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Cognitive ability to know colour concepts through method simple science experiments in early children

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getting to know

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ABSTRACT Ability to know colour is one aspect of ability. It is an essential cognitive function for brain development in children at an early age. Improving the ability to know colour must supported with adequate methods and facilities, but based on conditions in the field, fewer children still understand draft colour with good Research objectives This is to increase the ability of cognitive children to know draft colour through method simple science experiment. The research used is Classroom Action Research in nature collaborative. Amount of samples from the study: This totalled 11 people. The data collection method used is sheet observation (checklist). Data analysis techniques were carried out quantitatively. Research results show that cognitive knowledge of draft colour can increase with method simple science experiments. This matter is proven by Mark's ability cognitive child with an average value of 38 with the predicate is very lacking. As for the implementation process activity method experiment For increasing cognitive child seen from teacher activities and activities, children in cycle I and Cycle II experienced enhancement that is average percentage of implementation Teacher activity in cycle I reached 67.85% with predicate sufficient, and the average percentage of implementation activity children in cycle II reached 79.85% with predicate Good. after applied activity simple science experiments, abilities know color in group B experienced enhancement from cycle I was 42.20 to cycle II amounted to 71.39 pages This prove that activity simple science experiment can improve ability cognitive child.

INTRODUCTION

Rahimah and Izzaty (2018) stated that early childhood is a golden period of human growth and development. Early childhood will experience a golden age (The Golden Age) at 0-6 years (Harjanti, 2015). Meanwhile (Rosmala, 2005) stated that children experience a golden period at an early age, namely 4-6 years old. Children experience extraordinary development during this period, both in their brains and physically. The brain rays in children are progressing very rapidly. This incident is caused by new things that children acquire from their environment. The Republic of Indonesia Law NO. 20 of 2003 concerning the National Education System Article 1 Paragraph 14, Early Childhood

Education is a coaching effort aimed at children from birth to the age of six which is carried out through providing educational stimuli to help physical and spiritual growth and development so that children are ready to enter education.

Furthermore. The growth and development period of early childhood must be monitored continuously so that their maturity and readiness can be quickly identified, both regarding the development of basic abilities such as cognitive, language and motor skills as well as the development of other abilities that will shape their character in the future. These aspects of development do not develop independently but are integrated and interconnected. Of the several aspects of development, cognitive development is one of the essential aspects that must be developed for children's thinking abilities. This is so that children can manage their learning gains, solve problems, develop mathematical logic skills and knowledge of space and time, and prepare to develop the ability to think carefully (Marlianti, 2012). Cognitive development is essential because, through cognitive development, children can learn to think, solve problems, and develop logical abilities.

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Furthermore, the growth and development period of early childhood must be monitored continuously so that their maturity and readiness can be quickly identified, both regarding the development of basic abilities such as cognitive, language and motor skills as well as the development of other abilities that will shape their character in the future. These aspects of development do not develop independently but are integrated and interconnected. Of the several aspects of development, cognitive development is one of the essential aspects that must be developed for children's thinking abilities. This is so that children can manage their learning gains, solve problems, develop mathematical logic skills and knowledge of space and time, and prepare to develop the ability to think carefully. Cognitive development is an essential aspect of development because, through cognitive development, children can learn to think, solve problems, and develop logical abilities for their future development.

The ability to recognize colours is one aspect of cognitive ability. Recognizing colours in early childhood is essential for brain development because recognizing colours in early childhood can stimulate the brain's sense of sight. Colour can also provoke sensitivity to vision because the colour of an object is exposed to sunlight directly or indirectly, which can then be seen by the eye, such as opinion (Fudyartanta,

2011). The ability to recognize colours can be developed using various methods, including science activities. (Suyanto, 2005) stated that science can train children to use their five senses, connect cause and effect, use measuring instruments, find and understand events and understand the concepts of objects. Science learning is oriented learning and has a scope regarding events that occur in nature. Science learning makes students more active in interacting with the surrounding environment. According to (Utami, 2013), science is knowledge obtained through learning and proving or knowledge that covers a general truth of natural laws that occur, for example, obtained and proven through scientific methods. Learning science means learning about experiments to prove an event. Science contains discovery, observation, experimentation and problem-solving activities.

