

# ALTERNATIVE SCIENCE GAME FOR INCREASE COGNITIVE ABILITY OF EARLY AGE CHILDREN

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**ALTERNATIVE SCIENCE GAME FOR INCREASE  
COGNITIVE ABILITY OF EARLY AGE CHILDREN**

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**Abstrak**

Penelitian yang telah dilaksanakan ini bertujuan untuk meningkatkan kemampuan kognitif anak di Kelompok A di PAUD Yasmin Jember, dengan fokus penelitian pada (1) Kemampuan mengenal konsep sederhana dalam kehidupan sehari-hari; (2) Kemampuan mengamati dan rasa ingin tahu; (3) Kemampuan mengklasifikasikan atau menggolongkan; (4) Kemampuan menghubungkan sebab akibat. Dalam penelitian ini menggunakan pendekatan penelitian deskriptif kualitatif. Subyek penelitian adalah anak di Kelompok A PAUD Yasmin Jember yang berjumlah 11 anak. Dalam teknik pengumpulan data, penelitian ini menggunakan observasi, wawancara, dan dokumentasi. Teknik analisa data dengan menggunakan reduksi data, tampilan data (mendisplay data) dan menggambar atau kesimpulan (verifikasi). Berdasarkan penelitian dan analisis data selama kegiatan proses belajar diketahui bahwa ada 6 anak yang sudah dapat menunjukkan minat belajar dan tertarik untuk memecahkan masalah cukup baik dan 5 anak lain yang masih memerlukan motivasi dan bimbingan dalam hal untuk mengungkapkan rasa ingin tahu dan memecahkan masalah di sentra sains, dan ada 45% atau 5 anak dari jumlah 11 anak yang masih memerlukan motivasi dan bimbingan ketika berada di sentra sains. Hal ini terjadi dikarenakan anak-anak sebelumnya tidak bersekolah di PAUD Yasmin, sehingga tidak mengikuti kegiatan pembelajaran di sekolah yang sama.

**Abstract**

The purpose of this study was to improve children's cognitive ability of Group A in ECE Yasmin Jember, which was focused on (1) the ability to recognize simple concepts in daily life; (2) the ability to observe and curiosity; (3) the ability to classify; (4) the ability to relate cause and effect. This study was conducted by using qualitative descriptive approach. 11 children of Group A in ECE Yasmin Jember were subject of this study. Data collection techniques used observation, interview, and documentation. Miles and Huberman model were chosen as data analysis techniques which has three steps; data reduction, data display, and drawing or conclusion (verification). Based on research and data analysis during learning process activities known that there were 6 children who have been able to show interest in learning and problem solving while 45% or 5 of the 11 children required motivation and guidance in terms of expressing curiosity and solving problems when they were in science center. This happened because previously 5 children have ever been attended school at other, so they did not follow the whole same learning activities in ECE Yasmin Jember.

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## **INTRODUCTION**

In early childhood development, it is necessary to provide stimulation at every stage of growth, because this stage of age will determine the next stage of development. Based on The Ministry Regulation of National Education (Permendiknas/Peraturan Menteri Pendidikan Nasional) Number 58 Year 2009, it is stated that the level of development achievement describes the growth and development that is expected to be achieved by children in a certain age range. Children development is the integration of aspects of understanding religious and moral values, physical, cognitive, language, and social emotional.

Latif (2013: 73) argues that the learning process in early childhood is generally based on two learning theories, namely: (1) behaviorism, and (2) constructivism. Both theories have different characteristics with one another, such as behaviorism emphasizes on the outcomes of the learning process, while constructivism emphasizes the learning process.

Early childhood learning is designed according to the age of development stage, with a fun and

exciting atmosphere for children, so that they are interested in participating in the learning activities prepared by the teacher. According to Suyanto (2005: 9), learning for children must apply the essence of play. The essence of playing involves happy feeling, democratic, active, not forced, and independent. Learning should be arranged in such a way that it is fun, encouraging children to participate, and not being forced.

A teacher is expected to better understand the needs of children in terms of education and can direct and facilitate children in accordance with the environment and appropriate learning guidance as the stage of development.

Yamin (2010: 1) states that early childhood education is a coaching effort aimed at children from birth up to the age of six years which is done by through the provision of education stimulus to help both physical and spiritual growth so that children have readiness to enter further education.

According to Bredekamp and Regrant (in Yamin, 2010: 3), children will learn well and meaningfully when children feel

comfortable psychologically and their physical needs are met, children construct their knowledge, children learn through social interaction with adults and other children, search, use, learn through differences. Then the different elements of the child are noticed. By playing, children use their body muscles, stimulate the senses, explore, respond to the world around, and discover what the world and themselves are like.

