

# **INCREASING CHILDREN'S COGNITIVE ABILITY THROUGH NUMBERS BALL AT TK AISYIYAH BUSTANUL ATHFAL 3 TENGGARONG**

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## **ABSTRACT**

The background of this research is that children's cognitive abilities are lacking due to the lack of utilizing learning media, only using their fingers to say numbers. The teacher still focuses on using the singing method, so the children get bored and ignore the teacher. The purpose of this study was to improve the numeracy skills of children at Aisyiyah Kindergarten Bustanul Athfal 3 Tenggarong, Kutai Kartanegara Regency. Cognitive ability is an ability or thought process, namely the individual's ability to connect, assess, and consider an event or event. Indicators in this study include mentioning numbers 1-20, sorting numbers 1-20, connecting numbers with objects. This research is Classroom Action Research (CAR). The research was conducted in 2 cycles. 1 cycle consisting of 2 actions. Each cycle consists of planning, implementing, observing or observing, and reflecting. This research is collaborative between researchers and classroom teachers; data collection methods to improve cognitive abilities are collected through observation and documentation. Number ball game through indicators mentioning numbers 1-20, ordering numbers 1-20, and connecting numbers with objects. The results obtained from the two cycles were very significant in increasing children's cognitive abilities. Before the action was taken, the child's ability was still 32%, with the criteria for the child starting to develop (BB). After taking action, the child's development began to increase, namely, in the first cycle, the child's cognitive ability became 44% with the criteria for starting to develop (MB), in the second cycle, the child's cognitive ability increased to 73% with the criteria developing as expected (BSH). In cycle II, the agreed target was 70%. The conclusion of this researcher is that through playing numbers ball activities, children's cognitive abilities in TK Aisyiyah Bustanul Athfal 3 Tenggarong, Kutai Kartanegara Regency can be improved.

***Keywords: cognitive abilities, learning media, playing numbers ball activities.***

## ABSTRAK

Latar belakang penelitian ini adalah kemampuan kognitif anak yang kurang dikarenakan kurangnya memanfaatkan media pembelajaran, hanya menggunakan jari dalam menyebutkan angka. Guru masih berfokus menggunakan metode bernyanyi, sehingga anak bosan dan tidak memperhatikan guru. Tujuan penelitian ini adalah untuk meningkatkan kemampuan berhitung anak di Tk Aisyiyah Bustanul Athfal 3 Tenggarong Kabupaten Kutai Kartanegara. Kemampuan Kognitif adalah suatu kemampuan atau proses berpikir, yaitu kemampuan individu untuk menghubungkan, menilai, dan mempertimbangkan suatu kejadian atau peristiwa. Indikator dalam penelitian ini meliputi menyebutkan angka 1-20, mengurutkan angka 1-20, menghubungkan angka dengan benda. Penelitian ini merupakan Penelitian Tindakan Kelas (PTK). Penelitian dilakukan 2 siklus. 1 siklus yang terdiri 2 kali tindakan. Pada setiap siklus terdiri perencanaan, pelaksanaan, pengamatan atau observasi dan refleksi. Penelitian bersifat kolaboratif antara peneliti dan guru kelas, metode pengumpulan data meningkatkan kemampuan kognitif dikumpulkan melalui observasi dan dokumentasi. Permainan bola angka melalui indikator menyebutkan bilangan 1-20, mengurutkan bilangan 1-20, dan menghubungkan angka dengan benda. diperoleh hasil dari dua siklus yang sangat signifikan meningkatnya kemampuan kognitif anak. Sebelum dilakukan tindakan, kemampuan anak masih 32% dengan kriteria anak mulai berkembang (BB). Setelah dilakukan tindakan perkembangan anak mulai meningkat yaitu pada siklus I kemampuan kognitif anak menjadi 44% dengan kriteria mulai berkembang (MB), pada siklus II kemampuan kognitif anak meningkat menjadi 73% dengan kriteria berkembang sesuai harapan (BSH). Pada siklus II sudah mencapai target yang disepakati yaitu 70% Kesimpulan peneliti ini adalah melalui kegiatan bermain bola angka dapat meningkatkan kemampuan kognitif anak di TK Aisyiyah Bustanul Athfal 3 Tenggarong Kabupaten Kutai Kartanegara.

