

THE EFFECT OF EXPERIMENTAL METHODS ON CHILDREN'S SCIENCE ABILITIES

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Abstract

This research was motivated by the low science abilities of children. Because the methods used in the learning process tend to use conventional methods which make children less active in all their activities so that it can be detrimental to children in the learning process. The experimental method was chosen so that children are directly involved in searching, trying and finding their own answers in every science learning activity. Therefore, the aim of this research aims to find out the picture of children exploring natural colors in science games through a guided experimental approach in group B, Aisyiyah Bustanul Athfal V Kindergarten, Toddopuli Branch, Perumnas, Tello Baru Branch, Makassar City, which was given experimental method treatment and to find out its existence. The influence of the guided experiment method on the ability to explore natural colors in children's science games. The type of research used is Quasi Experiment or pseudo-experiment. The research population was all group B children at Aisyiyah Bustanul Athfal V Kindergarten. Meanwhile, the research sample was group B4, totaling 11 children, B2, totaling 11 children for the experimental group and control group. Data collection techniques through test and observation techniques. The data analysis techniques used are descriptive statistical analysis and nonparametric statistical analysis.

Keywords: science, kindergarten, experimental method

INTRODUCTION

Children are individuals whose ages range from 0-6 years. Children have unique characters and are not the same as adults. The growth and development process of early childhood is very rapid, so that this age period is often called the golden age because at this age children are in a sensitive period, which must be given appropriate stimulation. The sensitive period is a time when children are ready to receive stimulation from the environment and obtain it into new knowledge. Providing stimulation to early childhood is adjusted to the character of each child because children have different potential in each development.

Early childhood education is education that provides services to children in developing the child's potential which results in the child's abilities and skills. Through early childhood education (PAUD), children can create a learning environment that provides freedom to explore by seeing, understanding and providing learning experiences accompanied by play. Republic of Indonesia Law Number 20 of 2003 concerning the National Education system Chapter I, Article 1, point 14 states that:

Early childhood education is a training effort aimed at children from birth to 6 years of age which is carried out through providing educational stimuli to assist physical and spiritual growth and development so that children are ready to enter further education.

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The scientific approach stimulates children to understand the knowledge they have acquired. Basically, science for early childhood can be developed through learning activities with a fun play concept without children knowing whether or not the learning process is taking place in kindergarten. The objectives of science for PAUD, Leeper (1994) there are four things which are the objectives of developing early childhood science learning, namely (1) early childhood science learning is intended so that children have the ability to solve the problems they face through the use of scientific methods, so that children - children are helped and become skilled in resolving the various things they face (2) so that children have a scientific attitude (3) so that children gain knowledge and scientific information that is more reliable and based on original scientific standards (4) so that children become more interested and attracted to appreciate the knowledge that exists and is found in the environment and natural surroundings. Various methods and materials for developing scientific abilities can be taught to young children according to the child's ability to think. Therefore, educators, especially kindergarten teachers, must understand and use appropriate methods in developing science skills, especially in early childhood.

METHOD

The approach used in this research is a quantitative research approach. The type of research used here is Quasi Experimental or quasi-experimental research. The method has a control group, but it does not function fully to control external variables that influence the implementation of the experiment. This research examines two variables, namely the experimental method as the independent variable, or that which influences it and scientific ability as the dependent or influenced variable. The population in Aisyiyah Bustanul Athfal V Kindergarten, Toddopuli Branch, Perumnas, Tello Baru Branch, Makassar City, in group B, is 4 classes, totaling 61 children. Sampling was carried out using the Purposive Sampling technique. Data collection techniques using tests and observations.

RESULTS AND DISCUSSION

The approach used in this research is a quantitative research approach. The type of research used here is Quasi Experimental research or quasi-experimental research. This method has a control group, but it does not function fully to control external variables that influence the implementation of the experiment. This research tests two variables, namely the experimental method as the independent or influencing variable and scientific ability as the dependent or influenced variable. The population at Aisyiyah Bustanul Athfal V Kindergarten, Toddopuli Perumnas Branch, Tello Baru Branch, Makassar City in group B is 4 classes, totaling 61 children. Sampling was carried out using the Purposive Sampling technique. Data collection techniques use tests and observations.

