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Using Experimentation Method to Improve Children's Science Skills

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Abstract

The purpose of this study was to improve children's scientific skills by using experimental methods in Group B of Bungi Indah Kindergarten, Konawe Regency. This type of research is classroom action research. This research was conducted in two cycles. Each stage of this research follows the classroom behavior procedure. They are: (1) Planning, (2) Implementation, (3) Observation, and (4) Reflection. Observation and interview were used as data collection techniques. The data analysis technique is descriptive. The subjects of this study were 15 children aged 5-6 years, 4 girls and 11 boys, in Group B TK Bungi Indah Konawell Regency. Based on data analysis of the observation of teacher teaching activities in Cycle I, the success rate was 80%, the results of children's learning activities in Cycle I were 80%, and the learning outcomes of children in Cycle I were 60%. In Cycle II the success rate of teacher teaching activities reached 93.33%, Cycle II children's learning activities reached a success rate of 93.33%, and Cycle II student learning outcomes reached a success rate of 93.33%. achieved. Therefore, it can be concluded that this research can improve cognitive performance with experimental methods in Group B children of Bungi Indah Kindergarten, Konawe Regency.

Keywords: science ability; scientific skills; experimental method.

INTRODUCTION

Early childhood is a human being with different potentials, experiencing a very rapid growth and development process depending on the nature of the child (Supriani & Arifudin, 2023). According to (Silahuddin, 2017) children develop optimally when these potentials are stimulated and developed. Therefore, conditions and places of education are needed that are in accordance with the needs and development of children so that their educational needs are met optimally. Early childhood education plays a very important and decisive role for the history of the child's further development, because early childhood education is the foundation for the basis of the child's personality. The importance of education for early childhood is written in Law No.20 of 2003 concerning the National Education System article 1 paragraph 14 which states that: early childhood education is a coaching effort aimed at children from birth to 6 years of age which is carried out through providing stimulation, education to help physical and spiritual growth and development so that children have readiness to enter further education (Indarwati, 2018).

The introduction of science from an early age plays an important role in improving the quality of education, especially in forming children who are able to think critically, logically and creatively, so that children can think positively. must be trained for this ability from an early age. Attitudes towards children can develop in the future (Kusuma et al., 2023). According to (Lestari et al., 2020) science is the study of nature, which is related to the environment and oneself. Science learning is learning that involves children and the environment directly. Meanwhile, according to (Widayati et al., 2020) science learning is not only taught in elementary and junior high schools, but needs to be instilled early. This is because children at this age develop very rapidly cognitively, socially and emotionally. Children's intellectual

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development or intelligence reaches 50% at the age of 0-4 years, 80% at the age of 0-8 years, and 100% only at the age of 0-18 years. One of the goals of introducing science in early childhood is to instill in children the ability to solve problems encountered through a scientific process with humorous nuances so as to develop fun and interesting learning activities (Dini, 2022).

The realization of the science learning process is carried out through improving one of the skills of the child, namely process skills. According to (Nurmaniah & Sianturi, 2020) science process skills are a fundamental way to obtain information about natural phenomena through direct observation and through simple science activities that can be a source of new knowledge for children. Children start through simple ideas and develop to create new and complex ideas (Anidar, 2017). The basic science process skills of early childhood include the following abilities: observation skills, comparison skills, classification skills, measurement skills, and communication skills. Initial observations in Group B of Bungu Indah Kindergarten, Conawe Regency, in interviews with researchers and principals, found that children were less active in learning activities and science was the best. low because it has not developed perfectly. It is called this because in the learning process, several problems arise, such as the teacher not teaching according to the learning topic at that time.

Researchers found a problem in kindergarten because children sometimes rewrite what the teacher has written on the blackboard in daily learning. Science learning should not only be taught in elementary school and junior high school, but should be integrated from an early age. This is because children at this age develop very rapidly cognitively, socially and emotionally. Children's intellectual development or intelligence reaches 50% at the age of 0-4 years, 80% at the age of 0-8 years, and 100% only at the age of 0-18 years. One of the goals of introducing science in early childhood is to instill in children the ability to solve problems encountered through a scientific process with humorous nuances so as to develop fun and interesting learning activities. Because the nature of Natural Science (Science) can be instilled in children as early as possible. In addition, children's understanding of science will be more functional, if it is carefully developed through learning activities in kindergarten. Science can be used as a vehicle in developing other characters such as stimulating high curiosity, discipline, thoroughness, objectivity and openness to new things. High curiosity can stimulate the development of higher order thinking skills such as the ability to analyze, evaluate and synthesize (Azizah et al., 2021). Thus the aim in this study is to improve children's scientific skills by using the experimental method in Group B of Bungi Indah Kindergarten, Konawe Regency.

