



The Effect of the Number Dice Game on the Logical-Mathematical Intelligence in Children 5-6 Years Old

Jhoni Warmansyah¹; Rini Anriani¹; Dola Permata Sari¹; Welda Eliza¹; Ahmad Sabri²; Amalina³

¹ Early Childhood Education Department, UIN Mahmud Yunus Batusangkar, Indonesia

² Islamic Education Department, UIN Imam Bonjol Padang, Indonesia

³ Mathematics Department, UIN Imam Bonjol Padang, Indonesia

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Abstract

This study aims to determine the effect of the number dice game on the logical-mathematical intelligence in children 5-6 years old. This study used a quantitative pre-experiment design method with one group pretest-posttest type. The sampling technique was purposive sampling, which consisted of 17 children. The data collection technique used the checklist observation sheet on the development of the ability to recognize number concepts. Then, the data is processed by t-test. The results showed that there was an average increase in children's ability to recognize the concept of numbers after being given a number dice game. The results of hypothesis testing also prove that t count is greater than t table. This means, that there is a significant difference between the pre-test and post-test in the experimental group. So, it can be said that the number dice game has an effect on the logical-mathematical intelligence in children 5-6 years old.

Keywords: *The Number Dice Game; Logical-Mathematical Intelligence; Early Childhood*

Introduction

Cognitive development is a development that is important to develop early on because cognitive development is the stages that experience changes that will occur in the life span in how to understand, capture information, solve problems, and understand everything (Amalina et al., 2022; Nuha & Munawaroh, 2022; Priyanti & Warmansyah, 2021). Thus, children with good cognitive development can improve their ability to use the knowledge they have, and some changes occur in the attitude of thinking, intelligence, and children's language so that they can provide explanations so that children can remember, can think in solving problems, and can combine sentences are said meaning (Mualim & Saputra, 2021; Wulandani & Putri, 2022).

One aspect that is stimulated in children's cognitive development is logical-mathematical intelligence (Hendrik & Susanti, 2019; Nabighoh et al., 2022). Mathematical logic intelligence is

intelligence that can involve skills and abilities in using numbers well and doing reasoning correctly, such as the ability to solve problems and develop something with numbers and reasoning. Logical-Mathematical intelligence in early childhood can develop through playing, questioning, and solving (Ramadhani et al., 2019). So, logical-mathematical intelligence is intelligence that can involve skills and abilities in using numbers well and reasoning correctly.

The results of research conducted by Mufarizuddin, (2017), found that children who are intelligent in logical-mathematical related to understanding and skills in processing numbers and are proficient in using knowledge and thoughts. In line with this opinion, other research also mentions that logical-mathematical intelligence is related to the ability to count, reason, think, and able to solve problems (Aulia & Amra, 2021; Aunio & Räsänen, 2016; Warmansyah & Amalina, 2019; Wulandani & Putri, 2022).

Children who have mathematical logic intelligence will be more optimal in their ability to use numbers well and be able to complete math lessons (Idris et al., 2022; Niyati et al., 2016). From some of these opinions, it can be concluded that logical- mathematical intelligence is one aspect of the development of psychological characteristics that are important to be developed in early childhood (Badrudin et al., 2022; Suharman, 2018). This intelligence is said to be a child's ability to recognize and perceive mathematical symbols and numbers. These numbers and mathematical symbols indicate the early childhood ability to use mathematical logic in the early growth and development phase (Fauziyah et al., 2017).

In logical-mathematical intelligence, there are also several indicators that can be seen, including 1) the ability to recognize numbers, 2) the ability to demonstrate numbers, 3) the child's ability to understand symbols, and 4) the ability to know geometric shapes (Devi Yana & Asmendri, 2021; Elina, 2021). These indicators need to be developed in children, especially on indicators of mathematical logic intelligence because the intelligence they get from an early age will create and form knowledge that can develop the ability to recognize numbers, reason, the ability to understand symbols, and the ability to know geometric shapes. So, if a child's mathematical logic intelligence is not honed from an early age, the child will experience difficulties in learning mathematics (Amalina et al., 2022).

The results of observations at several group B kindergartens in the West Pasaman district, there are still various problems found including in mathematical logic intelligence including 1) children are less able to recognize numbers when participating in the learning process, 2) children experience difficulties in numeracy skills, 3) the learning process does not attract children's interest in counting and the media used is less varied so that it makes children bored and bored when learning occurs, 4) the lack of use of game methods in number recognition and counting so that children do not understand the concept of learning.

