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The Effect of the Traditional Dakon Game on the Intelligence of Children Aged 4–5 Years at KB Ester Sidoasri, Sumbermanjing Wetan (An Experimental Quantitative Study)

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ABSTRACT

This study aims to determine the effect of the traditional game dakon on the intelligence of children aged 4–5 years at KB Ester Sidoasri, Sumbermanjing Wetan District, before and after being given an intervention in the form of the dakon game. This research employed a quantitative approach with a one-group pretest-posttest experimental design. The subjects of the study were children aged 4–5 years enrolled at KB Ester Sidoasri. The instrument used was an intelligence test administered before (pretest) and after (posttest) the dakon game intervention. The results showed a significant increase in the children's intelligence levels following the intervention. The game proved effective in stimulating children's cognitive abilities, such as logical thinking, counting, and decision-making. Therefore, the traditional game dakon can serve as an enjoyable and beneficial learning medium to support the cognitive development of early childhood.

Introduction

Early childhood is a critical phase in human life, as it serves as the primary foundation for character formation and the development of individual abilities. According to Law No. 20 of 2003 on the National Education System, early childhood spans ages 0 to 6. During this period, children experience accelerated development in various aspects such as cognitive, socio-emotional, motor skills, and language. Erikson emphasized that this early stage of life is crucial for building self-confidence and independence (Thahir, 2023), while Piaget explained that children aged 2–7 years are in the preoperational stage, where they begin to develop symbolic and imaginative thinking abilities, as well as simple logical reasoning (Berk, 2013). Therefore, providing appropriate stimulation and learning experiences at this stage is crucial in supporting children's readiness for the next level of education and their long-term development.

However, many early childhood education institutions still fail to optimize teaching approaches that are suited to children's characteristics, especially in providing concrete, active, and enjoyable learning media. Most educational activities in early childhood education (PAUD) are still conventional and teacher-centered, where children passively receive information. This condition also exists at the Ester Sidoasri Playgroup (KB), Sumbermanjing Wetan District, Malang. Based on an observation on May 14, 2025, it was found that out of 17

children aged 4–5 years observed, only 6 children showed interest when given counting activities or asked to mention numbers, while the others were easily distracted and lacked focus. To address this, alternative learning media are needed that can stimulate children's engagement, learning interest, and cognitive development. One relevant and contextual approach is through traditional games, such as *dakon*. *Dakon* is a traditional game that is not only recreational but also educational. The game requires children to count dakon beans, anticipate game steps, devise strategies, and cooperate with others, thereby indirectly stimulating logical-mathematical intelligence and social skills (Santrock, 2002).

According to Piaget's theory of development, children aged 4–5 years are in the preoperational stage, where they learn through direct experiences and concrete activities (Ibda, 2015). Therefore, concrete games like *dakon* are highly suitable for supporting early childhood learning styles. This is supported by the findings of Sari & Astuti (2020), which show that *dakon* games can enhance logical-mathematical abilities and strengthen social interactions among children. Vygotsky also emphasized that play is an important activity in cognitive and social development because children learn through social interactions in the zone of proximal development (Pratiwi, 2020). In addition to empirical findings from previous studies, this research is also theoretically supported by Vygotsky's cognitive development theory.

According to Vygotsky (1978), children's intellectual development is greatly influenced by social, cultural, and environmental interactions. One of his key concepts is the Zone of Proximal Development (ZPD), which is the distance between a child's current ability (which can be done independently) and their potential ability (which can be reached with assistance). In this context, the traditional *dakon* game is an appropriate activity because it involves social interaction, cooperation, and peer discussion, creating a learning situation within the ZPD. Through this game, children not only engage in physical play but also use higher-level thinking skills such as remembering steps, creating strategies, and making decisions, all of which encourage cognitive advancement.