Playing is an activity that is needed by children, because by playing children will get a learning experience. Children will learn through the games they do. A fun play experience and the role of support from the surrounding environment will help the children's development process optimally.

Playing and game tools have therapeutic functions. Children's learning process is actually done through the method of playing with game tools, (Mutiah, 2010: 157). Playing can make a natural contribution to learning and growth, because with these activities children can make observations, activities, and gain knowledge directly when playing.

Playing will provide experiences

and activities directly in children to be able to practice and learn with a variety of skills and different concepts in every game.

Similarly, Latif (2013: 78) argues that by playing children will gain something by exploring and experimenting about the world around it in order to build self-knowledge.

Growth and development of children is divided into aspects of development, namely physical (fine and gross motor), cognitive (creativity, thinking power, emotional intelligence and spiritual intelligence), socio emotion (attitude and behavior), language and communication in accordance with the uniqueness of children respectively (Sujiono, 2009: 6)

Susanto (2005: 53) states that a cognitive development describes how the children's mind develop and function so that they can think. Cognitive development is very instrumental for the success of children in learning, because the learning activities are closely related to the ability of children in terms of remembering and thinking. By learning to solve problems ranging from simple is the first step so that

children have the ability to find solutions.

Early childhood do not yet have a realistic and objective understanding of the surrounding environment, and will always ask because they are driven by great curiosity. Piaget believes that a child should be viewed as a scientist seeking answers in an attempt to experiment with the world to see what happens (Mulyasa, 2012: 12).

In ECE Yasmin Jember, learning model that has been used is a child-centered learning model or learning center approach. Learning in the center is an alternative to improve cognitive abilities of early childhood. The central approach is the approach done within the circle and the center of play provides an initial foothold on the activities to be undertaken within the center (Sujiono, 2009: 216), and one of the centers in Yasmin Jember is the center of science.

Asmawati (2008: 10.27) mentions that science centers are places designed to invite children's curiosity and where children can find discovery areas. The center of science provides an opportunity for children to explore the events that

occur daily around the child by using the senses.

In the center of science, children are invited to do a lot of science games that is to conduct experiments and make observations and stimulate the children's curiosity to the surrounding environment. In children's science games, children learn to use thinking skills. In ECE Yasmin Jember, in the learning activities aiming to develop aspects of early childhood development, especially in cognitive abilities, children are given opportunities, challenges and involved in various activities to gain hands-on experience. With the game of science, they can foster a logical thinking pattern for children and they will also be accustomed to follow each stage in the experiment.

Therefore, from the background, the researcher needs to do research with the formulation of the problem as follows:

1. How are the cognitive abilities conducted through science games in Group A early childhood Yasmin Jember?
2. What are the obstacles in children's cognitive abilities conducted through science games

in Group A ECE Yasmin  
Jember?

## **LITERATURE REVIEW**

Optimizing aspects of early childhood development requires educational efforts that can help the process. Early childhood is in the golden stage in its developmental stage. Early childhood has a great sense of curiosity, so in every behavior, they like to make observations and always want to try new things.

Playing is an activity that children do spontaneously because it is liked, and often without a specific purpose. For children, playing is a necessary need for him to develop naturally and wholly, becoming an adult capable of adapting and building himself, becoming a mature and self-sufficient person, Montolalu (2008: 1.10).

Playing is an indispensable medium for thinking processes as it will support intellectual development through experiences that enrich the thinking of children. According to Vygotsky (in Montolalu, 2008: 1.15), there is a close relationship between playing and cognitive development. Playing is an opportunity for children

to explore, conduct research, conduct experiments in order to gain knowledge.

By introducing science games in early childhood, it will foster a variety of scientific attitudes and will help in solving problems. Through the game of science children will be familiar to follow the experimental stage and train children to observe and solve problems.

According to Sujiono (2007: 12.3) the purpose of science games in Kindergarten is to make children to able to actively seek information about what is around them. To fulfill their curiosity through exploration in the field of science, children try to understand their world through observation, investigation, and experiments. Many benefits will be obtained by children if from an early age they have been introduced to the game of science. By using science games, children will be able to conduct experiment and to be more creative.

Science games are beneficial to children because they can create a fun atmosphere and can create imaginations in children that can ultimately increase children's knowledge naturally (Sujiono, 2007:

12.4). Science games can train children to actively use the five senses, so children can actively optimize the five senses that can help the growth process.

