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Capilarization Game Foster Childrens's Cognitive and Language Abilities

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ABSTRACT

The purpose of the study was to analyze effect of capillary games foster children's cognitive and language abilities. The research was conducted using a quasi-experimental design with a quantitative approach. The experimental design used was a nonequivalent control group design. The research study was situated in an Indonesian early childhood education institution with a total of 30 children in the experimental group and 30 children in the control group. The data analysis technique in this study uses parametric statistics independent t test. The results showed that (1) there was an effect of capillary game foster children's cognitiveve abilities, statistically the value of t = -4.382 with a significant level of p = 0.000 less than 5%; (2) there is an effect of the capillary game on childrens's language abilities, statistically the value of t = -4.617 with a significant level of 0.000 less than 5%. Based on the results of the research and discussion, it can be concluded that cappilarry games foster childrens's cognitive and language abilities in an Indonesian early childhood education institution.Through from cappilarry games makes the childrens was recognice many color so the cognitive abilities can be foster. Another ability, cappilarry games make the childrens fluent to be telling stories so the language abilities can be foster. The practical implication in this research is that capillary games can be the foster children's cognitive and language abilities.

INTRODUCTION

Childhood education is an education that provides the most important basic for children's education in the future. Early childhood education is a sensitive period for children or an effective period to develop various aspects of child development, including the development of physical-motor skills, cognitive,language, social-emotional, arts, moral, and religious values. Early childhood, efforts to develop the full potential of children must be implemented so that the child's growth and development are optimally achieved (Aisyah, 2017a). Group of early childhood into three groups, namely children from infants up to 2 years, children aged 3-5 years, and children aged 6-8 years (Susanto, 2017). The division of children by age can influence the rules in implementing curriculum in education and child care.

Early childhood has different characteristics in each individual, but in general argues that early childhood has characteristics namely each child is unique, children learn through play and trying, the child's attention span is short, children see and understand the world from a different perspective from adults, children are egocentric, children need love and acceptance and exploration, activity and expression (Hanum, 2017). Children can think creatively through objects that are around them. Children at an early age are the most effective learning periods, children learn through playing both with peers and with objects that are around it (Fisher, 2014). Children tend to be egocentric

but still part of social beings who need other friends to play. Children aged 0-8 years still have a short span of concentration power so that in teaching children can not be too long, because children will quickly get bored (Augusta, 2013). Children recognize things by organizing and classifying them into concepts. Children still think symbolically, cannot think abstract and complex. Early childhood has developmental aspects that need to be developed. These aspects of development include religious moral values, gross motor, fine motor, language, cognitive and social emotional. Cognitive and language development is one of the important aspects in early childhood. However, as a known fact, the majority of children's cognitive and language abilities are provided by introducing numbers, counting and reading which are introduced to mathematics, science, and language teaching (Hamdayana, 2017).

Based on the results of initial observations situation in an Indonesian early childhood education institution it was found that childrens's had cognitive abilities with the Undeveloped category, sort objects and distinguish objects into several groups. Cognitive development is a thought process, namely the individual's ability to connect, assess and consider an event or events (Susanto, 2012). The process of cognitive development is related to the level of intelligence that marks a person with various interests, especially in the emergence of a learning idea. In addition, that cognitive development in early childhood includes learning problem solving, logical thinking which includes object classification, patterns, initiating, planning and recognizing cause and effect and symbolic thinking consisting of symbolic thinking, including the ability to recognize, mention, use the concept of numbers, recognize letters, and be able to represent various objects and their imagination in the form of pictures (Amalia,2018). The results of the initial observations that have been made not only found problems in cognitive abilities but also found other problems in the language abilities in an Indonesian early childhood education which were in the Undeveloped category. The lack of language skills in children can be seen from the problem of delay in speaking, having a limited vocabulary and not answering questions asked by the teacher. Childrens's language abilities have a level of ease in receiving and understanding new knowledge compared to logical development (Jazuli, 2015) because one of the characteristics of children is imitation so that when adults speak, children will observe how the pronunciation of words the. Children's language acquisition is obtained from the experience of children listening to their immediate environment. The role of language for early childhood includes as a means to think, listen, speak, read and write (Pebriana, 2017). Through language, a person can convey his wishes and opinions to others.