Gardner (2013) explained that early childhood intelligence is not limited to intellectual (IQ) but also includes logical-mathematical, spatial, interpersonal intelligence, and others. Therefore, games like *dakon* have great potential to stimulate children's holistic intelligence, including logical thinking, strategy building, and social interaction. However, traditional games like this are still rarely used as learning media in early childhood education. Some previous studies support the effectiveness of *dakon* as an educational medium. Rahmawati et al. (2022) showed that geometric modifications of *dakon* games could enhance the logical-mathematical intelligence of early childhood. Meanwhile, research by Siregar et al. (2024) at Tunas Permata Early Childhood

Education, Banyuwangi, showed that *dakon* games improve children's concentration, decision-making, and problem-solving abilities. Additionally, Saputra (2019) stated that traditional games can significantly help children learn logical thinking and enhance their problem-solving skills. Based on field observations and support from previous studies, it was found that the conventional approach at KB Ester Sidoasri has not effectively stimulated the intelligence of children aged 4–5 years. However, the traditional *dakon* game has proven to be a relevant and effective alternative solution to support concrete and enjoyable learning processes. Therefore, this study is essential to examine the effectiveness of the traditional *dakon* game on the intelligence of 4–5-year-old children at KB Ester Sidoasri, as an intervention tailored to early childhood learning characteristics.

Although various studies have shown that the traditional *dakon* game can significantly contribute to the cognitive development of children, the reality in the field reveals that learning methods still fail to fully utilize the potential of contextual learning media. This is reflected in the initial observation at the Ester Sidoasri Playgroup (KB), where the learning activities tend to be teacher-centered, with minimal use of concrete (real) educational media. Children appeared less active and lacked focus when participating in counting or basic math concept introduction activities in a conventional manner. Out of the 17 children aged 4–5 years observed, only about one-third showed enthusiasm and

engagement in these activities. This indicates that the learning approach used has not been able to optimally address the needs and developmental characteristics of early childhood.

This problem highlights the importance of a more in-depth study of the children's initial intelligence level before being introduced to educational games. Therefore, this study was conducted to assess the intelligence of 4–5-year-old children at KB Ester Sidoasri before they are introduced to the traditional *dakon* game. This preliminary study is essential to provide a complete picture of the children's condition before the learning intervention. The scope of intelligence referred to in this research includes aspects such as logical-mathematical thinking, logical reasoning, concentration, and simple decision-making, as reflected in daily play and learning activities. The definition of intelligence in this context refers to Gardner's (2013) view, which asserts that intelligence is not limited to intellectual abilities alone but also encompasses various forms of abilities such as logical-mathematical, interpersonal, and spatial intelligence.

The findings of this study are expected to provide a substantial contribution to improving the quality of learning in early childhood education institutions, especially through an approach based on traditional *dakon* games. Practically, the findings can be used by educators and PAUD (early childhood education) institution managers as a guide in designing learning strategies that are more aligned with

children's learning styles. Academically, this study is expected to enrich scientific references related to the use of traditional *dakon* game-based learning media, particularly in relation to the cognitive development of early childhood. The findings can serve as a reference for educators and researchers in developing learning models that are in line with children's characteristics.

On the social and cultural side, the use of traditional games like *dakon* not only functions as an educational tool but also contributes to the preservation of local culture, which holds educational value and remains relevant to today's children. Therefore, this research has broad benefits, both in supporting the improvement of early childhood education quality, strengthening the foundation for research in culture-based learning, and preserving traditional games as part of the nation's cultural heritage.

Methods

This study uses a quantitative approach with an experimental method (Sugiyono, 2018). The experimental design employed is a One-Group Pretest-Posttest Design, which is a research design involving one group of subjects who are given an intervention, and measurements are taken before and after the intervention to observe any significant changes (Hikamawati, 2020). This research was conducted from May to June 2025 and took place at KB Ester Sidoasri, located in Sumbermanjing Wetan District, Malang.

