International Journal of Teaching and Learning (INJOTEL) e-ISSN: 3025-8308
Vol. 2 No. 3, 2024, pages: 1761~1770

THE INFLUENCE OF SCIENCE LEARNING INTRODUCING PLANT PARTS ON THE COGNITIVE DEVELOPMENT OF EARLY CHILDREN IN TK IT NADA ASHOBAH

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Abstract

This study aims to examine the impact of nature-based science learning on the cognitive development of early childhood students at TK IT Nada Ashobah Wiyung Surabaya. The research method used is a quasi-experimental design with a one-group pretest-posttest design. The population in this study consists of all group B children at TK IT Nada Ashobah, totaling 15 children. The sampling technique used is saturated sampling. The sample consists of 15 group B children. The results show a significant improvement in children's understanding of plant parts after the treatment. The pretest indicated that most children were in the "Starting to Develop" category, while the posttest showed an increase, with the majority of children in the "Developing Very Well" category. The Wilcoxon test showed an Asymp (2-tailed) value of 0.001, indicating that nature-based science learning has a significant impact on children's cognitive development. The study concludes that the nature-based learning approach is effective in enhancing children's understanding and interest in science and recommends integrating this method into the early childhood education curriculum.

Keywords: Science learning, cognitive, early childhood.

INTRODUCTION

Education is a process that supports the growth and development of individuals through interaction with their physical and social environment, from birth to throughout life. In this process, social heritage plays an important role as part of the social environment that helps individuals develop optimally, which ultimately contributes to the progress of human welfare. The abilities that each individual needs to have to face society which is full of change and intense competition include readiness to continue learning throughout life, thinking integratively and conceptually, having responsiveness, thinking rationally, creatively, daring to take responsibility, having sensitivity. towards social justice and solidarity, understanding the limits of tolerance in society, having self-respect, and using reason independently.

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Education is an important aspect of life, especially if it starts at an early age. Early age is called the golden age, namely the period where growth and development occurs rapidly. Therefore, children's education must receive special attention so that they can grow and develop optimally. The family acts as the first educational institution because it is in the family environment that children first receive education and guidance. Thus, parents have a big influence on their children's education and their future, helping children achieve success and dreams in the future (Zahrawanny & Fitria, 2019).

Early childhood education (PAUD) is held to support children's growth and development in various aspects, including cognitive, language, social, emotional, physical and motoric. The aim is to ensure that children develop optimally and optimally so that in the future they can function as complete individuals in accordance with the nation's philosophy. Early childhood education is a planned effort and a form of early intervention carried out by educators or parents for children's growth and development. The aim is to optimize children's potential from ages zero to eight years (L. R. Pratama, 2022).

Early Childhood Education (PAUD) focuses on aspects of children's development with the aim of developing their personality as a whole. One important aspect is cognitive development, which involves the child's way of thinking. Cognitive relates to individual skills in connecting, assessing, and considering problems or events (W. Anggraini et al., 2020). Cognitive development is an important aspect that must be developed from an early age in children, because progress in this aspect will support the next stage of development. For this reason, cognitive development needs to be improved effectively and efficiently. Piaget (Susanto, 2017) explains that early childhood cognitive development is at the preoperational stage. At this stage, children begin to use symbols to represent things through body language, words, objects and movements. This allows children to fantasize and imagine various things they experience.

According to Piaget's theory, individuals have an active development pattern, and children develop through interrelated cognitive stages. These stages are closely related to brain growth and the experiences experienced by children (Izzati & Yulsyofriend, 2020). Meanwhile, Vygotsky stated that there are three levels in the child's learning stage, namely (1) unable to carry out tasks without the help of adults, (2) able to carry out tasks with the help of adults, and (3) able to complete tasks independently (Izzati & Yulsyofriend, 2020). Cognitive development in early childhood is different from older children.