Science games that will be done are suited to the level of children development. The activities undertaken can stimulate the children to be able to find their own new concepts and things that are implemented. Therefore, these activities will make children familiar to remember and construct their knowledge.

Exploration activities will be very fun for children, because children will naturally find their own things they want to know. Learning process that is packed with interesting and fun will arouse children's curiosity and motivate children to be able to think critically.

Early childhood is in the process of growth and development, which this time is the most appropriate time to lay the first and main foundation in developing the potential and ability of physical, cognitive, linguistic, artistic, social, emotional, spiritual, self concept, self discipline, and independence, (Mulyasa, 2012: 16).

Cognitive meaning is a process of thinking, i.e. the ability of individuals to relate, assess, and consider an event or event. Cognitive factors have an important role for the success of children in learning, because most learning activities are related to remembering and thinking.

Montessori (in Sujiono, 2007: 2.6) says that in the developmental range of 3-5 year olds characterized by sensitivity, a potential sensitivity to the stimulus will be generated through the five senses. Sensitivity has significance for every child's development.

Children are given understanding through concrete examples as live demonstrations and packed through play. Indirectly children will receive what is taught to them. Dewey (in Sujiono, 2007: 2.7) argues that educators should give every child the opportunity to do something, individually or in groups so that the child will gain experience and knowledge. Schools should be used as laboratories for children.

Based on the theory of cognitive development proposed by Jean Piaget (in Wahyudin, 2011: 35) , early age is at the motor sensory stage and preoperative, the period

when the child has not been able to operate mental logically. In this case, what is meant by operations are activities that are solved mentally and not physically.

According to Sujiono (2007: 12.8-12.9), in every growth and development, children have different characteristics in doing science activities. The influence of science games on cognitive development is through the activity of children's science they will use their cognitive abilities in solving problems, math, and language when they are observing, predicting, investigating, testing, declaring and communicating.

## **METHOD**

This research applied descriptive qualitative approach. According to Brogdhan and Taylor (in Moleong, 2004: 3), descriptive qualitative research is a series of research procedures that produce data descriptively both orally and in writing from the source or behavior of the observed person.

According Sugiyono (2015: 13), the method of qualitative research is a method of research based on postpositivism philosophy,

used to examine the condition of natural objects, (as opposed to experiments) where researchers are as a key instrument, data collection techniques are done in triangulation), data analysis is inductive /qualitative, and the results of qualitative research put more emphasis on the meaning rather than generalization.

The subjects were 11 children in Group A of ECE Yasmin Jember. The place of study was at Yasmin Early University Muhammadiyah Jl.Karimata No.49 Jember. The time allocation was conducted in the academic year 2017/2018 on October 2<sup>nd</sup>, 2107 until November 6<sup>th</sup>, 2017.

Data collection techniques used in this study were observation, interview and documentation. The type of observation used was participant observation, i.e. the researcher was involved in the daily activities with the research subjects. In each meeting, the researcher brought the observation sheets that have been made by the researcher.

Another collection technique applied in this research was the interview. Where the respondent or resource person was a teacher in the science center Group A ECE Yasmin



Jember. Types of interviews used were structured interviews according to the formulation of the problem.

Then, the next data collection technique was documentation, that is a photo of learning activity during research and RKH used by the class teacher.

Data analysis techniques on this research applied Miles and Huberman model (in Sugiyono, 2011: 246), and there were three steps including data reduction, data display, and conclusion or verification data.

Table 1. Cognitive Ability of Children through Science Centers

No	Name Code	Indicator of Cognitive Ability of Children through Science Centers				Means
		1	2	3	4	
1	ALY	13	7	13	4	9,25
2	AKM	14	12	13	9	12
3	ADZ	16	17	17	17	16,75
4	CDK	8	3	8	0	4,75
5	AYS	8	0	7	0	3,75
6	TQY	9	0	10	0	4,75
7	RFI	14	11	15	13	13,25
8	SYF	9	3	7	0	4,75
9	SLT	14	10	13	6	10,75
10	HRN	13	12	13	8	11,5
11	PRC	17	17	17	17	17

## RESULTS AND DISCUSSION

From the results of observation, interview and documentation obtained data as follows:

The result of research about science game as one of alternative to improve cognitive ability of early child in Group A at ECE Yasmin Jember was presented in table form which is a summary of research for 4 meetings. The data obtained were presented in Table 1. Indicator Description:

1. The ability to recognize simple concepts in everyday life.
2. The ability to observe and the curiosity.
3. The ability to classify or classify.
4. The ability to link cause and effect.

