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The Effect of Demonstration Method on Problem Solving Ability of Early Childhood in Science Learning

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Abstract

This research is motivated by the case has not developed the ability of early childhood problem solving, one of which occurred in a group in a kindergarten in Bandung. This is shown when the teacher asks students to perform and imitate a simple experiment in science learning, the average student directly asks for help to the teacher and does not try to think to solve the problem he faces. Therefore, the researchers tested the demonstration method in science learning on the ability of early childhood problem solving.The purpose of this study to determine: 1) the ability of problem solving in science learning by using the demonstration method. 2) the ability of problem solving in science learning by using exploration methods. 3) differences in problem solving skills in science learning between using demonstration methods by using environmental exploration methods in early childhood. This study uses a quantitative approach with quasi-experimental method, with the subject of this study consists of two classes of experimental class amounted to 12 students and control class amounted to 12 students. Data collection techniques using observation sheets and documentation. Based on the results of data analysis showed that the average value (mean) of experimental class using the demonstration method is 25.75, while the average value (mean) of control class using environmental exploration method is 25.17. In other words, the average value of the experimental class is greater than the average value of the control class. So it can be concluded that Ha is accepted and Ho is rejected, which means Ha : (2)_a (2)_b: there is a difference in the ability of problem solving in science learning between those who use the demonstration method and those who use the method of environmental exploration in early childhood.

Keywords: demonstration method, learning science, problem solving

Abstrak

Penelitian ini dilatarbelakangi oleh kasus belum berkembangnya kemampuan problem solving anak usia dini yang salah satunya terjadi pada sebuah kelompok di suatu taman kanak-kanak di Kota Bandung. Hal ini ditunjukkan ketika guru meminta siswa untuk melakukan dan menirukan sebuah percobaan sederhana pada pembelajaran sains, rata-rata siswa langsung meminta bantuan kepada guru dan tidak berusaha berpikir untuk memecahkan masalah yang dihadapinya. Oleh sebab itu, peneliti menguji cobakan metode demonstrasi pada pembelajaran sains terhadap kemampuan problem solving anak usia dini.Tujuan penelitian ini untuk mengetahui: 1) Kemampuan problem solving pada pembelajaran sains dengan

menggunakan metode demonstrasi. 2) Kemampuan problem solving pada pembelajaran sains dengan menggunakan metode eksplorasi. 3) Perbedaan kemampuan problem solving pada pembelajaran sains antara yang menggunakan metode demonstrasi dengan menggunakan metode eksplorasi lingkungan pada anak usia dini. Penelitian ini menggunakan pendekatan kuantitatif dengan metode kuasi eksperimen, dengan subjek penelitian ini terdiri dari dua kelas yakni kelas eksperimen berjumlah 12 siswa dan kelas kontrol berjumlah 12 siswa. Teknik pengumpulan data menggunakan lembar observasi dan dokumentasi. Berdasarkan hasil analisis data menunjukkan bahwa nilai rata-rata (mean) kelas eksperimen dengan menggunakan metode demonstrasi yaitu 25,75, sedangkan nilai rata-rata (mean) kelas kontrol yang menggunakan metode eksplorasi lingkungan yaitu 25,17. Dengan kata lain, nilai rata-rata kelas eksperimen lebih besar dari pada nilai rata-rata kelas kontrol. Sehingga dapat disimpulkan bahwa Ha diterima dan Ho ditolak yang berarti $H_a : \mu_A \neq \mu_B$: Terdapat perbedaan kemampuan problem solving pada pembelajaran sains antara yang menggunakan metode demonstrasi dengan yang menggunakan metode eksplorasi lingkungan pada anak usia dini.

Kata Kunci: *metode demonstasi, pembelajaran sains, problem solving*

A. Introduction

Early childhood education is a basic education that occupies a very strategic position in the development of human resources. This is in terms of the needs of children at an early age who are very receptive to stimulation (stimulus) from the outside and easily accept various things they experience. As also confirmed by regulation of the minister of education and culture of indonesia Number 1 of 2014, "curriculum states that early childhood education is a level of education carried out before basic education with coaching efforts aimed at children from birth to the age of six".[1]

Every child has several aspects of development that must be stimulated early on. Some aspects that need to be developed include religious and moral values, physical motor, language, social emotional, cognitive, and art. Each of these aspects of development is interrelated with each other. One aspect of development in early childhood that needs to be considered is cognitive development.