Piaget said that children aged 0-2 years are at the sensorimotor stage where they understand the world through physical actions and real interactions with external stimuli. Children's behavior develops from simple reflexes to more organized schemes. Meanwhile, children aged 2-7 years are at the preoperational stage where they are starting to think symbolically and language skills are starting to appear to describe objects and events. However, their way of thinking is not logical and does not resemble adult thinking. Early childhood at the preoperational stage thinks symbolically. Symbolic thinking allows children to construct words and images that describe certain objects or actions in their

minds. Therefore, in the learning context, children at this stage need concrete media to help them achieve learning goals (Veronica, 2018).

Cognitive is a very important thing to be stimulated because cognitive is fundamental in the development of children's intelligence. The stimulation given will have a huge influence on the development of children's thinking and cognitive including learning and problem solving, logical thinking and symbolic thinking and science learning content is attached to three parts. This cognition is where science is a combination of process skills (how children learn) and content (what they learn) (V. Anggraini et al., 2019).

Science is a branch of natural science that includes content and processes. In science activities, children gain knowledge about nature and the phenomena around them. Children's scientific attitudes develop when they practice science in learning, which involves developing critical thinking and problem solving skills in everyday life. Children start from simple things by exploring and asking questions through observation and experimentation (Husin & Yaswinda, 2021). Science activities can improve children's scientific process skills, including observing, discovering and solving problems (Dilek et al., 2020)

Science skills are skills that allow children to develop new information through concrete experiences. These skills are important in children's daily lives as well as in their future lives (Charlesworth & Lind, 2010, p. 77). Children's natural curiosity is critical to the learning of science skills, and they not only learn skills but also build a set of skills over time (Kuru, 2017). Moreover, these skills in the early years are also the best predictors of children's science achievement in later grades (Saçkes, 2013).

Based on the results of research conducted, it is stated that science learning can influence the cognitive development of children aged 5-6 years. It can be seen that when the researchers carried out experiments or trials, colored soap bubbles and sounding bottles in the experimental class were better than in the control class, so it can be concluded that science learning has an effect on the cognitive development of children aged 5-6 years at AL Hikmah Kindergarten, Sosa sub-district, Padang Lawas district (Hasibuan & Suryana, 2022).

Science learning for early childhood basically aims to introduce the scope of science to children and enable them to use basic aspects in solving the problems they face (Mirawati & Nugraha, 2017). If done correctly, science learning in early childhood can develop their logical thinking abilities (Rahmi, 2019). However, the reality in the field shows that science learning for early childhood is still not optimal. Teachers often only rely on magazine books and then give assignments, so that children's thinking abilities are less developed (Salim, Prasetyawati, & Hariyanti, 2014) (Wijaya & Dewi, 2021). Apart from that, this kind of science learning approach tends to be less enjoyable and limits children from exploring various scientific knowledge.

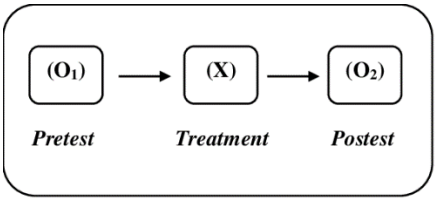
Based on the problems above, the formulation of the problem in this research is whether there is an influence of science learning on the cognitive development of young children at the Nada Ashobah Wiyung IT Kindergarten in Surabaya with activities to

introduce plant parts. This research aims to determine the effect of science learning on early childhood development at the Nada Ashobah Wiyung IT Kindergarten in Surabaya.

RESEARCH METHOD

In this research, the method used is quasi-experimental research, where research is carried out on one group without a comparison group or control group (Arikunto, 2013). The research design used is a one group pre-test-post-test design, which is experimental research on one group that is chosen randomly and without tests to assess the stability or clarity of the group's condition before treatment is given. This design involves measuring a pretest before the treatment is given and a posttest after the treatment is given at each learning session.

The pretest and posttest were carried out using oral tests. Treatment results can be known more accurately. Pretest and posttest were carried out before treatment was carried out. The following is the design of the one group pretest posttest design research:



Information :

O1: This is a pretest or score obtained before being given treatment in the form of science activities introducing nature-based plant parts.

X: Is a treatment or treatment in the form of a science activity introducing nature-based plant parts.