## A. INTRODUCTION

Early childhood education is the level of education before primary education which is a coaching effort aimed at children from birth to age six years that is done through the provision of educational stimulation to help physical and spiritual growth and development so that children have the readiness to enter further education, which is held on formal, nonformal, and informal pathways. Early childhood education is a means to explore and develop various potentials of children so that they can develop optimally.<sup>1</sup>

Paud institution provides opportunities for children to develop their personality and potential to the maximum. Paud institutions need to provide a variety of activities that can produce various aspects of development such as cognitive, language, social,

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<sup>1</sup> Muhiyatul Huliyah, "Hakikat Pendidikan Anak Usia Dini," *As-Sibyan: Jurnal Pendidikan Anak Usia Dini* 1, no. 01 (January 25, 2017): 60–71.

emotional, physical, and motor.<sup>2</sup> In the context of early childhood education, kindergarten has a considerable role in the development process in children. The education unit-level curriculum contains five aspects of development. One of the essential aspects that children should have is cognitive development. This aspect is said to be vital because it will relate to the creativity and imagination of the child to adjust to the environment. One of the aspects that will be developed in this study is the cognitive aspect. Cognitive development aims so that children can process their learning acquisition, find various alternative problem solving, develop mathematical logic skills, knowledge of space and time, the ability to choose and group, and prepare for the development of the ability to think carefully.

Islam is very concerned about a person's cognitive. This is evident from the many verses of the Qur'an and hadith, which explain the importance of studying and using reason to understand the symptoms of the universe that show the greatness of Allah. The qur'anic verse that was first revealed has even mentioned the importance of the learning process, namely:<sup>3</sup>

*Translation: 1) Read by the name of your God Who Created. 2 He created man out of a lump of blood. 3) Read, and your Lord is the Most Merciful. 4) Who teaches (man) through the medium of kalam. 5) He teaches to people he does not know. (QS. Al-Alaq [96]:1-5).*<sup>4</sup>

Based on initial observations made by researchers at Aisyiyah Bustanul Athfal Kindergarten 3 Tenggara, made on Thursday, January 7, 2021, it is still found that most children who have less cognitive abilities and are still low in children's cognitive skills in knowing the concept of numbers and symbols of numbers. This is shown the percentage of learning completion on the indicator mentioning the numbers 1-20 obtained a value of 42%, the indicator sorting the numbers 1-20 obtained a result of 33%, then on the indicator connecting numbers with objects acquired a value of 20%, the total value of learning completion of 15 children obtained a value of 32%, so overall in indicators of children's cognitive abilities has not appeared this is seen in knowing and understanding the concept of numbers and number symbols, like 1. Knowing the symbol of the child's number has not developed to the maximum 2. Children still have difficulty in doing the task of connecting the number of images with the corresponding numbers, 3. Multiply many objects 1-20 Know the concept of numbers and know the symbol of numbers 1-20.

The lack of cognitive ability of this child is evident when the teacher asks the child to mention the sequence of numbers 1-20, many children are just silent, and there are only a few children who can answer the teacher's questions, besides that the child

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<sup>2</sup> "Teori Pembelajaran Anak Usia Dini: Dalam Kajian Neurosains / Suyadi ; Editor, Nita Nur Muliawati | OPAC Perpustakaan Nasional RI."

<sup>3</sup> "Psikologi Perkembangan Islami: Menyingkap Rentang Kehidupan Manusia Dari Prakeselahiran Hingga Pascakematian / Aliah B. Purwakania Hasan | OPAC Perpustakaan Nasional RI."

