



## Implementation of Experimental Methods in Improving the Science Skills of Children Aged 5-6 Years

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### Abstract

This research is motivated by the importance of developing science skills in early childhood US the base for critical thinking, creativity, and problem solving, while science learning in Early Childhood Education still tends to be theoretical and does not involve direct children's experiences. This study aims to describe the implementation of experimental methods in improving the science skills of children aged 5-6 years at Ma'arif 28 Mountain Adi Kindergarten for the 2025/2026 Academic Year, with a focus on aspects of planning, implementation, and evaluation of learning. The research method used is a qualitative approach with a descriptive type, through data collection techniques in the form of observations, interviews, and documentation of school principals, teachers, and 12 children US research subjects. The results of the study show that the application of experimental methods is able to improve children 's science skills US a whole, including exploratory activities, the ability to solve simple problems, creative attitudes, understanding cause and effect, and the ability to classify and sort objects. Children become more active, enthusiastic, and confident in participating in learning because they are directly involved in experimental activities. In addition, the success of this method is supported by the role of teachers in providing guidance, the use of varied media, and interactive and fun learning. Thus, experimental methods have proven to be effective in developing early childhood science skills and can be an alternative to innovative learning strategies in early childhood education.

**Keywords** : *Early Childhood Science Skills, Early Childhood Learning, Experimental Methods*

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### INTRODUCTION

Childhood Education (PAUD) is fundamental phase in formation base development children, especially during the *golden age* that is range ages 0–6 years, where growth and development child is taking place very rapidly. At this time, children experience development in various aspect like cognitive, social-emotional, language, motor, as well as moral and spiritual ( Indrawati, 2020). In addition, PAUD plays a role important in optimize potential child since early to develop optimally according to with stage development (Yusuf et al., 2023). Education at the age of early No only functioning as a process of knowledge

transfer, but also as effort form character child in a way comprehensive (Suryana, 2019). This reinforced by the opinion of Yuliani (2020) who stated that education child age early must capable develop all over aspect development child in a way integrated. With Thus, PAUD becomes foundation main in prepare quality generations in the future.

The role of the environment education, good family and PAUD institutions are very important success grow flower children. Environment conducive education will provide the right stimulus for development child so that they Ready face level education next. Children's education age early can held through formal and non-formal channels, each of which has its own role in support development children (Rizqiyatunnisa, 2021). In context formal education such as park children, learning designed For develop various aspect development child in a way integrated. One of the aspect important things that need to be done developed is related science abilities with ability think logical and critical. Therefore that, learning in PAUD is necessary designed in a way innovative to be able to stimulate development cognitive child optimally.

Science learning for children age early own role important in grow a sense of curiosity know as well as ability understand environment around. Rahayu (2022) explains that science learning for children age early aim For introduce concepts simple related with life everyday life. In addition, science learning can also develop process skills such as observing, classifying, and concluding (Sumirat et al., 2025). However, in In practice, science learning in PAUD is still tend nature theoretical and less involving experience direct child. Condition This cause child not enough active in the learning process and lacking understand scientific concepts in general deep. Therefore that, is necessary method capable learning involving child in a way active in the learning process.

One of methods that can used in science learning is method experiment. Experimental method give chance to child For Study through experience direct with do test simple. Suryameng and Marselina (2021) stated that method experiment can increase ability cognitive child through activity exploration. In addition, the method experiments are also possible child For develop a sense of curiosity knowledge and ability think scientific (Harahap et al., 2023). Through activity experiments, children can understand scientific concepts in general more concrete Because they involved direct in the learning process. Azizah et al. (2023) also explains that the use of realia media in method experiment can increase understanding child to science concept. With Thus, the method experiment be one of effective approach in children's science learning age early.

Although method experiment own Lots advantages, in its implementation Still there is various obstacles faced by teachers. One of them constraint main is limitations teacher competence in design and implement activity appropriate experiments with stage development children. Hidayati (2022) stated that teacher competence is very influential to success implementation method experiments. In addition, the limitations of learning media also become obstacle in implementation activity experiments in PAUD. Fitriani (2022) explains that lack of guides and facilities learning causing teachers difficulties in develop interesting science activities. Destiyanti (2022) added that design instructional less experimentation systematic can hinder the learning process. Conditions This show that implementation method experiment Still need more optimal development.