Based on the results of the Wilcoxon test calculations, there is a significant difference between the science abilities of children who took part in learning using the experimental method and the group of children who took part in learning using the conventional method. The overall

influence of learning using the experimental method increased by 42%, which is quite high in learning because it can be used in other learning and 58% is an influence from outside.

The research results based on descriptive statistical analysis showed differences in pretest and posttest scores in the science abilities of children in the experimental class and control class, there was an influence of the guided experiment method on the ability to explore natural colors in children's science games. The difference in question is that the average value of children's science abilities has increased after being given the experimental method compared to the conventional method.

This is because the experimental method on children's science abilities provides children with direct opportunities in each activity to use their five senses. so that children can always play an independent role in the learning process which gives children real experience because they have been given the opportunity to carry out experiments in science activities. As stated by Trianto (2011), the aim of applying the experimental method is so that children are able to search for and find for themselves the various answers or problems they face by conducting experiments. By carrying out experiments, children find evidence and truth of what they learn. In accordance with the objectives of science for PAUD, Leeper (1994) there are four things which are the objectives of developing early childhood science learning, namely (1) early childhood science learning is intended so that children have the ability to solve problems they face through the use of scientific methods. , so that children are helped and become skilled in solving various things that come before them (2) so that children have a scientific attitude (3) so that children get scientific knowledge and information that is more reliable and based on original scientific standards (4) so that Children are more interested and attracted to appreciate the knowledge that is and is found in the environment and natural surroundings. There are several scientific activities contained here, namely activities to explore natural colors such as turmeric, suji leaves, secang wood. Where in each activity children carry out and observe independently what happens in science experiments which provide answers to children with the guidance and direction given by the teacher.

In the activity of exploring the natural color of turmeric, children begin to use all their five senses, from observing tools, materials, asking questions and about the objects they see. As well as holding and using his sense of smell. To prove that the turmeric plant can produce a yellow color, children carry out an experiment. It can be seen that when peeling and grating turmeric, children use their hands, eyes and smell when they see that their hands turn yellow and ask the teacher that their hands are yellow from the turmeric that sticks to their hands. From the grating results, children know that the color of grated turmeric produces a yellow color when filtered. Children who have high curiosity will continue to investigate what will happen and be able to solve the problems faced in their experimental activities in exporting the natural color of turmeric. Children know that the yellow color of turmeric is a natural color that comes from natural plants which were explained previously by the teacher. Apart from that, children gain new knowledge when the yellow color of turmeric is used in the process of making yellow rice which is cooked using a rice cooker. The ingredients used in making yellow rice are rice, turmeric, water and salt. When the child put the turmeric color into the rice cooker which contains the ingredients for yellow rice, the child looked enthusiastic when he put the ingredients in and waited for the results. When the rice is cooked in the rice cooker, the child sees the change from white rice to yellow from the turmeric given. Not only that, children also estimate the results of these experimental activities. This stimulates children's knowledge that the yellow color of turmeric, apart from being used as a dye, can also be used as a food coloring.

Apart from that, in the activity of exploring the color of suji leaves, children use tools and materials with the guidance and supervision of the teacher, children ask and observe the tools and materials that will be used. During the children's activities, I first did an experiment by rolling up the suji leaves and putting them in a blender. When blending suji leaves, children observe the

process of blending the suji leaves which are then put into a container. In this activity, children will learn that suji leaves will produce a green color when blended. After the filtering was complete of the green color, the children carried out an experiment on the color of the suji leaves. Children make a simple sponge cake consisting of eggs, sugar, wheat flour, salt and oil. Children make the dough ingredients, by beating the eggs, putting all the ingredients into the rice cooker and don't forget to add green food coloring from suji leaves. Apart from being used as cake coloring, children can also find out that suji leaves can be used as cake coloring. This can add to the child's previous knowledge scheme.