Based on the observations found in the learning process carried study sitiation in an Indonesian early childhood education institution, it shows that the teacher's way to develop cognitive and language skills is by writing, reading and counting so that the stages of cognitive and language development have not been carried out optimally. The results of initial observations regarding childrens's cognitive and language abilities in 20 people, showed that the cognitive skills of 12 children were in the undeveloped category, while in language skills it was found that 14 children were in the undeveloped category. Problems related to cognitive and language development can be solved through various learning methods, one of which is through science games for early childhood. This science game should be done from an early age with a process of fun activities and through habituation of children to undergo the scientific process

directly, so that they not only know the final result but also understand the process and scientific activities carried out. Early childhood science learning will give children a tendency to be able to explore various living and inanimate objects. Then it can also train children to use their five senses to recognize various objects and events (Aisyah, 2017b).

The application of the science experiment method is expected that children will be able to interact directly with the teacher regarding the activities given. So that with the application of the scientific experiment method, it is hoped that it will be able to improve the child's ability to understand every process of the given activity as well as being able to understand science concepts and be able to put aspects related to science skills. In the implementation of this activity, teachers can use existing media in the school environment (Fidyani,2014). The learning method applied to science learning should use media and learning resources that are close to children's lives. Teachers can also use child centered learning methods that involve children's activities directly in the learning process, one of which is using experimental learning methods (Fidyani,2014).

This research is using science games with experimental methods. The science games expectatition it can help improve children's cognitive development and language development. The form of the science game that will be carried out is the capillarization game. Cognitive development to be achieved is that children are able to recognize primary and secondary colors, while language development to be achieved is to be able to tell the process of experimental activities that have been carried out. The experimental method is a way of presenting activities when children conduct experiments by experiencing and proving for themselves something they have learned (Djamarah, 2012). In the learning process with the experimental method, children are given the opportunity to experience themselves or do it themselves, follow a process, observe an object, analyze, prove, and draw their own conclusions about an object, a certain state or process. Research by (Fidiyani et al., 2016) found that the application of experimental methods in science learning can improve children's cognitive and language abilities. Based on the results of observations study in an Indonesian early childhood education institution, a problem can be formulated, namely is there any effect of capillarization game foster childrens's cognitive and language abilities.

RESEARCH METHOD

General Background

This research was conducted using a quantitative approach. The method used in this study is a quasi-experimental design (quasi-experimental). The use of a quasi-experimental design method was carried out in order to achieve the research objectives, improving childrens's cognitive and language abilities (Jannah, 2018). The quasi-experimental design used in this study is a non-equivalent pretest-posttest control group design (John, 2013). This study involved two groups, namely the control group and the experimental group. The control group is a group that follows conventional learning. The experimental group is a group that participates in learning by applying science games with the experimental method.

Sample

The research subjects in this study were 60 childrens in Indonesian early childhood education institution using two groups. 30 children in the experimental group as a class

that received treatment (treatment) using the capillary games and 30 children in the control group class as a comparison using conventional learning.

Instrument

The instrument in this study was used to see the measurement of cognitive development and language development (Jannah, 2018). In order for the instrument to be used properly, researchers need to develop a design for the preparation of the instrument known as a grid. The instruments used in the study consisted of language and cognitive instruments in the form of observation sheets. Cognitive instruments are made based on operational definitions. The indicators in cognitive instruments include: (1) Children like to ask questions about what colors they don't know, (2) Children are able to do simple color mixing experiments, (3) Children are able to follow instructions as conveyed by the teacher, (4) Children are able to classify objects according to color, and (5) Children are able to tell the results of color mixing experiments.

The indicators in the language instrument include: (1) Children are able to listen to the words of the teacher with their friends, (2) Children are able to digest and understand the explanations of the teacher and their friends, (3) Children are able to recognize vocabulary, (4) Children are able to recognize simple words or sentences, (5) the child is able to answer the questions given by the teacher, (6) the child is able to state the reasons for something that is desired and unwanted. The research used 60 childrens in group Indonesian childhood education institution which were divided into two groups. There was 30 children in the experimental group as a class that received treatment using capillary games and 30 children in the control group class as a comparison using conventional learning. The research subjects in this study were 60 children divided into 2 groups. There was 30 children in the control group and 30 children in the experimental class. The control group consisted of 30 children, 17 boys (56.7%) and 13 girls (43.3%). And the experimental group there were 30 children there were 14 boys (51.7%) and 29 girls (48.3%).