<sup>4</sup> "Al-'Alaq - العلق | Qur'an Kemenag," accessed February 16, 2022, <https://quran.kemenag.go.id/sura/96>.

still has difficulty distinguishing numbers. Children are still often reversed when writing numbers. Then when the teacher assigns a task in the child's worksheet to do something similar to the material that has been delivered before, only a small percentage of children are immediately responsive to the task and are able to do it. This should be supported by the learning media.

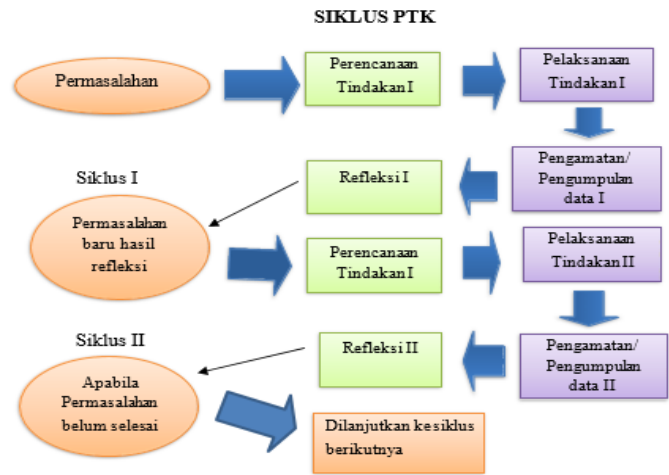
Ball game media is an activity carried out by children using colorful balls, where on each ball is already listed a number symbol (number) that is used as an introduction to the number symbol. With more concrete media, the learning process becomes active, innovative, creative, effective, and fun. The number ball game is carried out in two cycles, which is every one cycle with two actions. In the particles, the ability of children to mention the numbers 1-20 is only 42%, in terms of sorting the numbers 1-20 only 33%, then in linking the number with objects as much as 20%. Based on the background above, the author will conduct research directly using class action research methods (PTK) in the number ball game as one way to improve cognitive abilities by using class action research methods then take the title "Improvement of cognitive ability through games through numbers in Class B Tk Aisyiyah Bustanul Athfal 3 Tenggara Kutai Kartanegara Regency" In this library study; researchers dug up information from previous studies as a comparison material about existing shortcomings or advantages such as a study by Donna Amelia entitled "Improving Numeracy Through Number Ball Games In One Roof Pariaman Ocean Kindergarten" and Nika Cahyati entitled "The Ability to Generalize Numbers Through Fishing Media."<sup>5</sup>

## **B. METHOD**

This type of research is Class Action Research (PTK), which is research conducted by teachers (researchers) in classrooms (schools) where researchers teach with pressure on the refinement or improvement of learning processes and praxis. The subjects in this study were children in kindergarten Aisyiyah Bustanul Atfal 3 Tenggara, which amounted to 15 children consisting of 6 boys and nine girls. The PTK procedure consists of four activities performed in a repeating cycle. The four main activities that exist in each process, namely 1. Planning, 2. Action, 3. Observation, and 4. Reflections that can be described as follows:

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<sup>5</sup> Nika Cahyati, "Kemampuan Mengenal Angka Melalui Media Memancing Bola Angka," *Jurnal Pelita PAUD* 2, no. 2 (2018): 200–213.



**Picture 1 : Siklus PTK Model Kemmis Dan Taggart<sup>6</sup>**

Obtaining the necessary data for the study, the authors used observation techniques, interviews, and documentation. Observation is carried out during the teaching and learning process. The results are written by the teacher through an observation sheet filled by teachers and researchers, and the results are written in observation sheets. This study used a type of guided-free interview when interviewing only guided by an outline of the things to be asked. The results of the interview are to find out: 1). Information about the media used by the teacher, student learning outcomes, obstacles faced by teachers in learning activities, and teacher responses regarding the application of recognition using number color ball media, 2). Student reaction responses about the introduction of numeracy using number ball media. Documentation in this study was done using field records. This documentation technique is used to record all activities of students and teachers during the implementation of classroom action research. The documentation in this study uses cameras to document ongoing learning, establishing RPPM and field records.