METHODS

This research method uses classroom action research which studies learning problems in the classroom through self-reflection in an effort to solve these problems by carrying out various planned actions in real situations and analyzing any consequences of the treatment. According (Arikunto, 2009). Classroom Action Research (PTK) is research that is intended as an effort to solve problems that occur in the classroom by improving the learning process, so that learning can be achieved in accordance with the expected goals.

Data collection techniques in this study were carried out by means of observation, interviews and documentation. Observation is a data collection technique by directly observing the object to be studied regarding activeness, children's enthusiasm in moving and agility and flexibility of hand movements during activities. Interview is data collection by having a direct dialog with the respondent verbally based on the results of observations during the teaching and learning process to find out various information during the learning process. Document study is used to obtain the necessary data in the form of written documentation and photographs of students during the learning process, researchers will take pictures of activities carried out during the study. Researchers took documentation of children who were doing experimental

activities from Cycle I to Cycle II. The data analysis technique used is to use descriptive analysis.

RESULTS AND DISCUSSION

Before starting this activity, the researchers first had an initial meeting with the principal of Bungi Indah Kindergarten in Konawe District. The meeting aimed to communicate the purpose of researchers conducting research at Bungi Indah Kindergarten. In addition, the principal instructed the researchers to discuss this with the homeroom teacher. Based on the problems found, researchers used the experimental method to design learning activities that could arouse children's interest and improve their scientific abilities while having fun. Data on the acquisition of the value of improving children's scientific performance with the experimental method obtained from the results of the initial and final observations at Bungi Indah Kindergarten and the subsequent acquisition of the final results for each student are presented in Table 1 below.

The acquisition of children's scores on observation, it can be seen that the average value obtained by students is at the level of the star rating category (**) or Starting to Develop (MB). Based on the results of data processing, a classical success analysis was then carried out for the initial assessment of learning activities before the implementation of activities to improve children's science skills using the experimental method, the results are shown in table 2, as follows:

Table 1. Calculation of Classical Value at Initial Observation

Category	Total	(%)
Developing Very Well	0	0%
Developing as Expected	1	6,66%
Starting to Develop	13	86,66%
Not Developing	1	6,66%
Total	15	100%

The calculation data in Table 1 shows that children's scientific competence in experiments is still classically low. In the last assessment, the average child was given 1 star (**) or onset of development (MB) by 13 students (86.67%). H. Most students failed to meet the performance targets of the Success Metrics. Where this is an assessment activity that requires attention, direct support and general guidance in the form of direct support and general guidance needs to be given to children in these activities. From the results of the study, one student received a star rating (***) or 6.66%, and one student received a star rating (*) or less developed (BB) or 6.66%. The researcher then discussed again with the group B teacher and agreed to make improvements to improve children's science skills by conducting motion experiments in Cycle 1.

The first Cycle I meeting was carried out with the habit for children and teachers to hold a morning meeting in the schoolyard every morning. The teacher organized the students according to their classes, instructed them to enter the room, and reminded them to enter the room in an orderly manner. After shaking hands cheerfully, the children sit in their respective places. Then pray and sing together. In the core activities of Cycle I, where I attempted to improve children's science skills, the teacher conducted a pre-narration about the theme presented: cosmic theme, natural phenomena subtheme, and special theme. Followed by the teacher's narration explaining the purpose of the activities to be carried out with the designated

class utilizing miniature mountain media in learning activities and other activities planned in the lesson plan.