Next, when children explore the natural colors of secang wood, here children begin to understand the process of exploring the red color, children know how to do this by putting water in secang wood and waiting until the color of the secang wood comes out, in this activity the red color produced by children experiment with the red color. Apart from the red color, the benefit of this sappan wood color is that it can be used as a dye for fabric. To answer the child's curiosity, the child carried out an experiment by putting a white cloth into a container containing red secang wood. The child observes the color of the cloth which changes to red when the child lifts the white cloth. The processes in science experiments carried out by children will try to be understood simply by children through their five senses. In carrying out experiments, children use their five senses to recognize, understand and differentiate each process in each activity.

From the explanation of several science activities that have been given to children, it shows that children are directly involved in carrying out experiments. Children gain new knowledge by doing direct experiments. Children try out various natural colors in each experiment given by the teacher and observe for themselves the process of the experiments carried out. During experimental activities, children have various questions, these questions will arouse children's curiosity so that children will try to find explanations through the experiments carried out. The curiosity and abilities that children gain can be carried over to other areas of ability and really help children to develop everything within themselves and develop other aspects of the child's potential development. As explained by Sari (2012), science learning for children aims to develop students as a whole, both cognitively and attitudinally, so that they are able to solve everyday problems.

Meanwhile, science activities in conventional learning. The teacher only conveys, by showing pictures of objects that represent science learning, showing pictures of experiments if the object will show the reaction that occurs, or the equation of the picture. Next, the teacher distributes assignment sheets to the children and does them as explained by the teacher to determine the child's thinking ability in receiving learning. Teachers only use worksheets or magazines to see their students' abilities. Teachers do not give children the opportunity to discover and carry out experiments in science activities and end with an evaluation.

Thus, it can be seen that there are several things that cause differences in children's science ability scores between groups who took part in learning using the guided experimental method and learning using conventional methods, where the science ability scores of children who took part in learning using the guided experimental method were higher than the group of children who took part in learning using the guided experimental method. following conventional learning.

CONCLUSION

Based on the results of the research that has been carried out, the following conclusions can be drawn: It turns out that the guided experiment method is very useful in learning to play science which aims to explore the natural environment and solve simple problems in everyday life. There is an influence of the application of the guided experiment method on the ability to explore natural colors in children's science games in group B Aisyiyah Bustanul Athfal V Kindergarten, Toddopuli Branch, Perumnas Tello Baru Branch, Makassar City.