Data analysis in this study was done by reflecting the results of observations on the child's learning process in the classroom. Look for the average score of each indicator obtained from all children and assess the completion of student learning activities.

## **C. RESULTS OF RESEARCH AND DISCUSSION**

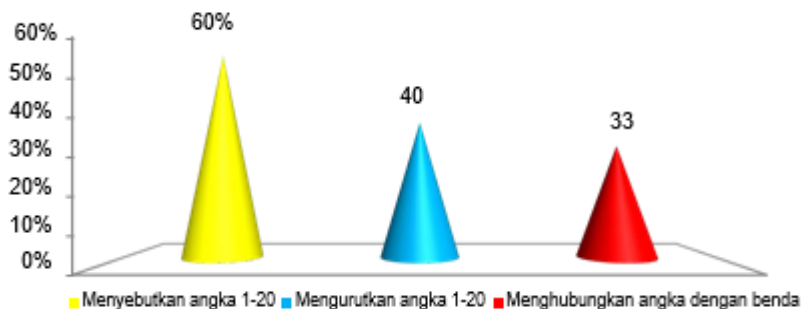
### **1. Research Results**

Based on the recapitulation table of a cycle I in 2 meetings, the results on all indicators on cognitive ability through the medium of ball numbers obtained a

<sup>6</sup> "Penelitian Tindakan Kelas (PTK) TK/RA, SLB/SDLB : Kecerdasan Musikal (Bernyanyi), Kecerdasan Fisik Motorik Kasar (Menari), Kecerdasanlinguistik (Berbahasa), Kecerdasan Kinestis (Olahraga), Kecerdasan Matemaik (Metode Kumon) / Zainal Aqib, Dkk.; Editor, Nurhid | OPAC Perpustakaan Nasional RI.," accessed February 17, 2022, <https://opac.perpusnas.go.id/DetailOpac.aspx?id=1139398>.

percentage of 44%, which shows the criteria of children in the direction of developing.

Based on the results of the recapitulation, the data can be seen from the following cycle graph I:



**Picture 2 : Grafik Kemampuan Kognitif Pada Siklus I**

Based on a graph of cognitive abilities through the medium of ball numbers obtained the following data:

- The yellow cone diagram shows the indicator of children being able to mention the numbers 1-20 by percentage 60%.
- The child's blue cone diagram can sort the numbers 1-20 by percentage 40%.
- A child's red cone diagram can connect numbers with objects with percentages of 33%.

Cycle I in improving cognitive ability is completed then the next step is to reflect. Reflection on cycle I am done by researchers and classroom teachers. This reflection discusses the obstacles found during the implementation of the cycle. The obstacles faced in cycle I am as follows::

- The cognitive ability of children through the medium of ball numbers has shown the criteria to begin to develop. However, the child is still not focused on activities because there are still those who like to tease their friends so that the class becomes boisterous and crowded.
- Children still can not follow the rules of the game delivered by the teacher, and children do not focus on the commands given by the teacher.
- Less time so that the child enjoys the game less.

Seeing the conditions in cycle I, there are obstacles, it is necessary to improve and improve. After discussion with the classroom teacher/collaborator, it can be arranged an action as a revamp and refinement in the following cycle actions: 1. Before playing, the teacher provides motivation to the child, Sets up an active child seat, and talks a lot with children who behave otherwise 2. Clarify the rules of the game to the child so that the child is more focused on playing, 3. Increase playing time

In cycle II, there is a refinement of the media used, then in cycle II using a number ball media with many colors. The learning process that occurs when doing actions while learning takes place, children are more enthusiastic when playing, the atmosphere is more conducive, children who talk a lot and like to play with their friends are not rane anymore, this is evident when the teacher asks not to have to tell

the forward but the child himself who is vying to advance in showing his work, the child is more confident, The child's development has improved optimally. There is an award for children who meet the criteria. Cognitive ability through the medium of balls and child number cards has met the indicators of success so research is sufficient. It is stopped until cycle II.

