

The Influence of Computer Learning Media on the Science Ability of Children Ages 5-6 Years in Kindergarten

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Abstract. The problem in this research is how is the description of children's science skills through the use of computer learning media? The purpose of this study was to describe the effect of computer learning media on children's science skills. Computer-based learning media is used to stimulate children's scientific skills. This research approach is quantitative using experimental methods with research design Non-equivalent Control Group Design. Measurements were made by involving two groups, namely the experimental group and the control group. Data collection techniques were carried out through tests and documentation in the form of photos of learning activities and plans for daily learning. The data analysis technique used is descriptive statistical analysis and non-parametric statistical analysis, using the Wilcoxon Signed Rank Test analysis. Then based on this analysis, it was found that the value of T count (55) > T table (8) and the value of Z count (2.80) > Z table (1.645) means that there is an influence of computer media on the scientific abilities of children aged 5-6 years in PAUD Terpadu Teratai, Makassar.

Keywords: *Computer Learning Media, Science Ability, 5-6 Years Old Children*

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INTRODUCTION

Computers are one of the learning media, computer media in learning are technology applications in education, their need and importance for improvement and enhancement of the quality of learning. Computers are very effective media because they are supported by moving images, sound effects or cheerful singing, making computer media very popular with children Diane Trister Dodge, Laura J Colker (2001). Various forms of the latest innovations in the development of computers by kindergarten children are not a hindrance in their use, even more easily accessing computers to fulfil their curiosity. The development of technology in education related to the use of computers in all fields has caused the world of children to be surrounded by various innovative means, media made with the help of computers, making learning more enjoyable and children learning to recognize letters.

The development of technology, especially computers, is not only enjoyed by adults, but has mushroomed in early childhood but has become a dilemma for most parents who feel awkward when children are friendly with computers. On the one hand, parents want their children not to be tech-savvy and able to learn a lot through computers, but on the other hand, parents are worried about the various negative effects that may result from inappropriate computer use.

Working using computers will motivate children to learn. Children look enthusiastic, curious, happy, more active, positive and concentrate more. Several studies have shown that working with computers results in positive attitudes towards writing, a strong commitment to learning and good attitudes towards teachers. This is evidence that with computers the attitude towards learning is higher. Another thing that happens is heightening reflectance motivation, which is the level a child wants to control or change his environment. This desire is of course related to attitude and self-esteem.

As a learning medium, computers have advantages in terms of interaction and foster interest in children's independent learning. In relation to learning, the use of computer media will create a pleasant atmosphere for early childhood. The pictures and sounds that appear make the child not get bored quickly, so that they can stimulate various aspects of the child's development. Methods or ways of educating children at an early age, of course, are very different from the methods or ways of educating children in adolescence or later. The factors that occur in learning develop aspects of scientific abilities, the tendency of teachers to present science learning is still monotonous only using mixing colours, experiments that use repetitive media, causing boredom in children. Educating early childhood in presenting the material being taught should be designed so that the process is very enjoyable, this can be done using a computer. Children should be given opportunities to learn by interacting with computers from an early age. Especially considering the use of computers is something that cannot be avoided at this time and in the future. Early childhood is an individual who is undergoing a process of rapid development and is very fundamental for the next life. Children are also egocentric, have natural curiosity, are social creatures, are unique, rich in fantasy,

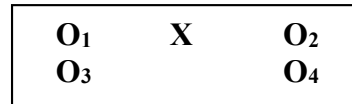
have short concentration power and at an early age are the most potential times for learning Wahyudin U & Agustin, M (2012).

Early childhood education is education that is held with the aim of facilitating the growth and development of the child as a whole or emphasizing the development of all aspects of the child's personality. Therefore early childhood education provides opportunities for children to develop their personality and potential to the fullest Suyadi & Maulidya Ulfah (2013). One aspect that can develop a child's personality and potential is science learning. Learning science is an introduction to natural concepts for children. As well as being an effort to help children find certain concepts and processes in life, with the understanding that science learning for children is essentially used as a medium used to stimulate aspects of development and maximize the potential that exists in children. Learning science in early childhood education provides enormous benefits for various aspects of child development Saçkes, Mesut & Trundle, Kathy & Flevaris, Lucia (2009). Besides that, it can also provide positive experiences through exploring, asking questions and observing the world around it. Through adult guidance, children will familiarize themselves with the scientific phenomena that occur in their environment Eshach, H., & Fried, M (2005).