The instrument trial in this study was focused on revealing the validity and reliability of the instrument. The instrument in this study consisted of an instrument to observe the effect of the capillary game media on the childrens's cognitive and language abilities in Indonesian childhood education institution. Variables on cognitive abilities that are measured are 5 indicators and language skills consist of 6 indicators. Statistical tests used in this study are validity tests using product moment correlation, reliability tests using Cronbach's alpha. The test was carried out on 30 childrens, all of them from members of the subject outside the research subject, for further analysis of the validity and reliability tests using the SPSS 26.0 analysis program computer.

Data Analysis

This study took a sample of 60 childrens in Indonesia childhood education institution. The subjects of this study consisted of an experimental class consisting of two classes with a sample of 30 childrens and a control class consisting of two classes with a sample of 30 childrens. The experimental class is a class that uses capillary game media while the control class is a class that uses conventional learning. The cognitive ability variable consists of 5 indicators. While the variable of children's language skills consists of 6 indicators with 4 (four) rating scales, namely (1) Not Developed, (2) Starting to Develop, (3) Developing According to Expectations, (4) Developing Very Well.

Descriptive analysis is used to describe the state of the variable itself. This analysis was carried out by explaining the variable state of children's cognitive abilities and language skills through the media of the capillary game to children aged 5-6 years in with 60 children in Indonesian early childhood education institution.

$$IK = \frac{\text{STt} - \text{STr}}{\text{JK}}$$

Description : IK = Class Interval
STt = High Value is 4
STr = Lowest Value is 1
JK = Class total

Based on the above formula it becomes:

$$IK = \frac{4-1}{4} = \frac{3}{4}$$
$$IK = 0{,}75$$

It can be seen that the group interval value is 0.75 so the criteria for assessment are in Table 1.

Table 1. Class interval.

Interval	Criteria
1,00 – 1,75	Undeveloped
1,76 – 2,50	Start To Developed
2,51 – 3,25	Growing As Expected
3,26 – 4,00	Growing Very Well

RESULT AND DISCUSSION

The results of children's cognitive abilities (post test) in the control group have an average value of 3.07 located in the "Developing According to Expectations" category and the results of children's cognitive abilities (pre test) in the control group have an average value of 1.70. Meanwhile, the results of the children's cognitive abilities (post test) in the experimental group had an average value of 3.65 in the "Very Good Development" category and the results of the children's cognitive abilities (pre test) in the experimental group had an average value of 1.86. And the results of calculating the average value with SPSS software can be seen in the Table 2.

Table 2. Results of grouping the average value of cognitive abilities descriptive statistics.

Dependent Variable: Cognitive abilities

		Mean	Description	N
Cognitiv Control (Pre Test)		1.7000	Undeveloped	30
	Experiment	1.8600	Undeveloped	30
	Total	1.7800	Undeveloped	60
Cognitiv Control (Post Test)		3.0733	Developing According Expectation	30
	Experiment	3.6467	Growing very well	30
	Total	3.3600	Developing According Expectation	60

Based on Table 2, it is known that the results of children's cognitive abilities (post test) in the control group have an average value of 3.0733 which is in the "Developing According to Expectations" category. While the results of the development of post-test children's cognitive abilities in the experimental group have an average value of 3.6467 which is included in the assessment of children who have children's cognitive abilities in the "Very Well Developed" category after getting learning using capillary games.

