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The Effect of Experimental Methods on Science Ability in Children Aged 5-6 Years at Paud Rafflessia Arnoldy Kayu Tiga, Sirimau District, Ambon City

Orpa Rumihin[1], Hermelina Abarua[2], Lamberthus J. Lokollo[3]

[1,2,3]Faculty of Teacher Training and Education, University of Pattimura;
Out of School Education Study Program

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Abstract

The experimental method will provide opportunities for children to gain direct and enjoyable learning experiences. Thus encouraging children to be skilled in doing their own experiments. In the process of teaching and learning with the experimental method, children are also given experience to observe an object by themselves. Thus the child is required to experience it for himself, seek the truth, look for the necessary data, obtain the data himself, prove a law and draw conclusions from the process he is experiencing. This is in accordance with Djamarah and Zain (2010: 84) which states that the experimental method is a learning method in which students are required to experience it for themselves, seek the truth, or try to find a law or truth and draw conclusions from the process they experience. This study aims to determine the effect of the experimental method on the ability of science in children aged 5-6 years at Rafflessia Arnoldy Kayu Tiga Early Childhood Education, Sirimau District, Ambon City. In this study using a quantitative descriptive method. The research method used is quasi-experimental research methods or (like an experiment). The results of this study indicate that there is an effect of the experimental method on increasing the ability to learn science after using the experimental method in children aged 5-6 years at Rafflessia Arnoldy Kayu Tiga Early Childhood Education. This is evidenced by the distribution table of scientific abilities in early childhood children after using the experimental method which is in the range of scores from 0 to 100 and the lowest score is 13, while the highest score is 20, obtained an average of 16.66.

Keywords:

Experimental Method, Science Ability

(*) Corresponding Author: orparumihin597@gmail.com

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INTRODUCTION

Children are the next generation of the nation and are the foundation and hope of their parents. Children need to be prepared so that one day they become quality human resources and are able to play an active role in national development.

Based on RI Law No. 20 of 2003 concerning the National Education System Chapter I, Article 1, item 14, states that early childhood education is a coaching effort aimed at children from birth to the good old age which is carried out through the provision of educational stimuli to help physical and spiritual growth and development so that children have readiness to enter further education.

Early childhood is a group of children who are in a unique growth and development process (Mansur, 2005: 88). Sujiono (Dewi and Eveline, 2004; 351) explains that early childhood is a group of children aged 0-8 years who have various genetic potentials and are ready to be developed through the provision of various stimuli. They have specific patterns of growth and development according to their level of growth and development. At this time is the golden age or*golden age*, because children experience very rapid growth and development and are irreplaceable in the future.

Science is a science that can be tested (actual observation results) for truth and developed consistently with certain principles based on truth or reality alone so that the knowledge that is guided by it can be trusted, through experimentation in theory understand that science is a process or result or product and as attitude. Science is related to how to find out about the universe systematically and not only a collection of knowledge in the form of facts, concepts, principles, but also a process of discovery, which emphasizes direct experience. Science is a process of seeking and discovering a truth through science.

Early childhood science learning can train and provide opportunities for children to develop process skills and can train children to be able to think and act rationally and critically towards scientific issues that exist in their environment. The skills given to children are as much as possible adapted to the level of age development and characteristics of the children, so that children can apply them in their daily lives.

The introduction of science to early childhood should be carried out in fun and direct activities so that children experience the process of science directly. Science life cannot be separated from everyday life, which serves to provide experiences such as observation. This is done so that children not only know the results but can also understand the process of the science activities they are doing. Besides that, it can also train children to use their five senses to explore various objects, both living and inanimate objects. Early childhood needs methods that can make them interact directly with the activities carried out, one of which is by using the experimental method.

The experimental method will provide opportunities for children to gain direct and enjoyable learning experiences. Thus encouraging children to be skilled in doing their own experiments. In the process of teaching and learning with the experimental method, children are also given experience to observe an object by themselves. Thus the child is required to experience it for himself, seek the truth, look for the necessary data, obtain the data himself, prove a law and draw conclusions from the process he is experiencing. This is in accordance with Djamarah and Zain (2010: 84) which states that the experimental method is a learning method in which students are required to experience it for themselves, seek the truth, or try to find a law or truth and draw conclusions from the process they experience.

Based on the results of observations made at Rafflesia Arnoldy Early Childhood Science, children's scientific abilities have not fully developed properly. The teacher gives assignments more often so that the learning activities carried out by the teacher are not conducive. The science learning process still uses the lecture method, so that science learning is more dominated by teachers.

METHOD

The research design used is quasi-experimental research or (*like an experiment*). The population in this study was 30 children aged 5-6 years. The sampling technique used was random sampling. The sample used in this study was 15(50%) children aged 5-6 out of a population of 30(100%) children aged 5-6 people. This research was conducted at Rafflesia Kayu Tiga Ambon PAUD. The independent variable in this study is the Experimental Method. The dependent variable in this study is Science Ability. The research uses a measuring tool in the form of a questionnaire. The univariate data analysis used is Descriptive Statistical Analysis. Bivariate data analysis used is Inferential Statistical Analysis.