These benefits can be a provision in developing potential and maximizing aspects of children's development, so it is essential to introduce and apply science to early childhood. An initial survey was conducted at RA Istiqomah, Bogor Regency, to learn the learning methods for introducing colours to children. Based on observations made at RA Istiqomah group B with 11 children in the learning process, teachers are not applying colour to children. This can be seen during the teaching and learning process in class; some children only know primary and secondary colours through the colour card method. This makes children feel bored with the colour card method. Considering these conditions, it is necessary to improve the learning process, one of which is by applying the method of introducing colour concepts through a simple science experiment method in the form of the activity of mixing primary colours, and this can be an excellent opportunity to attract children's attention when participating in the learning process in class with full attention and fun. Appropriate media support them. Hastining et al. (2022) state that teachers and students need learning media. Effective learning media makes it easier for educators to provide teaching and learning materials for students. Teachers can easily combine ideal teaching media using any strategy, approach and method.

METHOD

Data Collection Methods use 3 data collection techniques, namely:

1. Observation

The observation data in this research are observations that contain children's cognitive abilities in carrying out colour-mixing experimental methods. The aspects observed are the activities of children and teachers during the learning process. Group B teacher RA Istiqomah carried out observations. The instruments used were child activity observation sheets and teacher activity observation sheets. Each contains activities that must be carried out by students and teachers by the daily learning implementation plan that has been prepared previously.

2. Documentation

The documentation is in the form of photographs to record the activities in each child's colour-mixing cycle.

3. Performance

Performance as an indicator of learning effectiveness, quantity of performance refers to the number of tasks the child can perform within a specific predetermined time. As argued, performance is an assessment that requires students to carry out tasks in actions that can be observed, such as singing, sports, dancing and other forms of practice.

The types of data used are quantitative and qualitative data. The sampling method uses purposive sampling, where the researchers took a sample of 11 people who were advanced class B students at RA Istiqomah Tamnsari Bogor. The method used in this research is Classroom Action Research. According to Sanford (Tuniredja, 2013), Classroom Action Research is a comprehensive cyclical activity involving analysis, fact-finding, conceptualization, planning, implementation, finding additional facts, and evaluation. According to (Mulyasa, 2014), classroom action research can be defined as research carried out to improve the quality of a group of students' process and learning outcomes. The research model that will be used is the Kemmis and McTaggart model. The model developed by Stephen Kemmis and Robbin McTaggart is a development of Kurt Lewin's model, so it looks very close to Lewin's model.

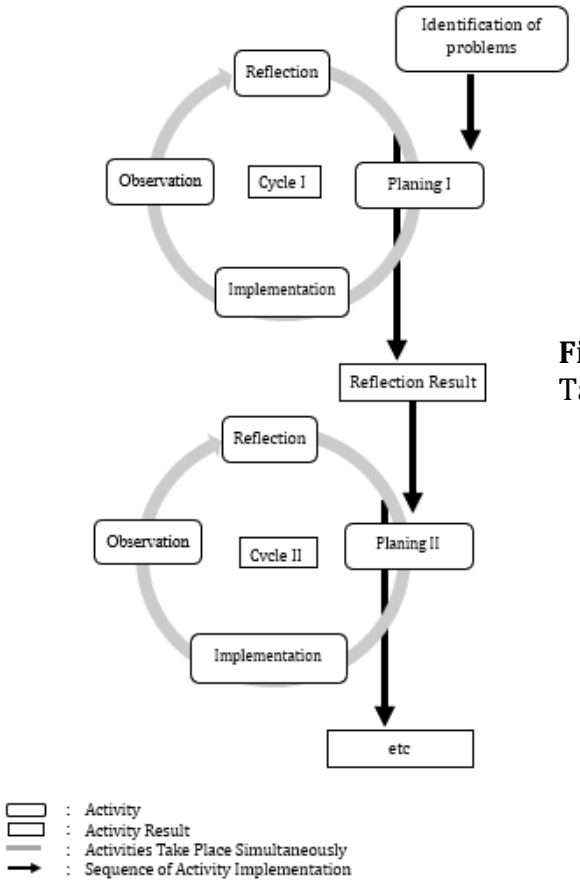

Figure 1. Kemmis and Mc Taggart Research Model

The data analysis used in this research is as follows:

1) Observation Analysis Observation

Analysis of the results of these observations is used to analyze the cognitive learning process of recognizing the concept of colour, as well as the activities of teachers and children during colour mixing activities using data in the form of observation sheet results, which are analyzed using qualitative descriptive data by describing the activities carried out during the teaching and learning process. After obtaining teacher activity and child activity, the percentages can be interpreted into a scale table based on RA qualifications (Sudjino, 2005) as follows:

Table 1. Assessment Qualification Scale

No.	Activity Implementation Level	Qualification	RA Qualifications
1.	80% - 100%	Very good	BSB
2.	60% - 79%	Good	BSH
3.	30% - 59%	Enough	MB
4.	0% - 29%	Not enough	BB

2) Analysis of Children's Cognitive Abilities in Recognizing Color Concepts.