## 2. Discussion

The existence of kindergarten 'Asiyah Bustanul Athfal 3 Tenggara not only focuses on efforts to bring students to higher education (SD), but also provides basic knowledge that aims to motivate and prepare students who are wise to learn.

Childhood is the defining time of the golden age that is the foundation for every human being. Given the importance of education at this early age, kindergarten 'Asiyah Bustanul Athfal 3 Tenggara strives wholeheartedly to assist parents in guiding, educating, and accompanying students in this fundamental process. So as the focus of early childhood education, kindergarten 'Asiyah Bustanul Athfal 3 Tenggara trains character formation and behavior based on the Quran and Al-Hadith as a foothold in its teaching develops other essential aspects such as language, art, cognitive and motor physical.

According to Piaget, cognitive ability aims to acquire the psychological structures necessary for humans to think logically and conduct abstention reasoning about actual problems and hypotheses.<sup>7</sup> Piaget views the child as an active organism that develops with certain internal impulses and developmental patterns.<sup>8</sup>

Cognitive is a process that occurs internally within the center of the nervous stacking when humans are thinking. This cognitive ability develops gradually, in line with the physical and nerve abilities at the center of the nervous system. Cognitive is a thought process, which is the ability of individuals to connect, assess, and balance an event or event.<sup>9</sup> Cognitive processes are related to the level of intelligence (intelligence) that characterizes a person with various interests especially aimed at ideas and learning.<sup>10</sup> Developing listening skills in early childhood is more accessible if using engaging media and makes children warm makes it easier for children to understand or master a learning material. Media is a tool used as an intermediary or introduction that brings lesson information to facilitate learning. Based on some of the above understandings, it can be understood that cognitive or thinking is a term used by psychologists who relate to the mind that allows gaining experience and ability to solve

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<sup>7</sup> Eny Isnin Nisa', "Konsep Belajar Konstruktivisme Jean Piaget Dalam Pembelajaran Pendidikan Islam" (undergraduate, IAIN Sunan Ampel Surabaya, 2009).

<sup>8</sup> Steven Beck and Rex Forehand, "Social Skills Training for Children: A Methodological and Clinical Review of Behavior Modification Studies," *Behavioural and Cognitive Psychotherapy* 12, no. 1 (1984): 17–45.

<sup>9</sup> John H. Flavell, "COGNITIVE DEVELOPMENT: Children's Knowledge About the Mind," *Annual Review of Psychology* 50, no. 1 (1999): 21–45, <https://doi.org/10.1146/annurev.psych.50.1.21>.

<sup>10</sup> Ute Kraidy, "Digital Media and Education: Cognitive Impact of Information Visualization," *Journal of Educational Media* 27, no. 3 (October 1, 2002): 95–106, <https://doi.org/10.1080/1358165020270302>.

problems faced in the process of human life and introduced early on.

Developing cognitive abilities in early childhood is easier if you use interesting media and get excited children, which makes it easier for children to understand or master a learning material. Media is a tool used as an intermediary or introduction that brings lesson information that aims to facilitate to achieve learning goals. Therefore, media is essential in learning activities. However, this is different in the learning process carried out in kindergarten 'Asyiyah Bustanul Athfal 3 Tenggara, which says that less than optimal when using media, teachers here teach using media because a lot of time is needed and classroom conditioning is less maximal. The ball game is an educational play activity used in the learning process in kindergarten. This game is intended for children aged 5-6 years in introducing the concept of numbers. This playing activity is called modification because the medium used is the ball in this game. Ball game that is done with a ball tool with rules that have been determined and done in a fun way.<sup>11</sup>