RESULTS AND DISCUSSION

Results

Data Analysis prerequisite testing

Testing the hypothesis in this study was carried out using the dependent t-test analysis technique (for 1 group before using the experimental method and the group after using the experimental method). Prior to data analysis, the requirements test was carried out, namely the normality test and homogeneity test.

a. Normality test

The normality test in this study was carried out using the Liliefors test, with a significant level of $\alpha = 0.05$. Testing using the normality test obtained the value of Lcount< Ltable.Thus the sample and population have a normal distribution. For more details can be seen in the following table:

1) Test for normality before using the experimental method

Table. 1 Calculation of Normality Test Before Using the Experimental Method

No	X	F	fkum	Day	F (Zi)	S (Zi)	F(Zi)–S(Zi)
1	10	3	3	-1.411255411	0.079084658	0.066666667	0.012417992
2	12	2	5	-0.545454545	0.292720467	0.266666667	0.026053801
3	13	4	9	-0.112554113	0.455192033	0.4	0.055192033
4	14	2	11	0.32034632	0.625647093	0.666666667	-0.041019573
5	15	1	12	0.753246753	0.774349175	0.8	-0.025650825
6	16	1	13	1.186147186	0.882217911	0.866666667	0.015551244
7	17	2	15	1.619047619	0.947281491	0.933333333	0.013948158
						count	0.055192033
						Ltabel	0.220

The table above shows that the calculation of the normality test before using the L experiment methodcount of 0.055192033 and Ltable = 0.220 from the Liliefors test list with criteria $\alpha = 0.05$. Because Lcount < Ltablethen the class data after using the experimental method is declared normal distribution.

2) Normality test after using the experimental method

Table. 2 Calculation of Normality Test

after using the experimental method

No	X	F	fkum	Day	F (Zi)	S (Zi)	F(Zi)–S(Zi)
1	13	3	3	-1.537815126	0.062047	0.066666667	-0.004619755
2	14	1	4	-1.117647059	0.131859	0.266666667	-0.134807786
3	16	1	5	-0.277310924	0.390771	0.333333333	0.057437353
4	17	4	9	0.142857143	0.556798	0.4	0.156798497
5	18	2	11	0.56302521	0.713291	0.666666667	0.046624475
6	19	3	14	0.983193277	0.837244	0.8	0.037243839
7	20	1	15	1.403361345	0.919745	1	-0.080254557
						count	0.156798497
						Ltabel	0.220

The table above shows that the calculation of the normality test after using the L experiment methodcount by 0. 156798497 and Ltable = 0.220 from the Liliefors test list with criteria α = 0.05. Because Lcount < Ltablethen the class data before using the experimental method is declared normal distribution.

b. Homogeneity test for pretest and posttest

Homogeneity test is carried out to find out whether the samples come from the same variance or are homogeneous. From the calculations in Appendix 6, the homogeneity test can be obtained as follows:

$$F_{count} = \frac{S_1^2}{S_2^2}$$

$$F_{count} = \frac{199^2}{250^2}$$

$$F_{count} = \frac{39.601}{62.500}$$

$$F_{count} = 0{,}633616$$

Then consult the value of the F distribution table at the significant level α = 0.05. From the calculation above, the value of F is obtained$_{count}$ of 0.633616 and F_{table} of 1.76131. because $F_{count} < F_{table}$namely 0.633616 < 1.76131, it is concluded that the data from both samples for the pretest and posttest are homogeneous or the samples come from the same variance.

Hypothesis testing

After testing the requirements for normality and homogeneity of the data, then testing the research hypothesis will be carried out. The hypothesis in this study is that there is only 1 (one) hypothesis to be tested where only one is to find out whether or not there is an influence on increasing science learning in early childhood before and after using the experimental method. Statistically it can be formulated as follows:

$H_{The} = m_1 = m_2$

$Ha = m_1 < m_2$

Differences in the average increase in science ability in early childhood before and after using the experimental method were analyzed using the dependent t test (in Appendix 1). From the results obtained tcount = -106.25<t_{table}= 2.145 at α = 0.05 and degrees of freedom n-1 = 14 then the null

hypothesis (Ho) is rejected and the alternative hypothesis (Ha) is accepted. Thus there is a significant difference in the average scientific ability before and after using the experimental method in children aged 5-6 years at Rafflessia Arnoldy Kayu Tiga Early Childhood Education.

DISCUSSION

At the beginning of the study, observations were made to determine students' initial abilities (pretest) in class. From the results of observation and learning using the lecture method, the children obtained an average score of 13.26 with a score range of 0-100. Then the class is given a different learning, namely by using the experimental method, after that the examiner makes observations to find out the final development (posttest). Because they have been treated using the experimental method, the average child's result is 17. It can be seen that there is a difference in the average pretest and posttest scores.

Based on the data obtained from the results of hypothesis testing where $t_{count}<t_{table}$ ie t_{count} = -106,25 < t_{table}= 2.145 at $\alpha = 0.05$ and degrees of freedom n-1 = 15-1 = 14. Thus it can be seen that the scientific ability of children using the experimental method is affected compared to children who are only taught by the lecture method.

Thus the results of this study conclude that in order to improve science skills in early childhood, teachers need to apply interesting and good learning so that children are motivated to learn.

CONCLUSION

The effect of the lecture method on improving science learning abilities before using the experimental method in children aged 5-6 years at Rafflessia Arnoldy Kayu Tiga Early Childhood Education. This is evidenced in the distribution of scientific abilities in preschool children before using the lecture method which is in the range of scores from 0 to 100 and the lowest score is 10, the highest score is 17 with the average value being 13.26.

There is an influence of the experimental method on increasing the ability to learn science after using the experimental method in children aged 5-6 years at Rafflessia Arnoldy Kayu Tiga Early Childhood Education. This is evidenced by the distribution table of scientific abilities in early childhood children after using the experimental method which is in the range of scores from 0 to 100 and the lowest score is 13, while the highest score is 20, obtained an average of 16.66

Based on the hypothesis test calculation, namely t_{count} = -106,25 < t_{table}= 2.145 at $\alpha = 0.05$ and degrees of freedom n-1 = 15-1 = 14. Thus it can be concluded that the Alternative hypothesis (H1) is accepted and the hypothesis (Ho) is rejected.

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