O2: This is a posttest or score obtained after being given treatment in the form of science activities introducing nature-based plant parts.

This research was conducted at the IT Nada Ashobah Wiyung Kindergarten, Surabaya, from 13-16 May 2024. The population of this research was group B children at the IT Nada Ashobah Wiyung Kindergarten, Surabaya, with a total of 15 children. The sampling technique used was a saturated sample. According to Sugiyono (S. Pratama, 2019), a saturated sample means that all members of the population were sampled. Therefore, all 15 group B children were used as samples in this study.

The initial stage before the instrument is used as research, the researcher first tests the instrument with a validity and reliability test. The results obtained were that all instruments were declared valid and reliable so they could be used in research. Indicators of success from percentage data can be seen in the following table:

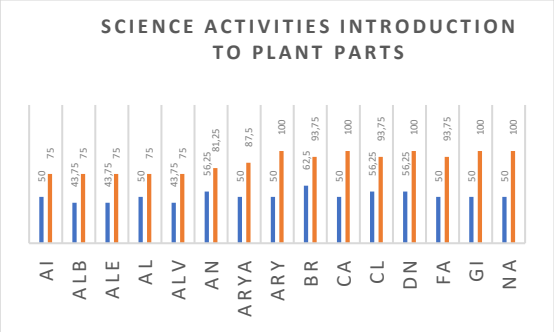
No.	Criteria	Score
1	Not yet developed (BB)	0-25%
2	Starting to develop (MB)	26-50%

3	Developing according to expectations (BSH)	51-75%
4	Developing very well (BSB)	76-100%

The data analysis technique used was the Wilcoxon test with the help of SPSS 25. The Wilcoxon test was used to determine the effect of science activities in the form of introducing nature-based plant parts on the cognitive development of group B children at the Nada Ashobah Wiyung IT Kindergarten, Surabaya.

RESULT AND DISCUSSION

Based on research conducted at the IT Nada Ashobah Wiyung Kindergarten, Surabaya with a sample of 15 children in Group B, the following results were obtained:



At the time of the pretest, 11 children were in the "Starting to Develop" (MB) category and 4 children were in the "Developing According to Expectations" (BSH) category with still low scores. This shows that before being given treatment, many children did not have adequate knowledge about plant parts, plant growth processes, and types of plants. This situation may be caused by the lack of effective and interesting learning methods in conveying science material to children.

After being given treatment, the posttest results showed a significant improvement with 5 children in the BSH category and 10 children in the "Very Well Developing" (BSB) category. This increase shows that the nature-based learning approach applied is able to make children better understand and master the material presented. Learning that uses interactive methods and is directly related to real environments turns out to be more effective in helping children understand basic science concepts.

Furthermore, the data analysis technique used was the Wilcoxon test to determine the effect of science learning with nature-based plant parts introduction activities on the cognitive development of early childhood children at the Nada Ashobah Wiyung IT Kindergarten in Surabaya to obtain the following:

Ranks

		N	Mean Rank	Sum of Ranks
Posttest - Pretest	Negative Ranks	0[a]	.00	.00
	Positive Ranks	15[b]	8.00	120.00
	Ties	0[c]		
	Total	15		
a. Posttest < Pretest				
b. Posttest > Pretest				
c. Posttest = Pretest				

Based on the Ranks table above, it is known that the negative ranks between science learning and the activity of recognizing nature-based plant parts for the pretest and posttest are 0 for both the N value, Mean Ranks and Sum of Ranks. The value 0 indicates there is no decrease/reduction from the pretest value to the posttest value. The positive ranks between science learning and activity in recognizing nature-based plant parts for the pretest and posttest were 15 data, which means that all students experienced an increase between pretest and posttest. This means that cognitive abilities through science learning with activities to introduce nature-based plant parts did not show any decline after being given treatment and obtained an average of 8, while the number of positive rankings was 120.00. Furthermore, to find out the effect of science learning on children's cognitive development at the Nada Ashobah Wiyung IT Kindergarten in Surabaya, it can be seen in the following table:

Test Statistics[a]	
	Posttest - Pretest
Z	-3.426[b]
Asymp. Sig. (2-tailed)	.001
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Based on the Wilcoxon test, the Asymp (2-tailed) value was 0.001 < 0.05, which shows that there is a difference in the pretest and posttest scores obtained by children or it can be said that learning science by introducing nature-based plant parts can have a significant effect on their vocabulary mastery. children at the IT Nada Ashobah Wiyung Kindergarten, Surabaya. This is because fun and enjoyable learning can be done with a

variety of media and learning strategies. One variation of the media used is the use of natural materials, concrete media, image media, and so on. The use of natural media in learning process activities can help develop aspects of children's development such as fine motor skills, cognitive and creativity, because using natural media can make it easier for children to absorb knowledge and help develop children's thinking patterns (Laksana et al., 2023).

The opinion above is also supported by Oktari, (2017) who said that natural material media can be used as a medium for learning. The appropriate use of natural materials as learning media by teachers will help natural children develop various aspects of children's development, including cognitive, social emotional, language, motoric, moral and religious values and life skills.

Science learning in early childhood has a very important role in the development of various cognitive aspects and logical thinking skills. This research aims to evaluate the effectiveness of a nature-based learning approach in introducing plant parts to children at TK IT Nada Ashobah Wiyung Surabaya. Based on the results of the pretest and posttest, it can be seen that there was a significant increase in children's understanding of the material presented after being given treatment.

Nature-based learning has many advantages compared to traditional methods. This method allows children to learn through direct experience and observation, which is very important in their cognitive development. Through this approach, children can see, touch and interact directly with the objects being studied, thereby increasing understanding and retention of information.

In this research, children are invited to observe plant parts directly, see the plant growth process, and recognize various types of plants. This hands-on experience not only increases their understanding of the material, but also fosters curiosity and interest in science. Apart from that, this activity also develops observation and exploration skills which are the basis of scientific skills.

The nature-based learning approach has proven effective in increasing children's understanding of basic science concepts. Therefore, teachers and educators are advised to integrate this method in their curriculum. Hands-on experience and contextual learning can increase children's interest and motivation towards science. This is very important because interest and motivation are key factors in effective learning. Thus, educators must create an interactive and enjoyable learning environment to facilitate meaningful learning.

According to science learning itself is knowledge aimed at understanding what happens in the surrounding environment. The synas learning process should use experimental methods that build patterns of student interaction with the material in the form of direct learning experiences. Science for AUD aims to encourage children to explore the environment such as making observations and reflecting on them with simple discoveries (Izzuddin & Lombok, 2021).

The main aim of science learning for children is to develop aspects of children's development and potential. Apart from that, science learning also aims to help children

understand the scope of science and be able to use basic concepts in solving the problems they face. Therefore, science learning development programs should focus on efforts to foster children's understanding, interest and appreciation for the world around them, namely the universe (Mirawati & Nugraha, 2017).

The importance of training and professional development for teachers in implementing nature-based learning methods. Teachers need to be equipped with the knowledge and skills necessary to design and implement interesting and effective learning activities. This training can include observation techniques, simple experiments, and how to use the surrounding environment as a learning resource.

Apart from that, the sustainability of this learning method is also a concern. Consistent efforts are needed to continue to apply and develop nature-based learning methods. One way to achieve this sustainability is to integrate this method in the curriculum as a whole and ensure support from all related parties, including teachers, parents and other stakeholders.

CONCLUSION

This research shows that science learning with the introduction of nature-based plant parts can significantly improve children's understanding and mastery of vocabulary at TK IT Nada Ashobah Wiyung Surabaya. Nature-based learning methods allow children to learn through direct experience, which is proven to be more effective than traditional methods.

These results provide important implications for early childhood education, especially in designing and implementing more interactive and contextual learning methods. For this reason, consistent efforts and support from various parties are needed to integrate nature-based learning methods in the curriculum and ensure their sustainability. In this way, we can create a more effective and enjoyable learning environment for children, which will ultimately improve the quality of their education.

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