The implementation of Cycle I Session II actions was carried out with the habit for children and teachers to hold morning meetings in the school yard every morning. The teacher organized the students according to their classes, instructed them to enter the room, and reminded them to enter the room in an orderly manner. After shaking hands cheerfully, the children sit in their respective places. The core activities of Cycle I included the themes introduced for the first time in session II that used the experimental method to improve children's scientific abilities: cosmic theme, natural phenomena subtheme, and concrete rainbow. Discussing the theme, the teacher explains that the purpose of the activity is that the teacher uses the media to make a rainbow in learning activities and other activities planned in the lesson plan which are carried out according to the assigned class. Before showing the learning media the teacher asks the day, date, month, and year of the day. After answering, the teacher writes on the board to read together. Then the teacher shows the children's media spontaneously, “What do you bring a mirror for?” while the teacher explains that what is in front of them is the tools and materials to make a rainbow, after showing the media, namely tools and materials such as containers, water, mirrors, the teacher immediately asks the children “who has ever seen a rainbow?”.

Simultaneously the children all raised their hands “I am the teacher” because the enthusiasm of the children was high, the teacher asked the children to mention the colors of the rainbow they knew and the tone of the children's voices answered “red, yellow, green but there were also children who answered as they pleased, after asking the colors of the rainbow the teacher also asked the children to repeat the colors of the rainbow that had been mentioned then the teacher asked the children to read the writing on the board. After reading, the teacher immediately shows the media that will be taught to children. After seeing the media held by the teacher, the child asked the teacher, “why is there water, mom?” Another child asks “why did the teacher bring water?” then the teacher explains to the child, “this is the media that we will use for learning today, then the teacher asks who wants to learn to use this media”. The tools and materials to be used are displayed. Then the teacher introduces and shares the tools and materials used in the rainbow making activity. Then give examples and practice making rainbows using the examples shown. Next, the teacher invites the children to experiment making rainbows using the tools and materials that have been provided. After the experiment is complete, the teacher asks the children to enter the classroom and sit in their respective places. After the experiment, the teacher asks the children to recite the prayer before eating and invites them to bring the ingredients brought from home. After eating, the children can play with their friends outside the classroom.

The implementation of session III of Cycle I will be carried out with the habit for children and teachers to hold a morning meeting in the school yard every morning. The teacher organizes the students according to their classes, instructs them to enter the room, and reminds them to enter the room in an orderly manner. After shaking hands cheerfully, the children sit in their respective places. Then pray and sing together. The core activities of Cycle I in session III use children's experimentation to develop children's scientific abilities. The teacher pre-narrates the theme presented: cosmic theme, natural phenomena subtopic, and special theme. Rain, after the teacher explains the purpose of the activity for the class and the use of media in learning activities and other activities planned in the lesson plan. Before showing the learning media, the teacher asks the date of the day. After answering, the teacher writes on the board to read together. Next the teacher shows the media in the form of a perforated container filled with water. The children naturally asked, “Teacher, why is there a hole in such a place?” explaining that it was used for creativity. The teacher immediately asked the children, “Have you ever seen rain?” ``I have never seen a shower," he said. The children's enthusiasm was so great, after the

teacher repeated the word “rain” from earlier, the teacher read the letters on the blackboard to the children, and some children answered at will.

After reading, the teacher immediately shows the teaching media to the children. After that the teacher explains to the children, “Today we will use the media to learn, and the teacher asks who wants to learn with the media,” and shows the media to be used. Next, the teacher introduces and distributes the tools and materials used in the rain-themed science play. Then practice the rain-themed science play by giving examples. Next, the teacher asks the children to pour water into a container with holes. After the science play activity is complete, the teacher invites the children to go to their respective places, after which the teacher guides the children to read the prayer before eating and asks the children to take home the material that has been learned. recommended for After eating, children can play with their friends outside the classroom.

Observations of teacher teaching activities were carried out to see the teacher's ability to improve children's science skills with experimental methods. Teacher teaching activities in Cycle I showed 5 indicators were incomplete or 33.33% of the 15 indicators the teacher had to complete in Session I, and 4 indicators or 26.67% were incomplete in Session II. shows that III There are 3 indicators that are not implemented or 20%. At the first meeting 10 indicators or 66.67% were implemented, at the second meeting 11 indicators or 73.33% were implemented and at the third meeting 12 indicators or 80% were implemented. Observation of children's learning activities aims to see how the improvement of children's science skills by using the experimental method. Analysis of children's observations is presented in the table below. Children's learning activities consisted of 5 indicators that were not completed or 33.33% of the 15 indicators that the teacher had to complete in Session I, and 4 indicators or 26.67% were not completed in Session II. shows that III There are 3 indicators that are not implemented or 20%. At the first meeting 10 indicators or 66.67% were implemented, at the second meeting 11 indicators or 73.33% were implemented and at the third meeting 12 indicators or 80% were implemented.