Other issues found in children's science learning age early is aspect evaluation that is still ongoing focused on results end. Aulia et al. (2024) stated that evaluation learning often Not yet pay attention to the learning process child in a way comprehensive. Khaerani et al. (2024) revealed that teachers tend to evaluate results work child without paying attention to the exploration process being carried out. In addition, Wulandari and Andari (2025) explain that limitations time and teacher understanding become factor reason not enough optimally evaluation process -based. In fact, in science learning, thinking process scientific child is very important aspect For developed. Therefore that, evaluation learning need designed For assessing processes and results Study in a way balanced.

Various study previously show that method experiment effective in increase children's science skills age early. Sulastri and Kurniawati (2022) found that method experiment can increase understanding children's science concepts through activity exploratory. Rahayu and Lestari (2023) stated that method experiment capable increase desire knowledge and ability think children. Wulandari (2021) explains that activity experiment can develop ability observation and cooperation children. Lestari and Pratiwi (2020) showed that method experiment can increase children's science skills in a way gradually through learning action class. Suryani and Hapsari (2023) also found that method experiment influential to ability think critical child. However thus, some big study the Still limited to analysis common and not yet study implementation method experiment in a way deep in context certain.

Based on description mentioned, there are gap research that shows that implementation method experiment in children's science learning age early Not yet done in a way systematic and comprehensive. In addition, research that examines in a way direct condition real in certain PAUD institutions Still limited. Therefore that, research This own novelty in study implementation method experiments that include aspect planning, implementation, and evaluation learning. Research it also focuses on the condition real at Ma'arif Kindergarten 28 Gunung Adi as context local who have characteristics alone. With Thus, research This expected can give contribution new in development children's science learning age early.

Pre-survey data show that children's science skills 5–6 year olds at Ma'arif 28 Kindergarten, Gunung Adi are still classified as low, where some big child is in the category Not yet grow and start developing. Conditions This show the need effort improvement through method more learning effective. Experimental method chosen as alternative Because capable give experience Study direct to Retno Setya's child Budiasningrum et al. (2025) stated that election method proper learning can increase interest and results Study students. In addition, Hasibuan and Suryana ( 2021) explained that method experiment influential to development cognitive children. With Thus, the implementation method experiment expected can increase children's science skills age early.

Based on description said, the purpose study This is For describe implementation method experiment in increase children's science skills aged 5–6 years at Ma'arif 28 Kindergarten, Gunung Adi, 2025/2026 Academic Year. Research This expected can give contribution theoretical in development knowledge education child age early as well as contribution practical for teachers in designing more science learning effective and innovative.

## **METHOD**

Study This use approach qualitative with type study descriptive purposeful For describe in a way deep implementation method experiment in increase children's science skills ages 5–6 years at Ma'arif Kindergarten 28 Gunung Adi. Approach qualitative chosen Because capable understand phenomenon in a way holistic in condition natural with researchers as instrument main ( Sugiyono, 2022). Research field This implemented in the even semester month February until March 2026 at Ma'arif Kindergarten 28 Gunung Adi with subject study covering head school, teacher, and 12 children ages 5–6 years consisting of of 7 men and 5 women. The sampling technique used is purposive sampling with consideration that informant own role direct in implementation learning experiment ( Suharsimi Arikunto, 2018). Data collected through observation, interviews, and documentation For get comprehensive information related to the learning process (Wulandari & Santoso, 2021). Observation done For observe in a way direct activity experiments and children's science abilities (Fauziah & Prasetyo, 2020), whereas interview used For dig information deep from teachers and principals school ( Hidayati & Ramdani, 2021), and documentation used For complete the data in the form of notes, photos, and

archives activity learning ( Sugiyono, 2022). Instruments study covering sheet observation, guidelines interviews, and documentation, with researchers as instrument key in collect and interpret data ( Moleong, 2021).