One of the skills that are also related to aspects of children's cognitive development is the skill of solving problems independently. Problem solving skills in children is a key feature in the development of social competence.[2] With good problem-solving skills, a child will learn to use the power he has more optimally, both cognitive and motor, to achieve the goals he expects without having to rely on help from others. Thus, he/she will be more confident in his abilities and tend to have a better self esteem. Fettig et al stated that if children become skilled problem solvers, their level of

[1] "Undang-Undang Sistem Pendidikan Nasional," Pub. L. No. 20 (2003).
[2] Gail E. Joseph and Phillip S. Strain, "Teaching Young Children Interpersonal Problem-Solving Skills," *Young Exceptional Children* 13, no. 3 (2010): 28–40, https://doi.org/https://doi.org/10.1177/1096250610365144.

independence and self-esteem will increase, and their level of frustration decreases. A study has proven that learning to solve problems independently can help prevent and reduce challenging behavior in children.[3]

According to Joseph and Strain, there are at least three benefits of problem-solving skills. First, this skill can go well with children. They can be used in any social situation to solve various social problems. Secondly, this skill is an excellent tool for preventing challenging behavior. Third, problem-solving skills allow children to quickly fix disagreements in their relationships with friends.[4] According to Webster-Stratton and Reid, poor social skills are a strong predictor of a child's academic failure.[5]

Therefore, problem solving skills are very important to be stimulated from an early age. However, in fact, not a few children are still less well developed and optimal in problem solving skills. Based on observations of researchers conducted in an Islamic kindergarten in Bandung, West Java, showed that the ability to solve problems (problem solving) is still not well developed. Some children still have difficulty in developing their problem solving skills. When teachers ask children to do and imitate a simple experiment in science learning, there are still children who are not independent and try to think to solve the problems they face during learning activities. Such as, have not been able to be careful in observing, making predictions, and making a decision. These conditions indicate that problem solving skills in children have not developed in accordance with expectations.

There are many factors that cause the emergence of this condition, including the methods and media used when conducting teaching and learning activities. Teachers usually only do conventional learning by utilizing whiteboard media or notebooks and children's worksheets to train children's problem solving skills. Less varied learning activities and the use of media that do not support the learning process make learning less effective. Meanwhile, learning activities in early childhood should be done in a fun way. So the teacher is required and must be able to choose what method he will use. Therefore, researchers will use two learning methods to stimulate problem solving skills, namely the demonstration method and the method of exploration of the surrounding environment.

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[3] Angel Fettig, Tia R. Schultz, and Michaelene M. Ostrosky, "Storybooks and Beyond: Teaching Problem Solving Skills in Early Childhood Classrooms," *Young Exceptional Children* 19, no. 3 (2016): 18–31, https://doi.org/https://doi.org/10.1177/1096250615576803.

[4] Joseph and Strain, "Teaching Young Children Interpersonal Problem-Solving Skills."

[5] Carolyn Webster-Stratton and M Jamila Reid, "Strengthening Social and Emotional Competence in Young Children-The Foundation for Early School Readiness and Success: Incredible Years Classroom Social Skills and Problem-Solving Curriculum," *Infants and Young Children* 17, no. 2 (2004): 96–113, https://doi.org/10.1097/00001163-200404000-00002.

One way to develop child's problem solving skills is through science. Science learning can stimulate children's ability to solve problems in everyday life that they will face. This is corroborated by the results of a study by Haenilah et al in 2021 which have shown that there is a significant difference in scores between before and after the use of a scientifically based learning process approach and there is a significant effect of the approach on early childhood problem solving abilities.[6] Bahar and Aksut also found that science learning practices are effective for developing problemsolving skills in preschoolers.[7]

One of the activities that can be used as a medium and means of learning in developing problem solving skills in early childhood is demonstration. Previously, a research conducted by the method of classroom action research in kindergarten children related to the application of demonstration methods in the framework of measurement to improve the cognitive development of children aged 5-6 years. The results of the research showed the calculation of what percentage of the increase in the ability of children's cognitive development in the early conditions of cognitive development of the seven criteria observed amounted to 44%. Then in the first cycle the figure increased to 63%, and increased in the second cycle increased to 88%.[8] It can be an indication of the positive impact of demonstration methods for good cognitive development of children.

