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**UTILIZATION OF CALCULATION BOARD MEDIA TO DEVELOP  
COGNITIVE CAPACITY OF COMMUNICATION IN EARLY CHILDREN**

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**ABSTRAK**

Cognitive development is identical to the ability of mathematical logic and arithmetic. At RA Diponegoro 224 Adisara the children could not distinguish the symbols of number symbols correctly, they could only mention the numbers 1-10 in sequence using a rote model. This study aims to determine whether children's numeracy cognitive abilities can develop using counting board media. The subjects in this study were 24 students consisting of 12 boys and 12 girls at Raudatul Athfal Diponegoro 224 Adisara, Jatilawang District, Banyumas Regency. Data collection techniques used are observation, interviews, and documentation. The data analysis technique used in this research is qualitative data analysis in descriptive form. The results of this study indicate that learning by using the counting board media can develop children's cognitive ability to count. With a counting board, children can learn to count with real objects instead of abstractly. Children also like to count using a counting board because it is more interesting. After all, on the counting board, there are colourful number cards that attract children's attention.

**Keywords:** cognitive, counting, counting board media



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## **1. INTRODUCTION**

Children have a golden period from birth to the age of six, which is called the golden age, but it is also a very critical period in human growth. For Suyadi (2014) Early childhood education focuses more on the growth of all factors that lead to the formation of children's character. In the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 137 of 2013, aspects related to early childhood development are (1) religious and moral values, (2) physical and motor values, (3) cognitive, (4) language, (5) Socio-emotional and (6) Art (Permendikbud 137, 2013). One of the most important aspects to develop is cognitive development. Children need cognitive skills to develop their knowledge of what they see, hear, taste, touch or smell through their five senses, by developing cognitive and thinking functions that can be used to address and solve problems and questions quickly and accurately.

Cognitive ability is seen as intelligence or children's ability to think more complexly, reason and solve problems. This cognitive development will make it easier for children to understand broader common sense so that children can function effectively (Yusuf, S., 2012). Cognitive is the basis of a child's ability to think. This is in line with Susanto's view as quoted by

Nirawati & Yeti (2019). Cognitive is a thought process, an individual's ability to relate, evaluate and consider one or more events. So cognitive processes related to intelligence indicate that a person has various interests, especially to learn ideas. According to Sujiono (2013) cognitive skills include grouping objects with the same colour, shape, and size, matching circular connections, triangles, and rectangles, and being able to count and understand numbers 1 to 20 (Yuliani, 2008). At the age of 5-6 years. According to the rules of Education Regulation no. 137 concerning the National Standard for Early Childhood Education which has been in effect since 2014, cognitive development includes 1. Mentioning numbers 1-10, 2. Solving simple everyday problems, 3. Categorizing objects 4. Distinguishing patterns based on size, colour and shape 4 Understanding the ABCD-ABCD pattern, 5. Arrange objects based on dimensions from very small to large or vice versa (Permendikbud tentang Standar Nasional PAUD, 2014).

Children's cognitive development consists of four stages. The first is the sensorimotor stage, where the child understands objects around him through sensors and motor activity or movement. The second stage is the pre-operational stage where the child's thinking process is centred on mastering symbols that can express past



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experiences. The three concrete operational stages are where children begin to be able to overcome problems related to sorting, classification, decentering, reversibility, conservation and eliminating egocentricity. In the four stages of formal operations, at this stage, the child already can think abstractly and reason logically (Susanto, A., 2007).

Counting is a part of mathematics that is needed in everyday life, especially the concept of numbers to develop mathematical abilities and preparation for participating in basic education. Counting in kindergarten is expected not only to be related to cognitive abilities, but also mental, social readiness, and emotional (Nirawati, T., 2019). Counting is a mathematical skill for every child, such as adding up or sorting numbers and counting, to develop the skills needed in life, developing mathematical skills plays an important role in preparing children for basic education (Khadijah, K., 2016). Sriningsih argues that if the child's counting activity is spoken along with number sequence and counting activities as it is. Children say some numbers without associating them with specific objects. By the time they are 4 years old, they can tell a sequence of numbers up to ten. On the other hand, 5-6-year-olds can pronounce numbers up to one hundred (Sriningsih, N., 2014).