Data analysis in study This use technique analysis inductive which includes data reduction, data presentation, and data extraction conclusion / verification as put forward by Miles and Huberman ( Sugiyono, 2022). Data reduction was carried out with selecting and focusing relevant data with research, then the data is presented in form narrative descriptive For make it easier understanding connection intervariable, and stage end done withdrawal conclusion based on findings that have been verified in a way continuously. Data validity is guaranteed through technique triangulation sources, techniques, and time For increase validity and reliability of data ( Moleong, 2019). Research This focus on variables implementation method experiment as variables freedom and children's scientific abilities as variables tied, with indicator science skills include ability observing, classifying, predicting, and concluding. Although study This give description deep related implementation method experiments, their limitations located in space scope research that only done on one institution so that the result No can generalized in a way wide, but still give contribution important contextual in development children's science learning age early (Rukayah & Nugraha, 2020).

## **RESULTS AND DISCUSSION**

### **Results**

Ma'arif 28 Gunung Adi Kindergarten is an Early Childhood Education institution located in Gunung Sari Village, Gunung Adi 2 Hamlet, with a rural environment where the majority of the population works as farmers and casual laborers. Geographically, the school is located in the middle of a residential area, with the presence of the Ibnu Taqin Mosque on the right which is actively used for religious activities, as well as residents' houses around the school area, thus creating a religious and conducive social environment. The surrounding community is predominantly Javanese who still uphold cultural values such as mutual cooperation, the tradition of saying goodbye before Ramadan, and the celebration of Islamic holidays which are routinely held every year. From an institutional perspective, this kindergarten has a vision to create intelligent, creative, independent, and morally noble children, supported by three teaching staff and adequate infrastructure, such as classrooms, playgrounds, and learning facilities. With a total of 17 students divided into two age groups, and strong social and cultural environmental support, Ma'arif 28 Gunung Adi Kindergarten is a relevant research location to examine the implementation of experimental methods in improving early childhood science skills.

### **Science Skills in 5-6 Year Old Children at Ma'arif 28 Kindergarten, Gunung Adi**

Children's science skills age early is one of the aspect important in development cognitive which includes ability exploration, observation, problem solving problem simple, and think creative. In children age 5–6 years, ability This become base in build method think simple scientific through interaction direct with environment. In study this, focus main directed at the science abilities of children at Ma'arif 28 Gunung Adi Kindergarten through implementation method experiments. Activities science learning is designed in form test simple, observational, and activity solution contextual problems. This process aim For stimulate desire know child in a way natural. With However, science learning does not only nature theoretical, but also provides experience real for child.

Development children's science skills No only impact on aspects cognitive, but also influential to development social and emotional. Children involved active in activity experiment tend more capable Work The same with friends, share ideas, and brave put forward opinion. In addition, children also learn finish problem in a way simple with ways that can accepted by the environment social activities experiment give chance to child For

train communication and interaction social in a way directly. This is seen from ability child in explain results observation with Language simple. With Thus, learning science through experiment capable develop various aspect development child in a way integrated.

Based on results observation early, children's science abilities 5–6 year olds at Ma'arif 28 Kindergarten, Gunung Adi are still classified as low. Most of the child is in the category start developing (MB), even a number of child Still in category Not yet developing (BB). This is seen from limitations child in do activity exploration in a way independent, and difficulty in classify and sort object based on size or color. In addition, children are not yet optimal in understand connection because consequence from something incident simple. Condition This show that stimulation science learning provided Still Not yet maximum. Lack of variation learning activities and media be one of factor affecting low children's science abilities.

Result data evaluation beginning show that out of 12 children, there are 6 children in category Not yet growing (BB), 4 children in category start developing (MB), and only 2 children were in the category develop in accordance expectations (BSH). This data confirm that part big child Not yet reach level optimal scientific development. The low achievements This show existence need will intervention more learning effective and interesting. Therefore that, research This focus on efforts improvement children's science skills through method experiment. This method expected capable give experience learn more meaningful for children. With Thus, children's science abilities can develop in a way gradual and optimal.