Analysis of children's cognitive abilities in recognizing the concept of colour in each cycle using instruments in the form of children's performance results. After obtaining the child's cognitive ability score and the classical average value using the formula above, the results are interpreted using the following qualification scale:

Table 2. Cognitive Ability Scale

No.	Intervals	Predicate
1.	80 – 100	Very good
2.	70-79	Good
3.	60 – 69	Enough
4.	50 – 59	Not enough
5.	0 – 54	Very less

RESULT AND DISCUSSION

The assessment of children's cognitive abilities before applying the simple science experiment method was measured using a performance instrument consisting of 3 (three) assessment indicator items: ability to say colour, ability to convey the results of simple colour experiments, and ability to group colours. The measurement of each indicator refers to the provisions: Very Well Developed is given a score of 4; Developing According to Expectations is given a score of 3; Starting to Develop is given a score of 2;

and Not Yet Developing is given a score of 1. Data on children's cognitive abilities at pre-cycle are presented in Table 3.

Table 3. Children's Cognitive Abilities at Pre-Cycle

No	Name	Indicator No			Score	Mark
		1	2	3		
1.	AAU	1	1	1	3	25
2.	JMA	2	2	2	6	50
3.	A A	1	1	1	3	25
4.	KAJ	2	3	2	7	59
5.	MDA	1	1	1	3	25
6.	FF	1	1	2	4	33
7.	NFA	2	1	1	4	33
8.	CASH	3	2	2	7	59
9.	MNW	1	1	1	3	25
10.	S.A	3	2	2	7	59
11.	TTF	1	1	1	3	25
	The number of marks obtained				63	418
	Average value					**38**

The results of Table 3 show that children's cognitive abilities in the pre-cycle received an average score of 43.3 with an abysmal rating. They are increasing children's cognitive abilities using science experiments through 2 cycles, each consisting of planning, action, observation, and reflection.

In cycle I, the teacher's core activity is to explain the activities that will be carried out today. The first activity carried out by the teacher in the experiment was to start by showing the red, yellow, green and blue coloured mica shown in Figure 1.

(a) (b)

Figure 1. (a) Simple Colored Mica Science Experiment; (b) Colour Grouping Activity; (c) Paint Beauty on Clothes

Then, strengthen this learning by grouping the colours of the star shapes (figure 1(b). Action II in cycle I carries out the core activity of painting beauty on clothes (figure 1(c).

The results of the analysis of teacher activities in the first cycle of action I reached a value of 64.28%, where the percentage results indicate that the teacher's activities were rated as sufficient.

The next day, the percentage of teacher activity in cycle one action II increased to 71.42% with a good predicate. So, the average result of observing teacher activities in cycle I reached 67.86 with a sufficient rating. This indicates a need to improve teacher performance to be of higher quality. The results of observations on children's activities in cycle I Action I are presented in Table 4.

Table 4. Children's Activities Cycle I Action I

No	Child's Name	Score	Percentage
1.	AAU	4	28.57%
2.	JMA	8	57.14%
3.	A A	4	28.57%
4.	KAJ	7	50%
5.	MDA	4	28.57%
6.	FF	6	42.85%
7.	M.F.A	5	35.71%
8.	CASH	8	57.14%
9.	N.W.A	5	35.71%
10	S.A	9	64.28%
11.	TTF	5	35.71%
	Total Percentage value		464.25%
	Average Percentage value		42.20%

Based on Table 4, the average score for achieving implementation of children's activities is 42.20%, which is a sufficient rating. The results of observations of children's activities in Cycle I Action II are presented in Table 5.