Therefore, this study was able to see how to reduce the demonstration method designed in the form of soap-powered shipbuilding experimental activities to early childhood problem-solving skills. With this experiment, children are required to pay attention to the steps of the experiment and then required to be able to practice it according to the instructions of the teacher/researcher. This research aims to reveal how examples of the application of children's Science Learning in early childhood, as well as examine the impact on changes in problem-solving skills of early childhood. Several trials were conducted with demonstration and exploration techniques to obtain answers to these.

B. Method

This study applies a quantitative approach, which is an approach that practices the measurement of quantitative data and objective statistics

[6] Een Yayah Haenilah, Hermi Yanzi, and Rizky Drupadi, "The Effect of the Scientific Approach-Based Learning on Problem Solving Skills in Early Childhood: Preliminary Study," *International Journal of Instruction* 14, no. 2 (2021): 289–304.
[7] Mehmet Bahar and Pelin Aksut, "Investigation on the Effects of Activity-Based Science Teaching Practices in the Acquisition of Problem Solving Skills for 5-6 Year Old Pre-School Children," *Journal of Turkish Science Education* 17, no. 1 (2020): 22–39, https://doi.org/10.36681/tused.2020.11.
[8] Putri Clawson and Ratna Yuwita, "Application of Demonstration Method in Measuring Activities to Increase Children Cognitive Development," *JURNAL TA'LIM: Jurnal Ilmu Pendidikan Dan Keguruan* 6, no. 2 (2018): 90–119.

through scientific calculations derived from a sample of people who are asked answers to a number of questions in a survey to determine the frequency and percentage of their responses. This research method is used to examine a particular population or sample, with sampling techniques performed randomly. Data collection using research instruments in the form of questionnaires. Data analysis is quantitative / statistical in order to test the hypothesis that has been set. The study was conducted by beginning with the pre-test and then followed by post-test observation.

This research has been conducted in an Islamic kindergarten located in Bandung, West Java, Indonesia. This study was conducted in the odd semester in August 2022. Data collection techniques used in this study is a structured observation and documentation of the development of problem solving skills of children when implemented demonstration methods in science learning.

The sample consisted of two groups. The first group numbered 12 children and the second group numbered 12 children so that the total number of students amounted to 24 children. After the randomization of roles aimed at determining the experimental group and control group. The first group was chosen to act as an experimental class. In this group the treatment given is the application of Science Learning with demonstration methods. While the second group acts as a control or comparison class, where there is no use of demonstration methods in it. However, researchers use environmental exploration methods.

Table 1
Research Sample

NO	Group	Amount
1	A	12
2	B	12
Amount		24

1. Data Collecting Techniques
   a. Observation

      The instruments used at this stage of the study is the observation sheet and rubric assessment. The observation sheet lists the behaviors observed when the child learns using the demonstration method. In the process of observation, The Observer simply puts a tick in the corresponding column of the score. From the observation results, the data will be analyzed and generalized the results. The problem solving observation sheet is arranged based on the instrument Grid presented in Table 2.

Table 2
Problem Solving Ability Instrument

Variable	Indicator	Sub-Indicator
Problem Solving Skill	1. Observation or observing skills	a. observing tools and demonstration materials b. observing demonstration activities
	2. Mengumpulkan data dan informasi	a. mention of tools during demonstrations b. mention of materials during demonstrations
	3. Processing information	a. mention the usefulness of the tools used during the demonstration b. mention the usefulness of the materials used during the demonstration
	4. Communicating information	a. expressing opinions on the usefulness of boats in everyday life b. expressing an opinion on "why does the soap power boat move?" c. expressing an opinion on "why did the soap energy boat fail to move?" d. expressing opinions on the use of dishwashing soap in demonstration activities

Table 3
Guidelines for observation of Problem Solving skills aged 5-6 years with a checklist

Name :					
Numb.	**Observed Item**	**Penilaian**			
		BB	**MB**	**BSH**	**BSB**

		(1)	(2)	(3)	(4)
1.	Students can observe the tools and materials used during the demonstration				
2.	Students can observe demonstration activities				
3.	Students can mention the tools used during the demonstration				
4.	students can mention the materials used during the demonstration				
5.	Students can mention the usefulness of the tools used during the demonstration				
6.	Students can mention the usefulness of the materials used during the demonstration				
7.	Express an opinion on the usefulness of the boat in everyday life				
8.	Express an opinion on "why soap power boat can move?"				
9.	Expressed an opinion on "why does the soap energy boat fail to move?"				
10.	Expressing opinions about the usefulness of dishwashing soap in demonstration activities				

Tabel 4
Scoring table Problem Solving skills of children

Criteria	**Score**
Belum Berkembang (BB)	1
Mulai Berkembang (MB)	2
Berkembang Sesuai Harapan (BSH)	3
Berkembang Sangat Baik (BSB)	4

Description:

BB: the child has not shown the early signs of behavior expressed in the indicator, with a score of one.