After its implementation method experiment in learning, occurs quite an improvement significant impact on children's science abilities. Children seen more active in follow activity learning, as well as show desire know more high. They are able to do observation, classifying objects, and understand connection because consequence with more good. The teacher also gives stimulation in the form of question open and guidance in a way gradually during the experimental process ongoing. Use of varied learning media like object colored and tools simple participate support success activities. This is show that method experiment capable increase involvement child in the learning process.

Based on the results data research, of 12 children there are 5 children is in the category develop in accordance hope (BSH), 2 children in the category developing very well (BSB), and 5 children is in the category start developing (MB). Not found Again children who are in the category Not yet developing (BB), which shows existence improvement scientific ability in general overall. Improvement This prove that method experiment effective in develop ability exploration, creativity, and problem solving problem children. Supporting factors success covering teacher creativity, media availability, and enthusiasm children, whereas factor inhibitor covering limitations time and concentration children. In a way overall, method experiment give impact positive to development children's science skills age early. Therefore that, method This can made into as alternative effective learning in PAUD.

### **Implementation of Experimental Methods in Improving Science Skills in 5-6 Year Old Children at Ma'arif 28 Kindergarten, Gunung Adi**

The development of science skills in early childhood provides an important foundation for developing critical thinking and creative thinking skills, as well as problem-solving abilities from an early age. Children aged 5–6 years have a strong curiosity and a tendency to learn through direct experience, thus requiring active and enjoyable learning methods. At Ma'arif 28 Kindergarten, Gunung Adi, the application of the experimental method is one strategy used to optimize this potential. This method allows children to be directly involved in the learning process through simple experimental activities relevant to everyday life. Thus, children not only passively receive information but also experience the

process of discovering scientific concepts themselves. This approach is expected to improve children's exploration, observation, and understanding of the concept of cause and effect.

1. Children are divided into 4–5 groups, each consisting of 4–5 children.

Distribution child to in group small done before activity experiment started so that the learning process walk more focused and effective. Based on results observation, this strategy make every child own equal opportunity For participate active in activity experiment. Children seen more focus moment do observation, discussion, and trying solve problem simple together his group. In addition, the atmosphere Study become more life Because existence interaction between members group. Activities this also helps child in develop skills social, such as Work equal and share assignment. With Thus, learning become more meaningful Because child No only Study in a way individual, but also as a collaborative.

Based on results interview with teachers and principals school, division group small considered very effective in increase quality learning. The teacher conveys that with group small, he can give more guidance intensive to every child in accordance his needs. Head the school also emphasized that this strategy practice child For interact social, respect opinion friends, and finish problem in a way together. This is show that distribution group No only impact on aspects cognitive, but also on development social children. Children become more believe self in convey ideas and more used to Work in team. With Thus, the activities This contribute to the improvement ability exploratory and problem-solving problem children. Research results This reinforced by documentation as following :



**Figure 1. Children are divided into groups**

2. The teacher chats with the child about the procedures, equipment, and materials that will be used

Before do experiment, teacher first formerly do conversation with child about steps activities, tools and materials to be used. Activities This aim For give understanding beginning to children so that they know What will done during the experimental process. Children invited For pay attention and know function from every tools and materials used. In addition, the teacher also provides question lighter for children start think about possibility results experiment. This is help child develop ability think critical and creative since beginning activities. With existence explanation early, child become more ready and confident self in follow activity experiment.

Interview results show that activity conversation beginning this is very important in build readiness Study child. The teacher stated that explanation about procedures and tools help child understand step Work so that they No Confused moment practice. Head the school also added that activity This practice child in know connection cause and effect through the thinking process before do experiment. Children are invited For predict results and understanding possible changes happened. With Thus, the stage This become base important in develop ability analysis This process also increases the child's sense of curiosity. know child to activities that will be conducted. Research results This reinforced by documentation data as following :



**Figure 2. Teacher and children discuss the experimental procedures and materials.**

3. Children are invited to make predictions about the experiments that will be carried out. At the stage this, child invited For predict results from the experiment that will be done based on experience or knowledge possessed. For example, children requested guess which object will float or sink in water. Activities This practice ability think logical and helpful child connect experience daily with simple science concept. From the results observation, some big child capable give prediction although Still simple. Children also look enthusiastic in convey his opinion in front friends. This is show that activity prediction can increase trust self and courage child.

