



The Improvement of Cognitive Ability of Children Class B Age Through Colored Sand Media

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DOI: <http://dx.doi.org/10.15294/belia.v10i2.36820>

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History Article

Submitted September 2021
Revised October 2021
Accepted November 2021

Keywords

Cognitive Procedural Ability;
Colored Sand Media; Early
Childhood; Cognitive

Abstract

This study aims to determine the increase in cognitive procedural abilities of kindergarten B age children through colored sand media. This research is conducted in Bustanul Athfal 'Aisyiyah Darussalam Magelang Regency using the method of pre-experiment design through One Group Pretest-Posttest. The population in this study is all kindergarten B students in Bustanul Athfal 'Aisyiyah Darussalam, Magelang Regency with a total of 60 children. The sampling technique in this study is purposive sampling, where the criteria for determining the sample are students who have not used sand as a learning medium, students with low cognitive abilities, and lack of development of cognitive procedural abilities. The sample used in this study was 30 children. The pretest and posttest results have an average value (mean) cognitive procedural ability on the pretest results of 200.23 while the posttest results of 234.23 so that there is an increase of 34 points. The significance of the results of the hypothesis test using the Paired Sample t-Test showed a significance value of 0.00 ($p < 0.05$). Thus it can be concluded that there is a significant difference in cognitive procedural abilities of kindergarten age B children through colored sand media, namely an increase in cognitive abilities of children before and after treatment on average by 3.

How to cite

Ziana, U., & Sumanto, R. P. A. (2021). The Improvement of Cognitive Ability of Children Class B Age Through Colored Sand Media. *BELIA: Early Childhood Education Papers*, 10(2).

INTRODUCTION

Childhood is a period where the process of growth and development of children takes place quickly. The growth achieved by children is a form of understanding religious and moral values, physical, cognitive, language, and social-emotional (Latif, et al, 2014: 72). Cognitive is a process that occurs internally in the central nervous system when humans think (Gagne, in Astuti, 2012: 25). Children's cognitive abilities will develop over time and are supported by educational factors and physical development, especially the brain. Research on the brain shows that until the age of 4 years, the capability of a child has reached 50%, at the age of 8 years reached 80%, and the remaining about 20% will be obtained when the child has passed the age of 8 years (Asmani, 2009: 24).

A kindergarten teacher must have the creativity of solving problems in learning that discuss with verbal messages that are difficult for children to understand. Learning with interesting and fun media will be very liked by children. With fun learning, it is hoped that messages and information from the teacher can be delivered optimally. One of the most popular media for children is sand. Sand can increase children's intelligence, increase children's motor skills, develop children's knowledge and imagination. Through the activity of playing sand is expected to improve the fine motor skills of early childhood because the child will move the parts of the hand, wrist to his fingers (Pratiwi, 2017: 2).

In general, sand has a black color, white, and brown. The color in the sand is one of the elements that can stimulate the thinking ability of children. Color has a strong appeal in everyday life, can reflect one's expression and psychological well. Children will be more interested in playing with objects that have color elements. Therefore, the researcher modifies the sand into color sand which is used as a learning medium. The colored sand media can be used as an alternative learning media. Colored sand media can easily be made by coloring beach sand or sand that is used for pets which are very affordable with food coloring whose color can be adjusted to the needs. Bright colors are more preferred by children, such as blue, red, green, and yellow.

Related to this fact in fact the learning of sand in early childhood education institutions is still less attention. According to Chayati (2014: 96), Sand learning is rarely done on the grounds, limitations of the playing environment, equipment and assume that when playing sand children

will get dirty. A kindergarten teacher in Bustanul Athfal 'Aisyiyah Darussalam not applying sand as the main activity when playing. In addition, educators also pay less attention to and develop children's cognitive abilities including procedural abilities. Often educators do not give children the opportunity to participate in solving problems or exploring learning activities.

The purpose of this study was to determine the increase in cognitive abilities of children, including cognitive procedural abilities that are in Bustanul Athfal 'Aisyiyah Darussalam Magelang District through colored sand media. This research is based on Standards for the Achievement of Child Development in Minister of Education and Culture Regulations Number 137 of 2014 and Bloom's Taxonomy Theory. The advantage of this research is knowing the increase in children's cognitive abilities, including procedural abilities, because research on procedural abilities for young children is still very minimal to be studied, as well as the use of colored sand media which is still rarely applied in learning. So it is hoped that this research can provide more knowledge to parents, the community, educators, and institutions of early childhood education in improving cognitive abilities, including procedural for children and the use of sand media in learning.

RESEARCH METHOD

This research uses quantitative research with experimental research methods to measure the validity of colored sand media. The research design used in this study is the Pre Experimental Design type *one-group pretest-posttest design*. Pre-experimental design is an experimental design that is not actually, often also referred to as *quasi-experiments* or pseudo experiments (Arikunto, 2010: 124).