BIBLIOGRAPHY

- Anggreni, Inten Ayu Gusti, Made Suara, Wiyasa Ngurah Komang. 2014. Meningkatkan Kemampuan Kognitif Sains Dalam Mencampur Warna Melalui Penerapan Metode Eksperimen Pada Anak Kelompok B Di Tk Titi Dharma Denpasar. Jurnal Pendidikan Anak Usia Dini (online),<http://ejournal.undiksha.ac.id/index.php/JJPAUD/article/view/3167> (Diakses 24 Januari 2017)
- Djamarah, Syaiful Bahri & Zain, Aswan. 2006. Strategi Belajar Mengajar. Jakarta: Rineka Cipta
- Iskandar, Harris. 2015. Pedoman Penilaian Pembelajaran Anak Usia Dini. Jakarta: Direktorat Pembinaan Pendidikan Anak Usia Dini Direktorat Jenderal Pendidikan Anak Usia Dini Dan Pendidikan Masyarakat Kementerian Pendidikan Dan Kebudayaan.
- Hamid, Moh Sholeh, 2014. Metode Edutainment. Jogjakarta: Diva Press.
- Hamidah, Margaretha Sy, Moh. Helmi Ismail. 2016. penerapan Metode Eksperimen dalam Meningkatkan Keterampilan Proses Sains pada Anak Usia Dini, Vol 1, No 1, 1-8 (Diakses 01 September 2017)
- Kurniasih, Imas. 2009. Pendidikan Anak Usia Dini. Edukasia: Edukasi.
- Kadir. 2010. Statistika Untuk Penelitian Ilmu-ilmu Sosial. Jakarta: PT Rosemata Sampurna.
- Magasida, Dian. 2017. Penerapan Metode Discovery Inkuiri Pada Pembelajaran Sains Anak Usia Dini. (online)
www.syekhnurjati.ac.id/jurnal/index.php/awldady Vol. 3 No. 1, Maret 2017 (Diakses 01 September 2017)
- Mutiah, Diana. 2010. Psikologi Bermain Anak Usia Dini. Jakarta: Kencana. Moelichatoen. 1999. Pengajaran Di Taman Kanak-Kanak. Jakarta: PT Rineka Cipta.
- Nugraha, Ali. 2008. Pengembangan Pembelajaran Sains Pada Anak Usia Dini. JILSI Foundation.
- Putra, Shiatava Rizema. 2013 Desain Belajar Mengajar Kreatif Berbasis Sains. Banguntapan Jogjakarta: Diva Press.
- Pratiwi, Dhian. 2016. Meningkatkan Keterampilan Proses Sains Dengan Metode Discovery Guide Pada Anak Kelompok B TK Salafiyah Preret Bantul
- Riduwan. 2014. Dasar-Dasar Statistika. Bandung: Alfabeta.
- Roza, Mela Murti. 2012. Pelaksanaan Pembelajaran Sains Anak Taman Kanak-kanak Aiyiyah Bustanul Athfal 29 Padang. Vol 1, No. 1,<http://ejournal.unp.ac.id/index.php/paud> (diakses 24 Januari 2017)
- Republik Indonesia. 2014. PERMEN 137 Tahun 2014 tentang Standar Pendidikan Anak Usia Dini. Kementerian Pendidikan Dan Kebudayaan.
- Sari, Yulia. 2012. Peningkatan Kemampuan Sains Anak Usia Dini Melalui Metode Demonstrasi di Taman Kanak-Kanak, Jurnal Pesona Paud (online), Vol. 1 No. 1, <http://ejournal.unp.ac.id/index.php/paud/article/view/1689>, (diakses 24 Januari 2017)
- Santoso, Singgih. 2010. Statistik Nonparametrik. Jakarta: PT Elex Media Komputindo Santrock, John W. 2007. Psikologi Pendidikan. Jakarta: Kencana.
- Setyosari, Punaji. 2013. Metode Penelitian Dan Pengembangan. Jakarta: Prenada Media Group.
- Setyanto, N ardi. 2014. Panduan Sukses Komunikasi Belajar Mengajar. Jogjakarta: Diva Press.
- Sudijono, Anas. 2015. Pengantar Statistik Pendidikan. Jakarta: Rajawali Pers. Sugiyono. 2016. Metode Penelitian Kuantitaif Kualitatif Dan R&D. Bandung: Alfabeta.

- Susilowati, Neni. 2016. Pengenalan Sains Melalui Percobaan Sederhana Pada Anak Kelompok B Di Kb-Ra It Al-Husna Yogyakarta. Jurnal Pendidikan Anak Usia Dini <http://journal.student.uny.ac.id/ojs/index.php/pgpaud/article/viewFile/2153/18> 35 (Diakses 27 Januari 2017)
- Trianto. 2011. Desain Pembelajaran Temati. Jakarta: Kencana Usman, Husaini. 2006. Pengantar Statistik. Jakarta: Bumi Aksara
- Widyastuti, Andini. 2016. Seabrek Kesalahan Guru PAUDYang Sering Di Remehkan. Yogyakarta: Diva Press.
- Wisudawati, Asih Widi dan Sulistyowati, eka. 2014. Metodologi Pembelajaran IPA. Jakarta: PT Bumi Aksara.
- Wonoraharjo, Surjani. 2011. Dasar-Dasar Sains Menciptakan Masyarakat Sadar Sains. Jakarta: PT Indeks.
- Zulfiani, Feronika dan Suartini. 2009. Strategi Pembelajaran Sains. Jakarta: Lembaga Penelitian UIN Jakarta.