Based on results interviews, activities prediction give impact positive to development ability think children. The teacher conveys that child become more active and creative in put forward ideas. Head school add that stage this also trains child For discuss and appreciate opinion friends. Children learn that every opinion own value and can compared to with results experiments. In addition, the activities This help child understand draft cause and effect in a way more deep. With Thus, the stage prediction become part important in the meaningful science learning process. Research results This reinforced by documentation data as following :



**Figure 3. Child conducting an experiment**

4. The teacher provides an explanation about carrying out the experiment accompanied by examples.

The teacher gives demonstration or example before child do test in a way independent. Demonstration This aims for children own clear picture about steps that must be taken done. Children invited For observe every process carried out by the teacher, so they can imitate with true. Activities This help child understand draft visually and practically. In addition, children are also trained For pay attention to details and follow instructions with good. With existence example straight away, son become more Ready in do test in a way independent.

Interview results show that the demonstration was very helpful in increase understanding child. The teacher stated that child more easy understand activity after see example in a way directly. Head the school also emphasized that activity This support ability child in classify objects and understanding simple science concepts. Children can see direct changes that occur and relate them with theory simple. This is make learning become more concrete and easy understood. With Thus, the stage demonstration play a role important in increase readiness and understanding children. Research results This reinforced by documentation data as following :



**Figure 4.3 Teacher gives an explanation**

5. Children practice the experiment themselves and prove the truth of the predictions.
 

After get explanation and examples, children do test in a way independent in group. At this stage this, child given freedom For try and explore in accordance with directions that have been given. The child is seen enthusiastic in do experiment and try prove predictions that have been they made before. Activities This practice motor skills,

abilities think, and courage in try matter new. In addition, children also learn observe changes that occur during test taking place. With thus, experience Study become more real and meaningful.

Based on results interview, practice direct give impact significant to development ability child. The teacher stated that child become more believe self and creativity in finish problem. Head the school also added that activity This practice child in classify and sort object in a way systematic. Children learn through experience directly, so that understanding gained more in-depth. In addition, children are also more easy remember the concepts studied. This is show that method experiment effective in increase children's science abilities. As picture following :



**Figure 5. Children doing experiments**

6. The teacher discusses with the children to draw conclusions

At the stage Finally, the teacher invites child discuss For interesting conclusion from results experiments that have been done. The child is asked For tell return what they observe and compare results with prediction beginning. Activities This practice ability communication, thinking logical, and reflection to experience learning. The child looks capable convey results observation although Still with Language simple. In addition, children also learn value opinion Friend in discussion group. With Thus, the stage This strengthen understanding scientific concepts that have been studied.

Interview results show that discussion own role important in deepen understanding children. The teacher conveys that through discussion, children can remember back process and results experiment. Head school add that activity This help child in evaluate experience learn and understand draft in a way comprehensive. Children also become more believe self in speaking in front of his friends. In addition, the discussion help child linking experience with more concepts wide. With Thus, the stage This become important cover in the learning process experiment. Research results This reinforced by the results documentation as following :



**Figure 6. Teacher and children draw conclusions**

Based on results research, implementation method experiments at Ma'arif 28 Kindergarten, Gunung Adi, have proven successful. capable increase children's science skills age 5–6 years in a way gradually and comprehensively. Children become more active in activity learning, able think creative, and understand draft cause and effect with more good. In addition, the ability social and communication children also experience significant development. Success This No let go from the role of teachers in designing and guiding activity in a way systematic as well as support environment conducive learning. Experimental method give experience real and fun learning for children. Therefore that, method this is highly recommended as a science learning strategy for children age early.

### **Discussion**

Implementation method experiments at Ma'arif 28 Kindergarten, Gunung Adi, have proven successful. capable increase activity exploratory and curious know child age 5–6 years in a way significant. Children become more active in do observation to phenomenon simple in the environment around, like incident object floating and sinking. Activities This give experience direct stimulating ability investigate as well as practice child For pay attention to detail more carefully. Through activity exploration, children pushed For try, ask, and find answer from every experiments conducted. The process make learning more meaningful Because child involved direct in activity learn. This is in line with Arief and Santosa's research (2020) stated that that method experiment capable increase ability exploratory child age early in a way significant.