Classroom action research is research conducted by teachers in their own classrooms through reflection, which aims to improve the learning process in order to improve student learning outcomes. The researcher aims to find out whether experimental activities can improve the cognitive abilities of Bungi Indah Kindergarten children. The implementation of this research consists of II cycles, each of which consists of three sessions. Media will be used to conduct learning at each meeting. Each meeting consists of three phases: initial activities, core activities, and final activities. The results achieved by conducting scientific activities and conducting experiments in Cycle I showed no improvement in the performance indicators to be achieved, so action was needed in Cycle II. This is caused by teacher, student and media factors used for learning. This can be seen from the data that has not been transformed on the teacher and child activity sheets.

Based on the results obtained, the researcher made improvements in Cycle II to ensure the expected performance metrics were achieved. After making improvements in Cycle II, the results proved to be very important for activities that use laboratory techniques to improve children's scientific abilities. This was due to improved teacher performance activities that increased from 80% to 93.33%. With the increase in teacher performance activities, children's learning activities also increased from 80% of themselves to 93.33% of themselves. Children's learning outcomes improve when there are more performance activities between teachers and children. The details can be seen in the histogram below.

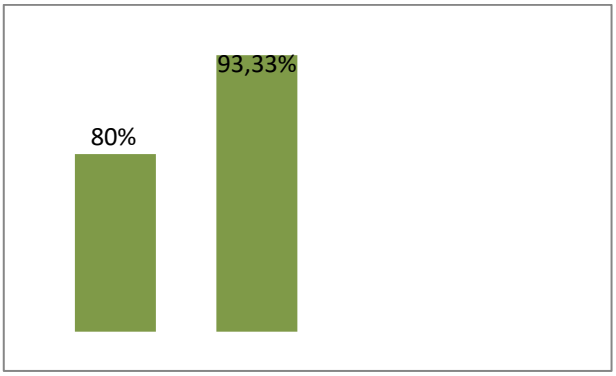

Figure 1. Histogram of Teachers' Teaching Activities in Cycle I and Cycle II

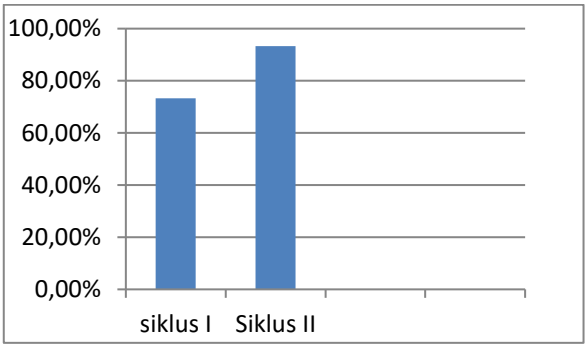

Figure 2. Histogram of Children's Learning Activity Cycle I and Cycle II

This can be seen from the children's learning achievements in cycle I, on average, children get a star value (***) or Developing As Expected (BSH) with a percentage of 60% or 9 children out of 15 children. The value of the star category (****) or Very Good Development (BSB) with a percentage of 0% then 5 children out of 15 children get a star category (**) or Start Developing with a percentage of 33.33% and as many as 1 child gets a star category value (*) who gets a Less Developed category value (BB) with a percentage of 6.66. While the results of children's learning achievement in cycle II, namely the average child gets a star value (****) or a Very Good Developing category (BSB) obtained by 7 children or 46.67%, received 7 children or 46.67%. Developing as expected (BSH) category, 1 child or 6.66% got the category Start Developing (MB), and no child got the category Not Developing (BB). From these results, it shows that the cognitive abilities of children achieved by children in each cycle have increased. This shows that playing science and doing experiments can improve children's cognitive abilities at Bungi Indah Kindergarten. These results can be converted into percentages. That is, the percentage reached 80% in Cycle I and 93.33% in Cycle II.