Table 5. Children's Activities Cycle I Action II

No	Child's Name	Score	Percentage
1.	AAU	7	50 %
2.	JMA	10	71.42 %
3.	A A	8	57.14%
4.	KAJ	11	78.57 %
5.	MDA	7	50 %
6.	FF	9	64.28 %
7.	M.F.A	9	64.28 %
8.	CASH	12	85.71%
9.	N.W.A	8	57.14 %
10	S.A	11	78.57 %
11.	TTF	8	57.14 %
	Total Percentage value		714.25 %
	Average Percentage value		64.93 %

Based on Table 5, the average score for achieving implementation of children's activities is 64.93% with sufficient predictions. This proves that there has been an increase in children's activity in recognizing the concept of colour using science experiments. Based on the findings obtained from action I and action II in cycle I and the teacher and observer analysis results, reflection was carried out on implementing the activities. The following is a reflection of cycle I in Table 6.

Table 6. Reflection on Cycle I Activities

No	Findings	Suggestion
1.	Some children seemed less interested in the materials used during the experiment.	Teachers must use exciting materials and add variety so that children are interested.
2.	Many children are so busy chatting with their friends that they ignore the teacher.	Teachers must try to be more informative in conveying what they will say so that children want to listen to the teacher.
3.	I was not paying attention to seating arrangements.	The teacher must arrange the children's seating so that it is orderly.

In Cycle II, Action I carried out colour mixing experiments. The tools and materials used in simple science experiment activities were small cups, red, yellow, green, and blue food colouring and water.

Figure 2. Color Mixing Experiments

Cycle II Action II conducts coloured thread experiments and introduces tools and materials consisting of HVS paper, thread, food colouring, and plastic plates. The following is a picture of a coloured thread experiment. These activities are presented in Figure 3.

Figure 3. Colored Yarn Experiment Activities

The analysis of teacher activity in cycle II of action I reached 85.71%, where the percentage results showed that teacher activity was rated as very good.

The analysis of teacher activities in the second cycle of action II reached 100%, where the percentage results showed that the teacher's activities were rated as very good. So, the average percentage for activities in Cycle II is 92.85%. So it can be said that teacher activity in cycle I to cycle II increased from the predicate adequate to very good. The results of observations of children's activities in Cycle II Action I are presented in Table 7.

Table 7. Children's Activities in Cycle II Action I

No	Child's Name	Score	Percentage
1.	AAU	10	71.42 %
2.	JMA	12	85.71 %
3.	A A	9	64.28 %
4.	KAJ	12	85.71 %
5.	MDA	10	71.42 %
6.	FF	11	78.57 %
7.	M.F.A	10	71.42 %
8.	CASH	12	85.71 %
9.	N.W.A	9	64.26 %
10	S.A	11	78.57 %
11.	TTF	10	71.42 %
	Total Percentage value		828.49 %
	Average Percentage value		75.31 %

Based on Table 7, the average value of children's activities is 75.31%, with a good predicate. The results of observations of children's activities in Cycle II Action II are presented in Table 8.

Table 8. Children's Activities Cycle II Action II

No	Child's Name	Score	Percentage
1.	AAU	12	85.71 %
2.	JMA	14	100%
3.	A A	12	85.71 %
4.	KAJ	14	100%
5.	MDA	13	92.85 %
6.	FF	13	92.85 %
7.	M.F.A	13	92.85 %
8.	CASH	14	100%
9.	N.W.A	12	85.71 %
10	S.A	13	92.85 %
11.	TTF	12	85.71 %
	Total Percentage value		928.39 %
	Average Percentage value		84.39 %

Table 8 shows the average value of children's activities is 84.39% with a very good predicate. The average activity in Cycle II reached 79.85% with a good predicate; this shows an increase in children's activity in improving children's cognitive abilities by introducing colours using simple science methods.

After implementing simple science experimental activities, the ability to recognize colours in group B RA Istiqomah increased from cycle I to cycle II. In the first cycle, the average value of children's colour recognition ability reached 42.20, with an abysmal rating. In cycle II, the average score for children's cognitive abilities reached 71.39, a good predicate. Based on the results obtained, it is proven that simple science experimental activities can improve children's cognitive abilities.

Media influences children's cognitive development, including using learning media that interests children. This is in line with what was stated by Latif, et al. (2016), who stated that learning media is a material and game tool enabling young children to acquire knowledge skills and determine attitudes. It has been proven that enjoyable learning will stimulate children's activeness in the activities provided by the teacher.

CONCLUSION

After implementing simple science experimental activities, the ability to recognize colours in group B RA Istiqomah increased from cycle I to cycle II. In the first cycle, the average value of children's ability to recognize colours reached 42.20, with an abysmal rating. In cycle II, the average score for children's cognitive abilities reached 71.39, a good predicate. Based on the results obtained, it is proven that simple science experimental activities can improve children's cognitive abilities.

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