The results of interviews with several teachers who found reinforced this first, the mathematical logic intelligence of children aged 5-6 years was still low. Second, during the learning process of introducing geometric shapes, the teacher still used media images. Third, the teacher only used the lecture method in learning so that children got bored in learning, the four teachers still have a limited understanding of mathematical logic intelligence, the fifth is the lack of games used during the learning process, the six media used are less varied during learning.

So, overcoming the problem of children's logical-mathematical intelligence needs to be done in an interesting, creative, and fun way for children. One step is by playing the number of dice. Playing is a necessity for children because through playing, children gain knowledge that can develop their abilities (Samsiah, 2018). They carried this dice game out in kindergarten learning activities that are linked to learning mathematics, because the dice have numbers or the number of dots, making it easier for children to count.

The results of research by Wardani et al., (2018), regarding increasing cognitive abilities by playing dice, there was an increase in children's ability to count using dice games. Reinforced research by Febrianti's (2018), playing dice on the ability to count from 1 to 6 in mathematics lessons in children shows that there is a change in score or an increase in early childhood math skills. This dice game is one of the relevant games for conveying the learning of mathematical addition with fun game techniques (Yumarlin, 2013).

Other studies state they can exercise the influence of mathematical logic intelligence through the use of various media, methods, strategies, and others. Research conducted by Mufarizuddin, (2017), said that to increase the logical-mathematical intelligence in children, one of them can use puzzle media which is used to convey information. Also supported by research conducted by Budianti (2021), using the number of dice games, it turns out that there is an influence on children's logical-mathematical intelligence. Calculations using certain experiments prove this (Zubaidah, 2018). The various problems in the intelligence of mathematical logic before, there have been many other studies considering problems with various media, methods, and strategies, but the problems in the research location need to be presented with treatment by providing a number dice game to overcome the existing problems. Therefore, this study aims to determine the effect of the Number Dice game on the mathematical logic intelligence in children 5-6-year-old.

Method

The type of research used is quantitative research using experimental methods with one group pretest-posttest design.

Table 1. Research Design

Group	Pre-Test	Treatment	Post-Test
Eksperimen	O ₁	X	O ₂

This research was conducted at the Makarti Mukti Tama Kindergarten, West Pasaman Regency. Purposive sampling is used in research sampling because researchers use certain criteria to ensure that the samples collected are relevant to the research objectives. Researchers used a sample of 17 children aged 5-6 years. The data collection technique uses a child development checklist consisting of aspects 1) the ability to recognize numbers, 2) the child's ability to show numbers, 3) the child's ability to understand symbols, 4) the ability to know geometric shapes, using a score range of 1-4 with the undeveloped category (1), starting to develop (2), developing according to expectations (3), very well developed (4). Testing the hypothesis of testing the effect before and after being given treatment on average using the t-test.

Result and Discussion

The data described in this study consists of the experimental group, namely the data about the pretest results on the intelligence of mathematical logic of children aged 5-6 years before treatment (treatment) of the experimental group consisting of one pretest then continued with four experiments and ended with posttest.

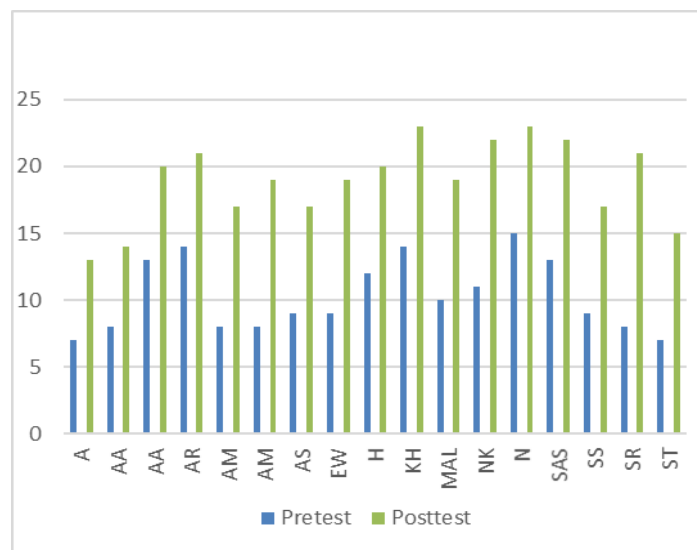
Table 2. Classification of Mathematical Logic Intelligence Development Score

No	Interval	Category	Pre test	
			F	%
1	20-24	Develop very well	0	0
2	15-19	Develop according to expectations	1	5,88
3	11-14	Began to develop	6	35,29
4	6-10	Undeveloped	10	58,82
Amount			17	100

Based on the table above it can be understood that in the pretest data there is no one child with a very good developing category, developing according to the expectations of 1 child, 6 children begin to develop and 10 children have not developed with a percentage.