The stage of scientific ability for early childhood based on the age of development is at the age of 4-5 years: 1) Children begin to understand many things in the form of information related to what is happening in the world around them; 2) Begin to understand what research means and become more meaningful and discover their exploration; 3) Like to think about the explanation of what they are researching, be it facts or imagination / fantasy; 4) Begin to use images to represent and express ideas. At the age of 5-6 years: 1) Having a long attention to various scientific activities, they begin to be able to enjoy activities carried out within a few days; 2) Interested in books related to activities from science practice with some illustrations in the form of pictures; 3) Beginning to be able to understand some abstract science concepts, but still with concrete examples and hands-on practice. The use of computer media in science learning can further clarify science practice by displaying image illustrations or videos on the computer so that science learning is more interesting and attractive Sund and Corring. (1993).

RESEARCH METHOD

The type of research used in this research is Quasi Experimental Design or quasi-experimental. Because this design has a control group, but it cannot fully function to control external variables that affect the implementation of the experiment. However, this design is better than pre-experimental design. As with Best's opinion Sugiyono (2014), this study controls better than pre-experiment, but there are still weaknesses, because usually it does not reach equality between the experiment and the control group. The research design used was the Non-equivalent Control Group Design where measurements were carried out involving 2 groups, namely the experimental group and the control group. The design is described as follows:



Description:

- O₁ : The pre-test results of children's science abilities before being given treatment with computer learning media.
- O₃ : The pre-test results of children's science abilities who were not treated with computer learning media.
- X : Treatment of computer learning media
- O₂ : The results of the observation of children's science abilities who were treated with computer learning media.
- O₄ : The results of the observation of children's science abilities who were not treated with computer learning media.

Population is a generalization area consisting of objects or subjects that have certain qualities and characteristics that are determined by the researcher for study and then draw conclusions. As for the population of this study were 96 children in the 5-6 year old PAUD Terpadu Teratai Makassar. The sample is part of the number and characteristics possessed by the population, or a small part of the population members taken according to certain procedures so that it can represent the population. Sampling is done by purposive sampling technique (sampling consideration), namely a sampling technique in which the sample members are selected deliberately on the basis of the knowledge and beliefs of the researcher.

The data collection techniques used in this study were tests and documentation. The test is a series of questions or exercises that are used to measure the knowledge possessed by individuals. Meanwhile, documentation is a technique used to obtain data directly from the research site. In this study the documentation in question is data of students and photos of learning activities and daily learning plans. Data obtained before and after the use of computer media were analyzed using descriptive statistical analysis techniques and inferential statistical analysis techniques. Descriptive statistical analysis is intended to describe the scientific skills of students using the Wilcoxon test. In this study using the Wilcoxon test to analyze paired data because of the two different treatments. Furthermore, in order to obtain a general description of the average level of children's science ability, the average calculation is carried out using the following formula.

$$P = \frac{\sum X}{N}$$

Description:

- P = average
- ∑x = value x
- N = the amount of data

The analysis technique used in this research is nonparametric statistical analysis. Nonparametric statistics are used when the sample size is so small that the distribution of the sample or population is not close to normal, it can handle ordinal scale or rank data. So, for the analysis of the difference test, the Wilcoxon Signed Rank Test analysis is used with the following formula:

$$Z = \frac{T - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}$$

Description :

Z = Test foundation

T = The total number of rankings with the same sign

X = Number of samples

The criteria for the testing decision are:

H₀ : There is no influence between the use of computer media and the science skills of children aged 5-6 years in PAUD Terpadu Teratai Makassar

H₁ : There is an influence between the use of computer media and the science skills of children aged 5-6 years in PAUD Terpadu Teratai Makassar.

H₀ : Accepted if T count < T table and Z count < Z table, it means that there is no influence between the use of computer media and the science abilities of children aged 5-6 years in PAUD Terpadu Teratai Makassar.

H₁ : Accepted if T count ≥ T table and Z count ≥ Z table, it means that there is an influence between the use of computer media and the science skills of children aged 5-6 years in PAUD Terpadu Teratai Makassar

RESULT AND DISCUSSION

The posttest results of the experimental class

In the use of computer media, researchers provide treatment to all research objects. After the researchers treated the data collected regarding the posttest results of children's scientific abilities, the lowest score was 16 and the highest score was 24. From these data, it was obtained an average value of 21.2 and a standard deviation of 0.91. The distribution of the categorization of the posttest results of children's science abilities can be seen in table 5.1 below:

Table 1. Observation Results of Teratai Makassar Integrated PAUD Class Experiment

Number	Value	Category	Frequency	%
1	23-25	BSB	3	30
2	20-22	BSH	2	20
3	17-19	MB	2	20
4	14-16	BB	3	30
Total			10	100

Based on the table above, it can be seen that the 10 children who were used as the experimental group were 3 children who had a percentage of 30% who were in

the very well developed category. Then there are 2 children with a percentage of 20% who are in the developing category as expected. And 2 children with a percentage of 20% who are in the developing category and 3 children with a percentage of 30% are in the underdeveloped category. Thus the mathematical logic abilities of the experimental group children after being treated in the form of an experimental method showed that of the 10 children 30% developed as expected, 20% developed very well, 20% began to develop and 30% did not develop.