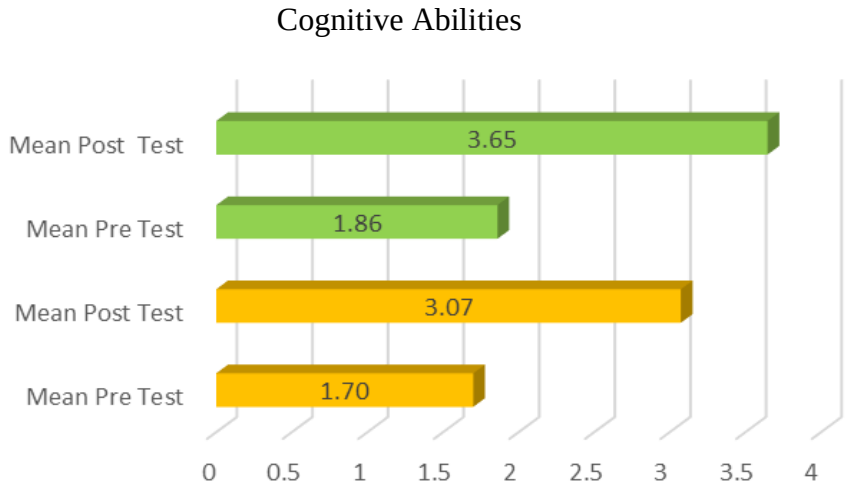

Figure 1. Comparison diagram of the average value of cognitive abilities between the experimental group and the control group.

Based Figure 1, known that the value of cognitive ability in the experimental group has increased significantly compared to the control group. Thus, the capillary game media is effective for improving the cognitive abilities in an Indonesian early childhood education institution. The results of the children's language ability (post test) in the control group had an average value of 2.87 which was in the "Developing as expected" category and the results of the children's language skills (pre test) in the control group had an average value of 1.68. While the results of the children's language ability (post test) in the experimental group had an average value of 3.41 located in the "very well developed" category and the results of the ability to recognize children's patterns (pre test) in the experimental group had an average value of 1.86. And the results of calculating the average value with those that have been processed with the help of SPSS 26.00 software are in Table 3.

Table 3. Children's language abilities results data descriptive statistics.

Dependent Variable: Language Abilities

		Mean	Description	N
Language Ability (Pre Test)		1.6827	Undeveloped	30
	Experiment	1.8330	Undeveloped	30
	Total	1.7578	Undeveloped	60
Language Ability (Post Test)		2.8717	Developing according expectation	30
	Experiment	3.4057	Growing very well	30
	Total	3.1387	Developing according expectation	60

Based on Table 3, it is known that the results of the children's language ability (post test) in the control group had an average value of 28717 which was in the "Developing as expected" category. While the results of the post-test children's language skills in the experimental group had an average value of 3.4057 which was included in the assessment of children who had children's language skills in the "Very Good Development" category after getting learning using capillary game media.

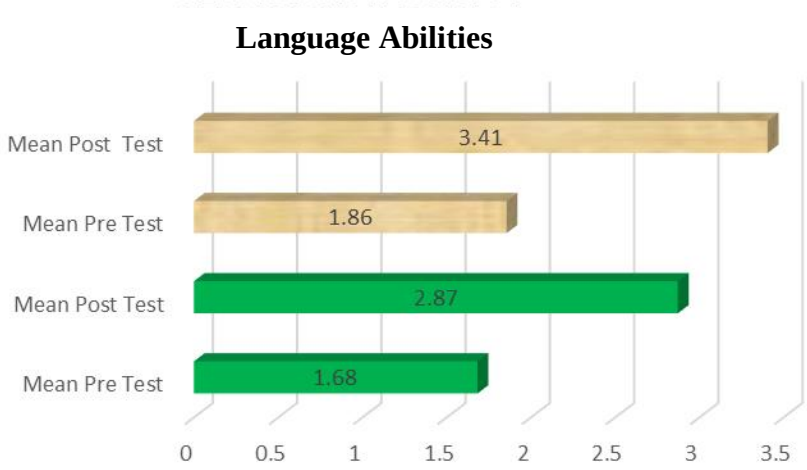

Figure 2. Comparison diagram of the average value of language abilities between the experimental group and the control group.