Table 3. Acquisition of data on the results of the development of logical-mathematical intelligence in posttest assessment

No	Interval	Category	Posttest	
			F	%
1	20-24	Develop very well	8	47,05
2	15-19	Develop according to expectations	7	41,17
3	11-14	Began to develop	2	11,76
4	6-10	Undeveloped	0	0
Amount			17	100



Graph 1. Comparison of Pretest and Posttest values

Based on the table and graph above obtained the highest score is 23 and the lowest score is 13. Children who in the category have not developed are not children, there are 2 children with a percentage of 11.76% with the category of starting to develop, 7 children develop as expected with category 41, 17%, 8 children developed very well in the 47.05% category. From the data above it can be seen that the development of the intelligence of the mathematical logic of children in TK Makarti Mukti Tama Pasaman Barat is said to increase after being given treatment with the game of dice numbers.

Hypothesis Testing

In answering the formulation of the problem, the hypothetical test that will be carried out using the t-test. Before the t-test is carried out, the calculation table is first made to obtain the following t value:

Table 5. Calculations to obtain "t" in order to test alternative hypothetical truths

No	Kode Child	<i>Pretset</i> Score	<i>Posttest</i> Score	D	D2
1	A	7	13	6	36
2	AA	8	14	6	36
3	AA	13	20	7	49
4	AR	14	21	7	49
5	AM	8	17	9	81
6	AM	8	19	11	121
7	AS	9	17	8	64
8	EW	9	19	10	100
9	H	12	20	8	64
10	KH	14	23	9	81
11	MAL	10	19	9	81
12	NK	11	22	11	121
13	NK	15	23	8	64
14	SAS	13	22	9	81
15	SS	9	17	8	64
16	SR	8	21	13	169
17	TK	7	15	8	64
Total		169	322	147	1.425

The next step gives interpretation to the T-Count by first calculating the DF and the DB, $n-1 = 16$. Comparing the amount of "t" obtained with the calculation ($t_0 = 4$) and the "t" listed in the T value table at a significant level 5%, namely 1.74, it is known that T-Count is greater than T-Table, which is $4 > 1.74$ because T-Count is greater than T-Table, the proposed nil hypothesis (H_0) is rejected and alternative hypothesis is accepted (H_a) This means that the effect of number dice games can increase of the logical mathematical intelligence in children 5-6 years old at Makarti Mukti Tama Kindergarten.

Based on the above data related to the influence of the number of dice game on the of the logical-mathematical intelligence in children aged 5-6 years old that the problem that is found in

early childhood. The main purpose of this study is to find out whether the numbers dice game affects the logical-mathematical intelligence.

In this study, the researcher saw that the number of dice game activity could affect the intelligence of children's mathematical logic. Each child has different abilities in accordance with the stages of the development of each child, one of the developments that can be developed in children is the development of logical mathematical intelligence. Children will be excited if the learning activities carried out are interesting. Moreover, learning is done using games that can increase the spirit of children's learning. The number dice game will make children more interested in following the learning process.

This research is in accordance with research conducted by Saroinsong et al., (2021), the results of his research on learning activities in children through dice games there was an increase in cognitive abilities in children through dice game Activity. This means that playing dice can improve cognitive abilities in counting. In line with the results of research conducted by Stegemann & Grünke, (2014), the results of his research mastery of the concept of counting using objects and saying numbers 1-20 can increase through playing activities in the dice board in turn. Also supported by research conducted Amini & Suyadi, (2020), the results of his research through dice media in learning mathematics early childhood the introduction of numbers is very suitable and appropriate.

So, after the researcher applies the influence of the number dice game, the logical mathematical intelligence has increased. The success of the research seen in the results of the study, shows that there is a suitability between the results of the study. This can be seen in the learning process of children in the dice game activities at Makarti Mukti Tama Kindergarten. This success proves that the effect of number dice can be used in increasing the logical mathematical intelligence children in 5-6 five years old.

Conclusion

Based on the results of the study it can be concluded that the number dice game has an effect on children's logical-mathematical intelligence. The number dice game is an interesting activity, so that children are more focused on the learning process given by the teacher. The effect of the number dice game can be used as a choice of activities that teachers can use to stimulate logical-mathematical intelligence in children.

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