The results of the control class posttest

After the researcher gave treatment to the control group, then the researcher gave a posttest to all research subjects. The data collected regarding the posttest results of children's science abilities obtained the smallest score of 14 and the highest score of 22. And the data was obtained from an average value of 17 and a standard deviation of 0.9. The distribution of the categorization of children's scientific abilities after being given treatment in the form of media without computers can be seen in table 5.2 below:

Table 2. Observation Results of the control class in PAUD Terpadu Teratai Makassar

Number	Value	Category	Frequency	%
1	20-21	BSB	2	20
2	18-19	BSh	2	20
3	16-17	MB	3	30
4	14-15	BB	3	30
Total			10	100

Based on the table above, it can be seen that the 10 children who were used as the control group were 2 children who had a percentage of 20% who were in the very well developed category. Then there are 2 children with a percentage of 20% who are in the developing category as expected. And 3 children with a percentage of 30% who are in the developing category and 3 children with a percentage of 30% are in the underdeveloped category. Thus the scientific ability of the control group children after being treated in the form of media learning without computers showed that 20% of the 10 children developed as expected, 20% developed very well, 30% began to develop and 30% did not develop.

Non-parametric statistical analysis

Based on the research results obtained from data from preliminary and final observations, it can be seen that the effect of computer media on children's scientific abilities after hypothesis testing with the Wilcoxon test analysis. The steps taken are as follows:

1. Data before (O_1 - O_2) treatment is determined by the difference in score difference.
2. Make a ranking of the total number of children (regardless of the sign) by sorting the values from the highest to the lowest, then from the top given a number that shows the ranking starting from 1,2,3,4 onwards. The same value

- must be given the same ranking, that is, by dividing the ranking value numbers equally among all owners of the same value. Put on each ranking sign (+ or -).
3. To determine the T-value, the smallest sign value is added from the two ranking groups that have the same sign, and N is obtained from the number of samples studied.
 4. Then a comparison is made between the T value obtained and the T value on the Wilcoxon signed test. The results of the data obtained can be seen in table 5.3. following.

Table 3. Results of T Value Analysis on the Wilcoxon signed test

Number	Children's Name	Science Ability		Value Difference (O ₁ -O ₂)	Rank	Rank Sign	
		Pre	Post			+	-
1	ATP	21	24	3	5	5	
2	NA	18	24	6	2	2	
3	PS	16	21	5	3,5	3,5	
4	RS	19	24	5	3,5	3,5	
5	NA	16	23	7	1	1	
6	DRU	21	22	1	8	8	
7	MFAFZ	19	20	1	8	8	
8	ZN	17	18	1	8	8	
9	FPI	20	20	0	10	10	
10	R	14	16	2	6	6	
Total		181	121				T = 55

Based on the table above, the scientific abilities of children found in the control group and the experimental group through trial activities show the number of rankings marked (+) = 55 and the number of rankings marked (-) = 0. In decision making, if $T \text{ count} < T \text{ table} = H_0$ accepted H_1 is rejected. This means that there is no influence of computer media on the scientific ability of the 5-6 year age group at PAUD Terpadu Teratai, Makassar. If $T \text{ count} \geq T \text{ table} = H_0$ is rejected, H_1 is accepted. This means that there is the influence of computer media on the scientific skills of children aged 5-6 years in PAUD Terpadu Teratai, Makassar. If $Z \text{ count} < Z \text{ table} = H_0$ is accepted, H_1 is rejected, it means that there is no influence of computer learning media on the scientific abilities of children aged 5-6 years in Teratai Integrated PAUD, Makassar. If $Z \text{ count} \geq Z \text{ table} = H_0$ is rejected, H_1 is accepted, it means that there is an influence of computer media on science ability in the 5-6 year age group in Teratai Integrated PAUD, Makassar.

The T count value obtained is 55 and T table 8, then the results of T count (55) $> T \text{ table}$ (8) H_1 are accepted and H_0 is rejected, meaning that there is an effect of computer media on scientific abilities at the age of 5-6 years in Teratai Integrated PAUD, Makassar. While the Z count value obtained is 2.80 and Z table is 1.645, the result is Z count (2.80) $> Z \text{ table}$ (1.645). H_1 is accepted and H_0 is rejected, which means that there is an influence of computer media on the science skills of children

aged 5-6 years in Teratai Integrated PAUD, Makassar. Based on the description above, it can be concluded that computer learning media have an effect on the scientific skills of children aged 5-6 years in PAUD Terpadu Teratai, Makassar.