In Rinaldi's opinion, the ball is one of the alternatives that are easy to play by children regardless of age. This color ball is marked by the numbers one to ten. The ball used in the study is a ball made of plastic measuring 2 inches (5cm) in diameter with bright colors and fun for children, including red, yellow, green, and blue. Through modified color ball games, it is expected that children aged 5-6 years are easier to understand the symbol of numbers.<sup>12</sup>

Based on the description above, it can be concluded that the ball game is an educational play activity carried out by children using colorful balls, where on each ball has been listed a number symbol (number) used as an introduction to the number symbol. Based on the results of research conducted by researchers over two cycles with two meetings that it reached four meetings in collaboration with kindergarten teacher 'Asyiyah Bustanul Athfal 3 Tenggara. Stimulation and guidance from teachers are needed when children do play activities in cycle I. It takes assistance for children because they are still playing alone, children are still not focused so that the results obtained are not maximal, then from the assessment of cycle I still 44% get the criteria to start developing (MB) then the activity continues to cycle II.

In cycle II the child has begun to be independent in carrying out the activities of these three aspects, although still with the help of teachers. The acquisition of results that are very satisfactory, so that the results are obtained by a percentage of 73% with the assessment criteria developing as expected (BSB) on the overall indicator and has increased, then researchers along with colleagues or collaborators do not take the next action. Berikut tabel rekapitulasi pratindakan, siklus I dan siklus II :

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<sup>11</sup> Rika Ilviantari, Ari Sofia, and Riswandi Riswandi, "Pengenalan Lambang Bilangan Melalui Permainan Bola," *Jurnal Pendidikan Anak* 3, no. 1 (May 2, 2017), <http://jurnal.fkip.unila.ac.id/index.php/PAUD/article/view/12702>.

<sup>12</sup> Oleh and Putri, "Pengembangan Media Permainan Bola-Bola Wol Untuk Meningkatkan Kemampuan Kognitif Anak Dalam Membilang Di Tk Bintang Ceria 2 Tanjung Karang Barat."

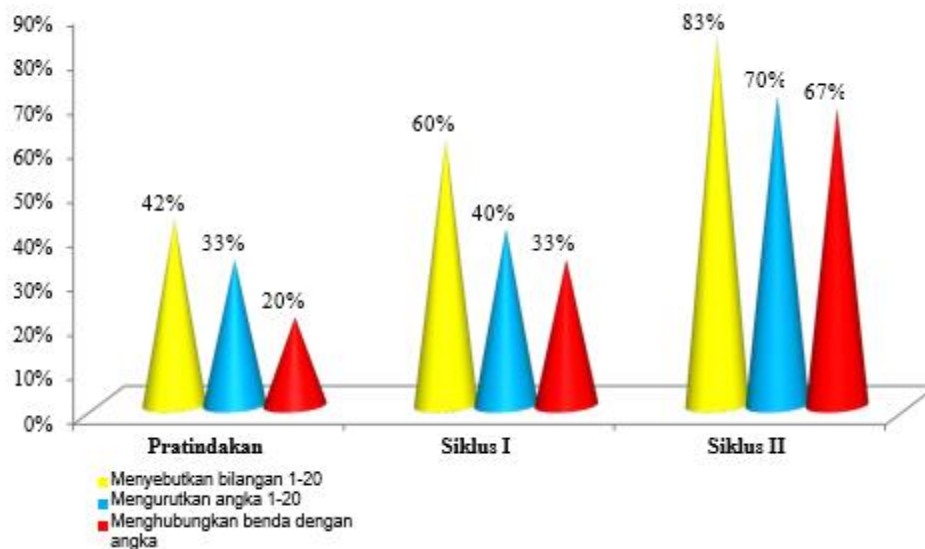


**Table I**  
**RECAPITULATION OF THE PERCENTAGE OF COGNITIVE ABILITY IN**  
**PRETINDAKAN, CYCLE I, CYCLE II**

No	Assessment Indicator	Recapitulation of Cognitive Abilities		
		Pratindakan	Siklus I	Siklus II
1.	Mention numbers 1-20	42%	60%	83%
2.	Sort numbers 1-20	33%	40%	70%
3.	Connecting objects with numbers	20%	33%	67%
Average percentage		33%	44%	73%