The data in table 1 presenting column of means were first sorted from the smallest to the largest, so that the data will be obtained sequentially, Then, the data were presented as follows: 3,75; 4,75; 4,75; 4,75; 9,25; 10,75; 11,5; 12; 13,25; 16,75; 17.

Therefore, the middle value was 10.75. Out of 11 children in Group A ECE Yasmin Jember studied, when the average value of cognitive abilities of children through science centers in the table above was 10.75 then the cognitive abilities of children were classified into good. But when the average value obtained

by children was below 10.75 then it can be concluded that the children still needed motivation and stimulation in their cognitive abilities in science centers.

Tabel 2. Interview with the teachers of science center.

No	Question/ Answer	Description
1	Question	What learning model is used in Yasmin Jember?
	Answer	Center learning model.
2	Question	Why do you select center learning model?
	Answer	Because children are given the flexibility to explore and build their own children's knowledge through various experiences in the centers of activities that encourage children's creativity.
3	Question	when is the center learning model started to be used?
	Answer	Since the establishment of early childhood Yasmin Jember more or less in 2011.
4	Question	How does the children's interest in the learning center model?
	Answer	Very happy, interested and enthusiastic in in conducting every activity.
5	Question	In science centers, how can teachers help children develop their cognitive abilities?
	Answer	By developing an active children's attitude and enthusiasm and curiosity towards the game of science.

The results showed that there were 11 children who were the subjects of the study. There were 6 children who were able to show interest in learning and were

interested in solving the problem quite well and 5 other children who still needed motivation and guidance in terms of expressing curiosity and solving problems in science game activities .

Because the 5 children previously did not attend school in the same foundation (ECE Yasmin) so for the learning process still needed time for adaptation.

The process of early childhood development was different, in accordance with stimulation and the influence of the surrounding environment. Children must be treated according to their age of development, as each child is different according to the process of environmental adaptation and the pattern of parenting.

According to Sujiono (2007: 1.25) , the factors that influence cognitive development include: (1) Heredity , that is determined by the characteristics that are brought from birth; (2) Environmental factor, that human development is determined by the experience and knowledge gained from the environment; (3) Maturity, that each organ (physical or psychic) can be said mature if it has reached the ability to carry out

their respective functions; (4) Formation, i.e. all circumstances outside oneself that influence the development of intelligence, can be due to intentional (school / formal) formation and unintentional (natural / informal) influences; (5) Interest and talent, that interest is the encouragement for the act, and talent is defined as innate ability, as the potential that needs to be developed and trained to be realized; (6) Freedom, which is the freedom of man to think divergently and can choose certain methods in solving problems and freely choose the problem according to his needs.

The results of this study were supported by the theory of Montessori (in Sujiono, 2007: 2.6) mentioning that in the range of development of children aged 3-5 years characterized by sensitive period, it will indicate sensitivity potential to the stimulus received through the five senses. Sensitivity has significance for every children's development.

Dewey (in Sujiono, 2007: 2.7) argues that educators should give every child the opportunity to do something, individually or in groups so that the child will gain

experience and knowledge. Schools should be used as laboratories for children.

The science games activities train children to be active using five senses to recognize the various kinds of objects and various events and causation. Science games are beneficial to children because they can create a fun atmosphere and can create imaginations in children that can ultimately increase children's knowledge naturally (Sujiono, 2007: 12.4).

By introducing the games of science in children means helping them to do a simple experiment so as to connect the cause and effect of a treatment.

## **CONCLUSIONS**

The game of science in improving cognitive abilities in Group A children in early childhood Yasmin Jember, has been shown the result that science games through science centers can significantly improve the cognitive abilities of children in Group A at Yasmin Jember. In an indicator of the ability to recognize simple concepts in everyday life and the ability to classify or classify, most children

were able to demonstrate their abilities well. Meanwhile, in indicators of observability and curiosity and the ability to link cause and effect, there were some children who lack or have not raised the attitude so that there was a need for more frequent motivation from teachers.

There were some obstacles when children played science that is the process of adaptation of children who required erratic time from each child, and the desire and the willingness of children in playing science that made children more interested and challenged to do it..

From the results of the research and discussion above, it can be concluded that as many as 45% of children still need motivation and more frequent stimulation of teachers so that children can further develop their thinking ability, and they are expected to have more experience and more aroused to solve their own problems. 54% of children was able to show interest and talent in playing science, they seem more enthusiastic and very interested to carry out learning activities that have been prepared by teachers.

Science games introduced early

have an effect on the development of children's thinking process. The games of science stimulate children to be more creative and imaginative. Science games can also stimulate children to be more creative and think logically. The game of science will provide a useful learning experience for early childhood that is useful for the development of their thinking skills.

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