The subjects of this study are children aged 4–5 years who are registered as students at KB Ester Sidoasri during the second semester of the 2024/2025 academic year. The subject selection was done using saturated sampling, meaning all children in the age range who were enrolled at the institution were included as participants, due to the limited number of children and the feasibility of studying them all.

The research procedure began with the collection of baseline data through a pretest to assess or observe the children's initial abilities before the intervention. Following this, the subjects were given the intervention based on the predetermined independent variable in the experimental design. After the intervention, a posttest was administered to assess any differences or improvements in the results. Throughout the process, observations were made to record behaviors, responses, and activities related to the intervention provided.

Instruments used in this research included observation sheets, pretest and posttest questionnaires, and supporting documentation. Observation sheets were used to collect qualitative data that emerged during the learning process. Pretest and posttest instruments were used to gather valid quantitative data that describe the children's abilities before and after the intervention, while documentation was used as additional data to support the validity of the findings.

Data collection techniques included direct observation, written tests during the pretest and posttest stages, and the collection of both

visual and administrative documentation. The data obtained were analyzed using descriptive and inferential statistical techniques (Ghozali, 2021). Descriptive analysis was used to illustrate the pretest and posttest results, while inferential analysis was performed using a paired sample t-test to determine the significance of the differences between the pretest and posttest results. The aim of this analysis is to assess the effectiveness of the intervention in improving the children's abilities based on the variables studied.

Result and Discussions

The findings of this study show a consistent improvement in the children's intelligence scores after receiving the intervention in the form of the *dakon* game. This strengthens the argument that educational games based on local culture can provide significant cognitive stimulation.

The table below presents the children's intelligence scores before and after the intervention:

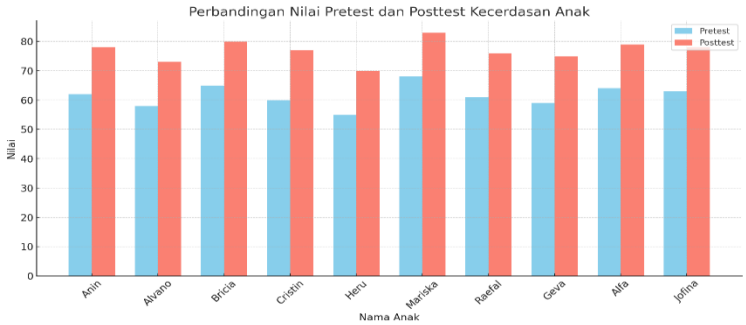
Table 1. Results of Children's Intelligence Measurement Before and After the *Dakon* Game Intervention

No.	Child's Name	Pretest (O1)	Posttest (O2)	Difference (O2-O1)
1	Anin	62	78	+16
2	Alvano	58	73	+15
3	Bricia	65	73	+15

4	Cristin	60	80	+17
5	Heru	55	70	+15
6	Mariska	68	83	+15
7	Raefal	61	76	+15
8	Geva	59	75	+16
9	Alfa	64	79	+15
10	Jofina	63	78	+15
	Mean	**61.5**	**76.9**	**+15.4**

To further enhance the presentation of the quantitative data, the results of the children's intelligence measurements before and after the *dakon* game intervention are not only presented in tabular form but also visualized in a bar chart. This visualization aims to provide a clearer and more comprehensive view of the pretest and posttest score differences for each subject. The chart illustrates the trend of individual and collective improvements in scores and facilitates the identification of patterns of change after the intervention. Therefore, the graphical representation is expected to aid in the visual interpretation of data and reinforce the finding that traditional *dakon* games have a positive impact on the intelligence of early childhood.

Figure 1. Comparison of Pretest and Posttest Scores on Children's Intelligence After the *Dakon* Game Intervention



The graph above compares the pretest and posttest intelligence scores of children after being given the *dakon* game intervention:

- The light blue color represents pretest scores.
- The light pink color represents posttest scores.