Ability child in solve problem simple also experienced improvement through activity experiments conducted in a way in groups. When the results test No in accordance with prediction early, child pushed For look for alternative solution with try various method new. This process practice child For think flexible and not easy give up in face problems. In addition, the interaction in group make child Study finish problem in a way social with consider opinion friends. Experience This form pattern think more open and adaptive to various situation. Research Prasetyo, Santoso, and Rahman (2021) show that method experiment effective in increase children's problem solving skills age early. With Thus, the indicator ability solve problem simple can develop with Good through approach This.

Next, the method experiments also play a role important in grow creativity child in the learning process. Children are given chance For try various method in finish experiments, especially when method beginning No successful. This is push child For think outside the box habits and find different solutions from previously. Creativity appear from courage child For experiment and explore possibility new in a way independent and group. This process show that learning No only focus on the results, but also on the thought processes experienced children. Rahmawati and Hidayat (2019) stated that method experiment capable increase creativity child through activity repeated exploration. With Thus, the indicator attitude creative in finish problem can develop optimally.

experimental method also provides experience real to child in understand draft cause and effect in a way directly. When the child see changes that occur in experiment, they start connect between actions taken with results obtained. Experience concrete This help child in build greater understanding deep compared to with learning that is theoretically. Children become more easy recognize pattern connection between objects and events around them. The ability this is very important as base think scientific at the stage development next. This is supported by research by Sari and Nugroho (2020) which states that activity experiment can increase understanding cause and effect in children age early.

In addition, the ability child in classify object based on color, shape, and size also experience improvement through activity experiment. Children learn differentiate characteristics objects and group them in accordance with category certain. This process practice ability cognitive child in recognize similarities and differences between objects. Activities classification also helps child in increase focus and precision to visual details. With repetitive exercises, children become more skilled in organize object in a way systematic research Prasetyo and Santoso (2018) show that activity grouping object influential to improvement ability cognitive child age early.

Ability classify object in more amount Lots as well as sort object based on size also shows significant development. Children are trained For identify difference size and place it in correct order from the smallest until the biggest or on the contrary. Activity This No only practice logic thinking, but also the ability analysis and visual coordination of children. Children become more systematic in understand patterns and relationships between objects. In addition, activities this also increases the sense of trust self child in take decision. Sari, Utami, and Hidayat (2019) stated that activity sorting object effective in increase ability logic and understanding basic science concepts in children age early.

In a way overall, implementation method experiments at Ma'arif 28 Kindergarten, Gunung Adi, have proven successful. capable increase children's science skills in a way comprehensive. Children become more active, creative, capable observe, understand cause and effect, and classify and sort object with good. Research results this is also in line with findings of Sulastri and Kurniawati (2022), Rahayu and Lestari (2023), and Wulandari (2021) which confirm that method experiment give experience Study effective direct in children's science learning age early. In addition, Lestari and Pratiwi (2020) and Suryani and Hapsari (2023) also stated that method This capable increase desire knowledge and ability think critical children. With Thus, the method experiment can it is said as effective and relevant approach in develop children's science skills age early in a way holistic.

## **CONCLUSION**

Based on the research results, the application of the experimental method in Ma'arif 28 Kindergarten, Gunung Adi, has been proven to improve the overall science skills of children aged 5–6 years. Children become more active in carrying out exploratory activities, are able to solve simple problems, demonstrate creative attitudes, understand cause-and-effect relationships, and are skilled at classifying and sorting objects according to the established science ability indicators. This method stimulates children's curiosity, logical thinking skills, creativity, and learning independence through direct experience and

enjoyable practice. The success of this learning is supported by systematic activity design, a variety of media, and an interactive approach so that children are more motivated to learn. The research results emphasize the importance of implementing active and fun learning methods in early childhood education to build a strong and sustainable foundation of science competencies.

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