Based on Figure 2, known that the value of language skills in the experimental group has increased significantly compared to the control group. Thus, the use of capilarization game media is effective for improving language abilities in an Indonesian early childhood education institution. Early childhood is often referred to as the "golden age". At this time, almost all potential children experience a sensitive period to grow and develop rapidly and greatly. The development of each student is not the same because each individual has a different development. Nutritious and balanced food and intensive stimulation are needed for this growth and development. If children are given intensive stimulation from their environment, they will be able to carry out their developmental tasks well. Therefore, in this study, capillary media was used to stimulate children's cognitive development. Based on the results of hypothesis testing, it is proven that the capillary game has an effect on the cognitive abilities. Cognitive development is the basis for a child's ability to think, this is in accordance with the opinion of Susanto (2012) that cognitive is a thinking process, namely the individual's ability to connect, assess, and consider an event or events. So the cognitive process is related to the level of intelligence (intelligence) that marks a person with various interests, especially aimed at learning ideas.

The results of this study are in line with a study conducted by Paramita et al. (2019) which found that the application of science games could improve children's cognitive abilities in group B students of Permata Hati Kindergarten Surakarta. The application of science games is a game that utilizes simple learning media that can be used as a means of playing and learning for children so that they can improve children's cognitive abilities. The results of this study are also in line with the study conducted by Amalia et al. (2018) which found that learning with the experimental method can improve the ability of science to recognize liquids. It can be seen from the experimental activities in

the observing aspect, it can be seen that when asked the children were able to answer because the children paid attention to the experimental process carried out, in the classifying aspect, it was seen that children began to believe when grouping objects based on their type, in the predicting aspect they were able to make temporary guesses about the results (Kumalasari et al., 2015). The experiment that will be carried out even though there are still some mistakes, in the aspect of concluding it appears that the children have been able to make conclusions about the results of the experiments carried out because during the experiment process the children paid attention seriously, and in the aspect of communicating in communicating the results and process of the experiment in front of the class the children were brave and did not look shy. Learning by using experimental methods can improve children's scientific ability to recognize liquids (Mustika, Y., & Nurwidaningsih, 2018).

The results of this study are also in line with the study conducted by Nurwidaningsih (2018) which found that science experiments on color mixing material affect the cognitive development of early childhood in Kartika Siwi Kindergarten. Science experiments can affect children's cognitive development by 4.50 or classified in the good category. The results of the study are also strengthened by a study conducted by Fidiyani et al. (2016) which found that children's cognitive abilities before this research was carried out were still not developed, but the application of experimental methods carried out in 3 (three) cycles showed an increase in children's cognitive abilities. Based on the results of hypothesis testing, it is proven that the capillary games has an effect on the children's cognitive abilities. Cognitive development is the basis for a child's ability to think, that cognitive is a thinking process, namely the individual's ability to connect, assess, and consider an event or events. So the cognitive process is related to the level of intelligence (intelligence) that marks a person with various interests, especially aimed at learning ideas.

Language development is one of the most important developments in early childhood growth. Language development is closely related to the overall development of children both in terms of cognitive, social, and emotional. As a means of expression, children learn to express the language of their minds through verbal language. Children's language skills will be the basis for children's ability to obtain and process information and develop themselves through socialization with their environment. In children aged 3-6 years, the most common and effective language development carried out is speaking. This is in line with the general characteristics of children's language development at that age. One of these characteristics includes the child's ability to speak well and fluently. Good language development, especially in speaking, makes children able to express their thoughts and feelings intelligently according to the context and situation when they are talking. One of the learning methods that emphasizes the stimulation of children's language development is the capillary game experimental method.

Based on the results of hypothesis testing, it is proven that there is a capillarization game that affects the language abilities in an Indonesian childhood education institution. This shows that the development of children's language at preschool age develops very quickly. Therefore, one of the characteristics at this age is the age of asking, where children often ask questions about everything they see and think, sometimes even not wanting to stop asking if the desired answer has not been answered. With language, children can express what they want to say and know about

the world around them (Hapsari, 2016). This study is expected to provide knowledge, research reference sources regarding capillary games and the use of capillary games foster childrens's cognitive and language abilities.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that cappilarry games foster childrens's cognitive and language abilities in an Indonesian early childhood education institution.Through from cappilarry games makes the childrens was recognice many color so the cognitive abilities can be foster. Another ability, cappilarry games make the childrens fluent to be telling stories so the language abilities can be foster. The practical implication in this research is that capillary games can be the foster children's cognitive and language abilities.

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