The development of this science is an ability related to experiments or demonstrations as a scientific or logical approach, but still taking into account the child's thinking stages according to the abilities to be developed by kindergarten children Susanto, Ahmad (2015). In real science learning, children must be taught how to feel, experience, and try various natural phenomena, because activities related to these experiments will spur children's creativity. Indicators in the dimensions of scientific processes such as observing, comparing, explaining, estimating, communicating, classifying and measuring Nugraha, Ali. (2005). Simply put, while playing by exploring various objects, both living things and non-living things around them.

Based on observations that have been made the introduction of science to early childhood is carried out only focuses on children's science activities, in learning the teacher only uses the lecture and assignment method so that in learning children are less interested in paying attention to what is explained by the teacher, science learning is still carried out through writing counting, drawing, and coloring, then learning activities are still centered on the teacher, children do not do their own experiments so that children cannot develop their processing skills optimally. In addition, teachers do not apply varied learning media. Science learning should use media that attracts children so that it is fun by directly involving children in the learning process. An alternative that can be used is computer media. Computer-based learning is an attractive learning medium and is able to increase children's learning motivation Warsita, Bambang (2008). Computer-based learning is learning that uses computers as a medium to convey learning material.

Learning with computer media in Kindergarten aims to introduce computer technology to children from an early age, so that from an early age children begin to know the benefits of computers. Computer-based learning really needs to be learned by children because the rapid development of technology requires children to be able to use technology, namely computers as a medium for delivering learning material. Computer learning that is given to children can be started from simple things. For example, by introducing computers in the theme of learning or even using computers in learning activities. In its application, only a few early childhood education institutions implement children's computer learning as a means of delivering learning material. So computer-based learning is learning using advanced technology (computers) to stimulate aspects of child development.

Based on the things that have been stated, it shows that the scientific abilities of children aged 5-6 years should be able to do this, but if the provision of learning activities is not interesting, it will have an impact that will affect children's scientific abilities. Before students are given treatment, children's scientific skills are still lacking. Where in giving the pre-test the child was still unable to observe, observe and mention some of the differences shown to children regarding changes in water color and other science activities according to the theme.

This pre-test giving activity begins when the researcher enters the room and performs opening activities such as greeting students, singing, and doing questions and answers. In this activity, researchers gave tests to children, this test was carried out by showing the tools used in science activities and asking children how changes occurred in water after being mixed with colors. During the pre-test giving activity, the researcher observed the child and made an assessment using the instrument. Based on the results of the pre-test, it was concluded that children's science was still lacking so that the researchers at the next meeting gave treatment to children in the form of activities using computer media where this media was expected to have an influence on children's scientific abilities.

After previously students were given a pre-test and the results were found that the children's scientific abilities were still lacking, therefore the researchers designed the application of treatment and would see the differences in students' scientific abilities before and after being given treatment in the form of activities using computers. The use of computer media in this treatment activity begins with opening activities, such as greeting students, singing, and doing questions and answers. Then entering the core activities, the researcher provides learning by displaying films and videos and displaying pictures in the form of providing science game activities about water, foam, plants, and magnets. In this activity, the child observes, compares, explains, estimates, communicates, classifies according to the scenario that has been made. In this scenario there are six activities that are given to the child, then when carrying out the activity the researcher begins to observe and assess the child one by one so that later they can conclude whether or not computer media has an influence on the child's scientific ability.

In this activity children are very enthusiastic when carrying out this activity, because this activity is a new activity for children because they have never had activities like this before. After the core activities are carried out, the researcher then carries out closing activities according to the scenario that has been previously made. Where in this closing activity there is a question and answer activity regarding the activities that have been carried out.

This study uses a quantitative research approach, where this research was conducted to analyze the influence of computer media on children's scientific abilities. Quantitative research is to generate a situation or event, this research is intended to see a result or treatment. With the provision of computer learning media, it can be seen based on the results of data analysis that there is a difference between before and after children are given treatment. These results were obtained based on the data that the researcher processed from the results of observations and assessments during the pre-test and post-test activities for students. In this data collection technique, researchers used tests and documentation which were then processed using descriptive statistical data analysis techniques and nonparametric statistical data analysis techniques, using the Wilcoxon Signed Rank Test analysis. Then based on this analysis, it was found that the value of T count (55) > T table (8) and the value of Z count (2.80) > Z table (1.645) means that there is an influence of computer media on the scientific abilities of children aged 5-6 years in PAUD Terpadu Teratai, Makassar.

CONCLUSION

Based on the results of the research that has been carried out, the following conclusions can be drawn:

1. The scientific ability of children before being given treatment with computer learning media, it was found that children's scientific abilities were still lacking.
2. After being given treatment with computer learning media, there are differences that show children's scientific abilities are more developed than before being given treatment.
3. Based on the above, it can be stated that there is an influence of computer learning media on the scientific abilities of children aged 5-6 years in PAUD Terpadu Teratai, Makassar.

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