The purpose of teaching mathematics at the Ministry of National Education is to know the basics of mathematics so that children are better prepared to learn mathematics at the next stage which is more environmentally friendly. On the other hand, they can think logically and systematically from an early age, observing certain objects, pictures, or numbers in their immediate environment (Depdiknas, 2000).

According to Piaget quoted by Norma Diana Fitri the purpose of early childhood numeracy learning is to learn to think logically and mathematically in a fun and uncomplicated way. The purpose of learning numeracy for early childhood is to train children to think logically and systematically from an early age and to introduce the basics of learning to count so that in time children will be better prepared to take counting lessons at the next complex level (Fitri, N. D., & Hariani, I. T., 2019).

In choosing children's education, it should also be adjusted to the characteristics of early childhood, it is intended that learning objectives can be achieved without ignoring the process carried out to achieve these goals. Media acts as a way of interpreting messages or messages conveyed by the sender of the message to the recipient of the message, in this case, the student is the recipient of the message and the teacher is the sender of the message.



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Previous research conducted by Siti Rahmah the results of her research shows that students' numeracy competence increases greatly when using a flannel board (Rahmah, S., 2020). The research of Norma Diana Fitri and India Tri Hariani stated that there was a very significant increase in numeracy skills using the fingermathic method in early childhood in Tunas Asri Benowo Kindergarten Surabaya (Fitri, N. D., & Hariani, I. T., 2019). Research by Titin Nirawati and Rivda Yetti The improvement of children's numeracy skills at Pelita Bunda Kindergarten Batang Lapu West Pasaman can be improved, one of which is by using a turntable game (Nirawati, T., & Yetti, R. 2019). This shows that the presence of media can also support children's needs for simpler modules, children feel happier when learning, because they learn to read realistically with real objects, not abstracts.

For students of RA Diponegoro 224 Adisara, based on the results of initial observations, the author argues that there are still many children whose numeracy skills have not developed when counting from one to 10. Children still cannot read with number symbols. This is because the media used by the teacher is in the form of words and blackboards so children are not interested in learning to count.

Based on the results of observations made by the author at Raudhatul Athfal Diponegoro 224 Adisara, the author tries to use the counting board media to improve children's numeracy skills. This matter is tried to attract children's attention so that children do not get bored, focus more on learning and can respond well to teacher problems. Because by using the counting board media, children's learning to count activities is tried while playing. Learning to count using the counting board media is given which states that learning to count while recognizing objects where the teacher provides any object into the container, then takes one by one the child and counts until the objects in the container run out. the container, so that without realizing it the child can learn to count while recognizing objects (Nirawati, T., & Yetti, R., 2019).

The purpose of this study was to determine the development of children's numeracy skills using the counting board media. The author proposes a hypothesis that children's cognitive abilities can develop using counting board media.

## **2. METHODS**

This research uses descriptive qualitative research. Qualitative research seeks to detect and describe in a narrative way the activities that are tried and the consequences of the actions that are attempted on the



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subject (Anggito, A., & Setiawan, J., 2014). The result referred to in this study is the numeracy ability of class B students at Raudhatul Athfal Diponegoro 224 Adisara after being tested, learning activities to count using the counting board media. According to the explanation of Suharsimi Arikunto Descriptive qualitative research is an analysis procedure which is interpreted with words or sentences to obtain the right conclusion (Arikunto, S., 2013).

This research was conducted at RA Diponegoro 224 Adisara, with the research subjects being students of Raudhatul Athfal Diponegoro 224 Adisara class B, totalling 24 children with details of 12 girls and 12 boys. The object of this research is the numeracy ability of RA Diponegoro 224 Adisara students. Data collection techniques were carried out using initial observation, then interviews and documentation.