  It is clear that all children experienced an increase in their scores after the intervention, indicating that the traditional *dakon* game had a positive effect on the children's intelligence.

Based on the results presented in Table 1 and Figure 1, it can be seen that all participants at KB Ester Sidoasri experienced an increase in intelligence scores after participating in the learning session using the traditional *dakon* game. The pretest scores, which ranged from 55 to 68, increased to 70 to 83 on the posttest. The average pretest score of 61.5 increased to 76.9 on the posttest, with an average improvement of 15.4 points. This improvement occurred consistently for all subjects, with no decrease or stagnation in scores. This shows that the intervention in the form of the *dakon* game contributed positively to the cognitive development of early childhood (Kusuma et al., 2022).

This observed improvement can be explained in relation to the

research objectives, which were to examine the effect of the *dakon* game on children's intelligence. The data presented in the graph and table show that the *dakon* game successfully stimulated various cognitive aspects, such as counting ability, predicting steps, remembering positions, and making strategic decisions during play (Istifadah, 2024). These activities are clear forms of stimulation for the executive functions of the child's brain, which play an essential role in learning and decision-making processes.

The phenomenon of improvement can be explained by linking it to the theory of cognitive development proposed by Piaget (2013), where children at the preoperational stage develop the ability to think logically in a concrete way. In the *dakon* game, children learn to plan their moves, count, and recall previous moves, which actively engage their cognitive functions and contribute to their intelligence.

The positive effect of the *dakon* game on children's cognitive development is also supported by Vygotsky's (1978) theory of cognitive development, which emphasizes the role of social interaction and collaborative activities in enhancing cognitive abilities. The *dakon* game, by encouraging social interaction and collaboration among children, creates a learning environment within the Zone of Proximal Development (ZPD). According to Vygotsky, children's cognitive abilities are developed more effectively when they are assisted by others, and the *dakon* game facilitates this process by allowing children to work

together and learn from their peers.

In addition, Gardner's (2013) theory of multiple intelligences suggests that the *dakon* game engages not only logical-mathematical intelligence but also interpersonal and kinesthetic intelligences. Children engage in social interaction while playing the game, which fosters their interpersonal skills, and they also use their hands to manipulate the *dakon* pieces, stimulating kinesthetic intelligence. Therefore, the *dakon* game provides a holistic approach to developing various forms of intelligence.

The results of this study indicate that the *dakon* game has a positive impact on improving children's cognitive abilities, including their logical thinking, concentration, memory, and decision-making skills. These findings support the use of traditional games as an effective learning tool in early childhood education, as they provide concrete and enjoyable learning experiences that stimulate cognitive development. Furthermore, the study suggests that the *dakon* game can be a valuable addition to the educational practices at KB Ester Sidoasri and other similar early childhood education institutions.

Moreover, the uniformity of the improvement across all children (with an average increase of 15 to 17 points) indicates that the *dakon* game is inclusive and can reach children of all ability levels. This reinforces the argument that traditional games can serve as equitable learning tools, particularly in early childhood education, where

developmental stages and learning needs can vary widely. The fact that all children showed improvement demonstrates that the *dakon* game is a versatile tool that can contribute positively to the cognitive development of young children, regardless of their initial skill levels.

Conclusion

This study demonstrates that the traditional *dakon* game positively impacts the intelligence of children aged 4–5 years. The intervention led to a significant increase in cognitive abilities, with an average improvement of 15.4 points in intelligence scores. The *dakon* game successfully stimulated children's logical thinking, concentration, memory, and decision-making skills, supporting the achievement of holistic early childhood education goals. The results align with developmental theories by Piaget, Vygotsky, and Gardner, highlighting the importance of interactive and culturally relevant learning experiences. This study underscores the value of incorporating traditional games like *dakon* into early childhood education curricula to enhance cognitive and social development. It provides evidence that such games are not only fun but also effective educational tools that contribute significantly to children's growth.

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