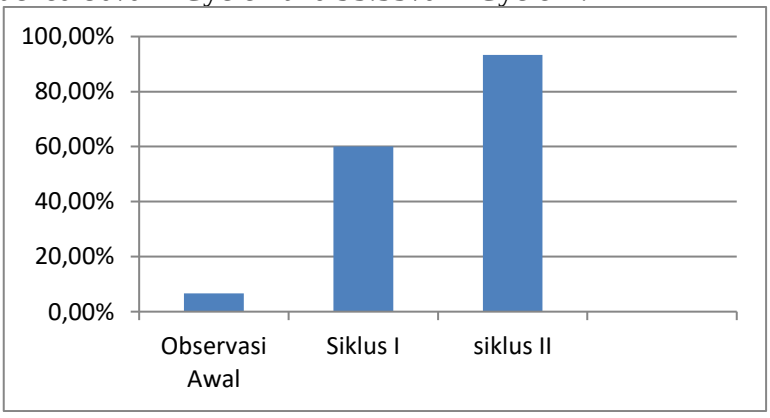

Figure 3. Histogram of Comparison of Children's Learning Outcomes

Research activities have been carried out, the results of the data obtained as described on the previous page, and learning to improve children's scientific skills using experimental methods by researchers in collaboration with teachers in group B. Activities are considered structured and carried out well and optimally. Meetings in Cycle I and Cycle II, and seeing children's understanding in cycle I reached 80% of their understanding, compared to only 6.66% in the initial observation stage of the study. In the second cycle it reached 80%. 93.33% shows better results than before. This research can be stopped if the performance index is set at a minimum of 85%. In line with research conducted by (Pujiarto, 2020) the application of the experimental method used in this study affects the learning process, especially the understanding of science concepts. In addition, the application of the experimental method in science learning activities is appropriate for developing science skills in early childhood so that children can reach developmental stages that are appropriate for their age. Similarly, (Astuti & Nurhafizah, 2023) that the experimental method is more effective in improving children's science skills compared to control class learning that applies conventional learning. Providing learning treatment with the project method has an effect on the development of science process skills and achieving positive feedback from children when the learning process takes place in kindergarten children, because the project method is a learning method that allows children to develop their potential and abilities in solving problems by directly exploring the knowledge gained by doing it themselves, allowing children to recall the experience and create a better understanding (Amantika et al., 2023).

Implementing this experimental method requires teachers' readiness to teach science material that will be introduced to children starting from planning, implementation, assessment and evaluation of learning activities. Similar to research conducted by (Hikam & Nursari, 2020) teachers are used as figures by children because what the teacher says and does will be followed and obeyed by the children. By using the experimental method in science learning for early childhood, students can follow the process well, and when the child is asked by the teacher to do the experiment, the child responds enthusiastically and enthusiastically. In line with (Wingsih & Yaswinda, 2020) with the experimental method or experiments related to the environment will be able to foster critical thinking skills in kindergarten children. So it can be concluded that science experiments related to the environment can affect children's critical thinking skills. Because according to (Nainggolan et al., 2021) that the importance of science is able to make children understand their world better. Understanding the environment, existing fears will be erased and make them feel comfortable and can increase their sense of alertness to events or people, and objects around them, because the children's part is something interesting and new, and can also provide knowledge or inspire them to understand and investigate. Learning science through simple experimental activities can increase children's curiosity, making it an opportunity to improve the development of children's science skills.

CONCLUSION

Based on the observations and findings of children's activities carried out in conjunction with the implementation of two cycles of research, each cycle consisting of three meetings and consisting of three sets of initial activities, if core activities and final activities are made, we have the following conclusions. A success rate of 80% was determined based on the analysis of observation data of teacher learning activities in Cycle I. In Cycle I, the achievement of children's learning activities reached 80%. Children's learning outcomes in Cycle I reached 80% of the percentage of children who achieved BOD and BSH scores. Based on the analysis of observation data of teacher teaching activities in Cycle II, the level of implementation was 93.33%. Very Good (BSB), Spreading As Expected (BSH). Based on the results of research and discussion in Cycle I and Cycle II, it is concluded that science skills can be improved

through experimental methods in Group B children of Bungi Indah Kindergarten, Konawe Regency.

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