The data analysis technique used in this research is descriptive. The data obtained from the research results in the form of information written in the form of a sentence description to be used as a conclusion.

### **3. RESULTS AND DISCUSSION**

The results were obtained after the authors carried out learning activities using the counting board media in RA Diponegoro 224 Adisara students, children who played with cognitive counting boards could count.

The number of children who play using the counting board media is 24 children. Before the children were invited to play using a counting board, the author also

In the initial conditions before the research was conducted, the majority of children at Raudhatul Athfal Diponegoro 224 Adisara had difficulty when counting activities were held. In general, children can only memorize numbers, but children cannot understand the shapes of numbers. This situation can be seen from the results of the initial observations that have been made by the author, that in the cognitive aspect, children can mention numbers 1-10 by rote, they memorize the sequence of numbers from 1-10 because they often hear, but it turns out that children can't tell the difference. symbols for numbers 1-10 properly and correctly. Before the writer applied to learn to count with the media of the counting board, the writer tried to invite children to learn to count using the media module. The result is that from 24 children there are only 2 students who can name and match the symbols of the numbers 1-2 correctly, while 22 children can only mention them and cannot match the symbols of the number symbols. When asked about numbers at random and not in order, the children also felt confused because it turned out that they could only mention numbers sequentially from numbers 1 to 10 by rote



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because they often hear from and have not memorized it understandably.

After the author tried to invite children to learn to count without using the media and it was found that most of them did not understand numbers and could not distinguish the symbols of number symbols, then the author invited children to learn by using the counting board media. The counting board is used for playing. The children were introduced to the counting board media and the writer explained how to play with the counting board media. The children were very enthusiastic and curious about the counting board media. First, children are introduced to the symbols of numbers 1-10 through number cards. Next, we invite the children to choose 2 number cards as the basis for how many salak seeds they will use for counting. After the children take 2 number cards, they take the salak seeds according to the numbers they choose and our children play by putting the salak seeds into a bottle of mineral water. After the salak seeds are put into the bottle of mineral water, we invite the children to take and count the number of salak seeds, then invite the children to take number cards according to the results of counting the salak seeds. In choosing the number card, the writer assisted by the teacher helps direct the child to the appropriate card. It turns out that children are very happy and interested in

counting games with counting board media so that children more quickly catch and understand numbers and number symbols

The results were obtained after the children were invited to play counting using a counting board media from 24 children there were 20 children whose cognitive development was very good, namely being able to count and recognize numbers and symbols of number symbols correctly.

The counting board media used by inviting children to learn by playing will produce good cognitive development, namely children can count

**4. CONCLUSION AND  
RECOMMENDATION**

The results showed that the children who played the counting board media were very happy and focused more on learning to count so that it was easier for them to catch the material presented by the teacher. Children who play with the counting board media cognitive development can increase their ability to count.

This proves that using the counting board media can develop children's numeracy skills, especially children at Raudhatul Athfal Diponegoro 224 Adisara.

Children's cognitive ability to count is known to develop and improve. The cognitive development of children's numeracy at RA Diponegoro 224 Adisara is



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strongly influenced by the use of media. Utilization of the media used is to use the media counting board which aims to develop the cognitive development of children's numeracy.

In qualitative analysis, it can be said that children's numeracy cognitive abilities can be developed by providing learning tools in the form of counting boards for children. This is because children need learning tools or media that can be used to learn while playing so that children feel happy, children are more focused and are not bored in learning to count.

According to Vygotsky's (1978) theory, children's cognitive development grows not only through action on objects but through assistance and stimulation from adults or their peers. The stimulus given is in the form of providing media assistance for counting board learning. According to Bruner's theory, when children learn to count, children should be trained to learn to count with real objects by the use of counting board media and learn to

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