Based on the recapitulation table above, the initial data on children's cognitive abilities in pre-bullying obtained an average percentage value of 33% with the criteria of starting to develop (MB), the action of a cycle I increased to 44% with the criteria began to develop (MB), in cycle II the result increased to 73% with the criteria of developing as expected (BSH) and has achieved learning completion.

More details in the increase in children's creativity can be seen from the following graph:



**Picture 3. Graphique de l'achèvement des capacités cognitives des enfants**  
**pretindakan, cycle I, cycle II**

Based on the graph of the completion of children's creativity above obtained data:  
 1) The red bar diagram shows the indicator mentioning the numbers 1-20, obtained the percentage value at 42%, after the action on cycle I obtained the result rose to 60%,

- then again the action of cycle II with a value of 85%. And cycle III is obtained 83%
- 2) The blue bar diagram shows the indicator sorting the numbers 1-20, obtained the percentage value at 33%, after the action in cycle I obtained the result rose to 40%, and in cycle II obtained a percentage value obtained 70%
  - 3) The yellow bar diagram shows the indicator connecting objects with numbers, obtained a percentage value at 20% pre-action, after an action in cycle I obtained the result rose to 33%, and cycle II reached the percentage value 67%

The use of number ball media media can improve children's cognitive abilities in kindergarten 'Asiyah Bustanul Athfal 3 Tenggaraong.

The following table illustrates the comparison of previous research with current research:

**Table II**  
**COMPARISON OF PREVIOUS RESEARCH RESULTS**

No	Nama Peneliti	Pendekatan Pembelajaran					Hasil Penelitian
		Permainan Labirin	Barang bekas kardus	Bola Angka	Model Pembelajaran Make A Match	Balok	
1	Dwi Nuraini	√					Kemampuan kognitif meningkat
2	Desta Yulistia,		√				Kemampuan kognitif meningkat
3	Tutik Suparmi			√			Keterampilan kognitif meningkat
4	Eva Susanti,					√	Keterampilan kognitif meningkat
5	Warnia Datina				√		Keterampilan kognitif meningkat
6	Peneliti Lestari			√			Kemampuan berhitung meningkat

Based on the table above, the data obtained that the use of media listed in the table can improve cognitive ability, especially number ball media that has improved cognitive ability in kindergarten 'Asiyah Bustanul Athfal 3 Tenggaraong.

#### **D. CONCLUSION**

Based on the description of the results of research conducted in Pre-Action, Cycle I, and Cycle II it can be concluded that learning through number ball playing activities can improve cognitive abilities in early childhood, especially kindergarten 'Asiyah Bustanul Athfal 3 Tenggaraong. This can be proven from the data of learning

observations in each cycle on three indicators of assessment in cognitive ability, namely mentioning the numbers 1-20, sorting the numbers 1-20, and connecting numbers on objects.

Before the action of children's cognitive abilities through playing ball, numbers are said to be successful if each child gets the completion of learning at least achieving the criteria of developing as expected (BSH). In pre-cycle research, according to existing data before applying activities through ball games number 33% of 15 children, then the action obtained results in cycle I in 2 meetings with a percentage of 44% are on the criteria of starting to develop (MB) and have not obtained maximum results so that the research continued in cycle II in 2 meetings obtained results with a percentage of 73% were on the criteria of developing as expected (BSH)) and had reached criteria set by the completion value in the school. So the research was done with the number ball media in kindergarten 'Asiyah.

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