One group pretest-posttest design:

O1	: Pretest (sebelum perlakuan)
O1 x O2	
X	: Perlakuan
O2	: Posttest (sesudah perlakuan)

According to Arikunto (2010: 126), variables are objects or are the focus of research. The research variable in this study is Bustanul Athfal 'Aisyiyah Darussalam with the independent variable in the form of colored sand media, while the dependent variable in this study is the cognitive procedural abilities of children. The population is a generalization area that consists of objects or subjects that have certain qualities and charac-

teristics (Sugiyono, 2011: 80). The population in this study is all students of Kindergarten B Bustanul Athfal 'Aisiyyah Darussalam, Magelang Regency with a total of 60 children. Sample is part of the number and characteristics possessed by the population (Sugiyono, 2011: 81). The sample in this study amounted to 30 children from a total population of 60 children based on a *purposive sampling technique*. *Purposive sampling technique* is a sampling technique with certain considerations.

The study is conducted 12 times with a span of 30-40 minutes per meeting. The study began with a pretest to find out cognitive procedural abilities possessed by children before the treatment. Furthermore, the researcher gives treatment 12 times with colored sand media. Activities carried out using colored sand media include: mixing sand and food coloring, guessing numbers and letters, collages, making sand puppets and so on. The study is ended with a posttest to find out the cognitive procedural abilities of children after the treatment. The data collection techniques in this study using a questionnaire, namely data collection techniques that are carried out indirectly or not carried out question and answer activities with respondents.

After the research is carried out, the next step is to analyze the data. The data analysis technique used in this study is a *paired sample t-test technique* using the SPSS statistical program. This calculation will see the results of normality tests and hypothesis testing. The normality test is used to determine whether the data used is a normal distribution or not. While testing the hypothesis using the *paired sample t-test* is used to determine whether the independent variable can affect the dependent variable.

RESULT AND DISCUSSION

The research was conducted in Bustanul Athfal 'Aisiyyah Darussalam Magelang Regency. Bustanul Athfal 'Aisiyyah Darussalam is in the Darussalam Foundation complex, where the institution is adjacent to the Play Group, Elementary School, and Vocational High School. The foundation complex is in the market area and close to the highway. This institution has good facilities, including classrooms in the form of a center of six classes, the principal's office, teacher's room, library room, toilets, playgrounds, outdoor play facilities, and several other rooms.

The daily learning activities begin with the morning routine, which consists of reciting, carried out before learning and individualized, followed by opening activities in the form of praying, reading short letters and hadiths and motoric activities. Furthermore, the core activities are in

accordance with the themes that have been determined, interspersed with the implementation of the Dhuha Prayer and then eat together. Closing activities contain material recalling, moral formation, delivery of certain information and tomorrow's activities.

Based on research conducted in Bustanul Athfal 'Aisiyyah Darussalam Magelang District with a total of 30 samples, obtained data as follows:

Table 1. Normality Test Result

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Pretest	,112	30	,200	,931	30	,052
Posttest	,191	30	,007	,956	30	,244

Based on the above table, it is known that the Shapiro-Wilk value of Pretest data is 0.052 and Posttest data is 0.244 which means it is greater than 0.05 so it can be concluded that the data is normally distributed.

Table 2. Hypothesis Test Results

	Paired Differences						df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t		
				Lower	Upper			
Pair 1 Pre - test - Post- test	-34.000	20,081	3,666	-41,498	-26,502	-9,274	29	,000

Based on the table above, it is known that the value of sig. (2-tailed) is 0,000 <0.05, then H0 is rejected and Ha is accepted. So it can be concluded that there is an increase in cognitive procedural abilities of kindergarten age B children through colored sand media.

Table 3. Mean Test Results

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Pretest	200,23	30	21,852	3,990
Posttest	234,23	30	4,006	,731

Based on the table above, it is known that the Mean value of the Pretest is 200.23 and the Mean value of the Posttest is 234.23 which means that there is a difference in the Mean value of 34. In addition, the researcher will present the pretest

and posttest data in the value category. This value category will be presented in five categories, namely very high, high, medium, low and very low. Calculation values in categories are obtained using a mathematical formula for the calculation of the range and length of the interval. The scale used in the research instrument has four choices, namely a score of 4, 3, 2, 1 and the number of statements in the research instrument after being tested for validity and reliability yields 61 valid items from 63 items, then the calculation method for the value category is as follows:

Nilai Maksimal = skor maksimal x jumlah item = 4 x 61 = 244	Jangkauan = nilai maksimal – nilai minimal = 244 – 61 = 183
Nilai minimal = skor minimal x jumlah item = 1 x 61 = 61	Data interval = jangkauan : kategori nilai = 183 : 5 = 36,6 (dibulatkan menjadi 37)

