objectives in RA.

Conclusion

Based on the findings of the study, it can be concluded that the traditional game of congklak has a significant positive effect on the cognitive development of children aged 5–6 years at RA Darussaadah Chaidir Adam. The integration of congklak into learning activities has been shown to enhance children's basic

numeracy skills, logical reasoning, concentration, and problem-solving abilities. This improvement is clearly reflected in the differences between pre-intervention and post-intervention outcomes, indicating that congklak serves as an effective and developmentally appropriate learning medium for early childhood education.From a practical perspective, these findings highlight that RA/PAUD teachers can adopt the congklak game as an innovative and culturally relevant instructional strategy to stimulate children's cognitive growth. Its simplicity, accessibility, and engaging nature make it highly adaptable for integration into daily classroom activities. Moreover, the use of traditional games like congklak also contributes to the preservation of local cultural heritage while supporting meaningful learning experiences. In a broader educational context, this approach aligns with play-based learning principles and can support the development of 21st-century skills such as critical thinking and adaptive problem-solving from an early age.In addition, the study carries important implications for curriculum development and policy. Educational institutions and curriculum designers are encouraged to incorporate traditional game-based learning models into early childhood education frameworks, particularly those that emphasize active, student-centered learning. Training programs for teachers may also consider including modules on the pedagogical use of traditional games to maximize their educational potential.However, this study is not without limitations. First, the sample size was relatively limited and confined to a single institution, which may affect the generalizability of the findings to broader populations. Second, the duration of the intervention was relatively short, potentially limiting the observation of long-term effects on children's cognitive development. Third, the study focused primarily on cognitive aspects, without extensively examining other developmental domains such as social-emotional or motor skills, which may also be influenced by the congklak game. Additionally, external factors such as children's home environment and prior exposure to similar games were not fully controlled.Therefore, future research is recommended to involve a larger and more diverse sample, extend the duration of the intervention, and explore the impact of congklak on multiple developmental domains. Further studies could also investigate variations in game implementation, integration with digital or hybrid learning approaches, and comparative analyses with other traditional or modern educational games to produce more comprehensive and generalizable findings.

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