Based on the calculation above, we can get the following intervals from each category:

K a t - egori	Interval	Pretest		Posttest	
		Jumlah	%	Jumlah	%
Sangat Tinggi	210 – 246	11	36,7	30	100
Tinggi	173 – 209	16	53,3	0	0
Sedang	136 – 172	3	10	0	0
Rendah	99 – 135	0	0	0	0
Sangat Rendah	61 – 98	0	0	0	0
Jumlah		30	100	30	100

Based on the table above, it is known that the acquisition of pretest scores for children in the very high category is 11 children and the percentage is 36.7%. The high category is 16 children and the percentage is 53.3%. The medium category is 3 children and the percentage is 10%. The low category is 0 and the percentage is 0%. The very low category is as much as 0 and the percentage is 0%. Furthermore, the acquisition of posttest scores for children in the very high category is 30 children and the percentage is 100%. The high category is 0 and the percentage is 0%. The medium category is 0 and the percentage is 0%. The low category is 0 and the percentage is 0%. The very low category is as much as 0 and the percenta-

ge is 0%. The calculation results above show that the cognitive abilities of children at first are in the high category, and then increase to very high. The initial percentage of 36.7% then increased to 100%, meaning that the cognitive procedural abilities of children increased by 53.3%.

Bloom Taxonomy Revised (in Gunawan and Palupi, 2016: 111) explains that basically procedural ability is the ability of a person about how, which includes when, how, using what, related to the algorithm, skills, techniques, and methods. This ability will help children in solving various problems in everyday life properly. In addition, children have a better ability to understand and obtain findings or observations from observational and experimental activities they do. Children will get used to thinking logically, trying to solve problems, think symbolically, have the ability to reason and reason and have the ability to describe how and why a procedure can be a solution to a problem.

The colored sand media is a learning medium that is rarely used. Sand media has elements of color and texture that are expected to provide stimulus to the nerves and cognitive of children. There are many activities that can be done with colored sand media, including pouring, shaping, printing, measuring, measuring, squeezing, collage, and so on.

The cognitive abilities possessed by children aged 5-6 years according to Piaget are the preoperational stage (Santrock, 2007: 251-255). At this stage, the child experiences an egocentric period, because the child has not been able to see from the perspective of others. In addition, children also experience the stages of symbolic functions and the stages of intuitive thought. Based on Permendikbud (Minister of Culture and Education Regulation) No. 137 of 2014, in general, the cognitive abilities of children aged 5-6 years include the ability to learn and solve problems, think logically and think symbolically. Meanwhile, according to Permendiknas No 58 of 2009, at this age children will develop general knowledge and science, the concepts of shapes, colors, and patterns, as well as the concepts of numbers, symbols of numbers and letters.

The study is conducted on 30 children aged 5-6 years in Bustanul Athfal 'Aisyiyah Darussalam Magelang Regency. After using colored sand media, children become more enthusiastic, enthusiastic, and show better performance in learning and application in daily life. This is based on the results of the calculation of the hypothesis test, which shows the value of sig. (2-tailed) is 0.00, where the value is less than 0.05, which

means that H_0 is rejected and H_a is accepted. In addition, the mean value of the pretest and posttest data shows an average difference of 34. Then the hypothesis accepted in this study is H_a , which states that there is an increase in cognitive procedural abilities through the colored sand media on average by 34.

This is in accordance with previous research conducted by Nita Erliana Pratiwi with the title "Improving Fine Motor Ability Through Sand Play Activities in Children 3-4 years at PPT Melati Surabaya in 2017". The results of this study indicate that in the first cycle of the successful performance of teachers in the learning process by 70% and in the second cycle increased to 90%. This shows that the performance of teachers in the learning process increased significantly and was very good (successful). Whereas on children's performance, the first cycle showed 68.12% results and on the second cycle increased to 85%. This shows that the children's performance in implementing sand play activities is able to experience a significant and good improvement.

CONCLUSION

Based on the results of research and discussion of the study entitled "The Improvement of Cognitive Ability of Children Class B Age Through Colored Sand Media in Bustanul Athfal 'Aisyiyah Darussalam Kindergarten Of Magelang Regency", the cognitive abilities of children after being treated through colored sand media increased. This increase can be seen from the mean value of children's cognitive abilities which was originally 200.23 increased to 234.23, so an average increase of 34. The results showed that the average value of early cognitive abilities of kindergarten B children in Bustanul Athfal 'Aisyiyah Darussalam Magelang Regency increased after being given treatment through colored sand media. In addition, the results of hypothesis testing

indicate the value of Sig. <0.05 so H_a can be accepted and the calculation of the pretest-posttest score in the interval category shows an initial percentage of 36.7% and then increases to 100%, meaning that the cognitive abilities of children have increased by 53.3%.

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