MB: The Child has begun to show early signs of behavior expressed in the indicator but not yet consistent, with a score of two.

BSH: the child has begun to show early signs of behavior expressed in the indicator and began to be consistent, with a score of three.

BSB: the child continues to show early signs of behavior expressed in the indicator and has been consistent, with a score of four.

b. Dokumentation

Documentation can also be referred to as Documentary Studies, which is a data collection technique by collecting and analyzing documents, both in the form of written documents, images and electronics.[9] In this study, there are several documents that serve as a source of research data, namely documentation of photographs during the activity.

2. Data Analysis

a. Validity Test

Validity is a measure that reflects the degree of validity or validity of an instrument. A valid or valid instrument has a high validity. Conversely, a less valid instrument means that it has a low validity.[10] In this study the validation process is done by using the product moment correlation formula rough numbers, as follows:

$$r = \frac{.N\Sigma xy - \sum x \sum y}{\sqrt{\{N\sum x^2 - (\sum x)^2\}\{N\sum y^2 - (\sum y)^2\}}}$$

b. Realibility

To determine the determination of the test results performed reliability tests. Trust is about trust issues. An instrument is said to have a high level of confidence if its test results can provide a fixed test result.[11] To determine the reliability in this study used the Formula Cronbach Alpha as follows:

$r_{11}=(\frac{k}{k-1})(1-\frac{\sum Si^2}{St^2})$

c. Partial analysis of items per indicator

This analysis is intended to test and calculate the average value of variables X and Y separately, the steps are as follows:

For the variable X with the formula: $\bar{x} = \frac{\sum FX}{N}$

For the variable Y with the formula: $\bar{x} = \frac{\sum FX}{N}$

[9] Nana Syaodih Sukmadinata, *Metode Penelitian Pendidikan* (Bandung: Remaja Rosdakarya, 2017).

[10] Suharsimi Arikunto, *Prosedur Penelitian : Suatu Pendekatan Praktik* (Jakarta: Rineka Cipta, 2011).

[11] Arikunto.

After knowing the average value, then interpreted into a table interpretation.

Tabel 5

Criteria For Assessing Children's Problem Solving Skills

Score	**Criteria**
83-100	Berkembang Sangat Baik (BSB)
63-82	Berkembang Sesuai Harapan (BSH)
44-62	Mulai Berkembang (MB)
<43	Belum Berkembang (BB)

(Khaerudin, 2012)

Furthermore, to measure or test the difference in problem solving skills in science learning between the control class and the experimental class is done by comparing the average posttest results of experimental class and control class using an independent sample t-test . The hypothesis is:

a. H_o : there is no difference in the average problem solving ability between the control class and the experimental class.
b. H_a : there is a difference in the average problem solving ability between the control class and the experimental class.

The basis for decision-making in the test independent sample t-test is as followst:

a. If the Sig value. (2-tailed) > 0.05 then Ho is accepted and Ha is rejected, which means there is no difference in the average problem solving ability between the control class with the experimental class.
b. If the Sig value. (2-tailed) < 0.05 then Ho is rejected and Ha is accepted, which means there is a difference in the average problem solving ability between the control class and the experimental class.

d. Analyze Pretest and Posttest results

To determine the ability of problem solving in children aged 5-6 years who use the demonstration method is better than children aged 5-6 years who use the method of environmental exploration, then used quantitative data obtained from the results of pretest and posttest through observation of problem solving skills in the experimental class and control class through statistical analysis as follows:

e. Normality Test

Normality test is a test conducted with the aim to assess the distribution of data on a group of data or variables, whether the distribution of data is normal distribution or not. Here the researchers used the Shapiro Wilk test to test the normality of the data. The basis

for decision making in this normality test if sig > 0.05 then the data is normally distributed, otherwise if sig < 0.05 then the data is not normally distributed.

f. Homogeneity Test

Homogeneity test is done to test whether the data distribution is homogeneous or not, by comparing the two variants. Homogeneity test can be obtained by using manually with the following formula:

$$F_{\text{hitung}} = \frac{\text{biggest variant}}{smallest\ variant}$$

Data homogeneity test steps are as follows:

1) comparing the largest variance and the smallest variance
2) Comparing Fhitung and Ftable with the formula:
   DB numerator = n-1 (for greatest variance)
   db denominator = n-1 (for smallest variance)
3) Create Test criteria (conclude)

If $F_{\text{hitung}} \geq F_{\text{tabel}}$, then the data is not homogeneous and if $F_{\text{hitung}} \leq F_{\text{tabel}}$, then the data is homogeneous.

g. hypothesis test

There are 3 alternatives in hypothesis testing, among others:

1) If the experimental group data and control group data are normal and homogeneous, then the t-test is used with the following formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{dsg\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} \text{ with } dsg = \sqrt{\frac{(n_1-1)v_1+(n_1-1)v_2}{n_1+n_2-2}}$$

Description:

$\bar{X}_1$ = The largest average value, and $\bar{X}_2$ = Smallest average value

n_1 = Largest variance sample size, dan n_2 = Smallest variance sample size

With the following conditions:

If $t_{hitung} < t_{tabel}$, then H_o is rejected.

If $t_{hitung} \geq t_{tabel}$, then H_o is accepted.

(Nurgana, 1985)

2) If the experimental group variance data and Group data arenormal control but one or both are not homogeneous, then used t ' test with the following resolution steps:

Find the value of t' using the formula, as follows:

$$t' = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{v_1}{n_1}+\frac{v_2}{n_2}}}$$

Description:

X _1 = largest average value, and X _2 = smallest average value

v_1 = largest variance, and v_2 = smallest variance
n_1 =large variance sample size, and n_2 = small variance sample size

Calculating the critical value of t' and hypothesis testing with the formula, as follows:

$$nK_{t\prime} = \pm \frac{W_1 t_1 + W_2 t_2}{W_1 t_2}$$

Description:
nK_t ' = largest average value
$t_1 = t\left(1 - \frac{1}{2}\alpha\right)(n_1 - 1)$ dan $t_2 = t\left(1 - \frac{1}{2}\alpha\right)(n_2 - 1)$
$W_1 = \frac{s_1^2}{n_1}$ dan $W_2 = \frac{s_2^2}{n_2}$
With the following conditions:
If t^ 'exists outside the critical value interval t' or is equal to the critical value t', then Ho is accepted and Ha is rejected. (Nurgana, 1985)

3) If the experimental group data and control group data is one or both abnormal, then the calculation is used with non-parametric statistics. In this case, the Mann-Whitney test is used using the following formula:

$$\mathrm{U}_x = (n_x)(n_x) + \frac{n_x(n_x + 1)}{2} - \Sigma \mathrm{R}_x$$

C. Result and Discussion

Problem solving skills in the experimental class and control class ages 4-5 years intend to see the influence of demonstration methods and environmental exploration methods on science learning. The indicators of problem solving skills in early childhood include: 1) observation or observing skills, 2) collecting data and Information, 3) processing information, and 4) communicating information.[12]

1. Description of Problem Solving skills in experimental classes through demonstration methods in Science Learning.

   Problem solving ability of experimental class using the demonstration method, obtained an average value of 72.5 at the time of pretest. The value is in the range of 63-82, with the interpretation developing as expected (BSH). As for the ability of problem solving at the time of posttest obtained an average value of 77.81 with BSH interpretation. That is, the ability of problem solving in children aged 5-6 years in the experimental class that uses demonstration methods in science learning is at a level developed as expected. This is also supported by the purpose of the demonstration method, which is where the demonstration method

[12] Putri Nadila, "The Importance of Practicing Problem Solving in Early Childhood through Play," *Pedagogi: Jurnal Ilmu Pendidikan* 21, no. 1 (2021): 51–55, https://doi.org/https://doi.org/10.24036/pedagogi.v21i1.965.

is an imitation of the model that can be done and provide a more real learning experience by using all five senses, so as to improve the ability of students in the learning process by providing a more real learning experience.

2. Description of Problem Solving Ability in control class through environmental exploration method in science learning.

   The ability of problem solving control class using environmental exploration methods, obtained an average value of 63.75 at the time of pretest. The value is in the range of 62-83, with the interpretation of BSH. As for the ability of problem solving at the time of posttest obtained an average value of 76.19 with BSH interpretation. That is, the ability of problem solving in children aged 5-6 years in the control class that uses environmental exploration methods in science learning is at a level developed as expected.

   Where this is in line with the objectives of the environmental exploration method, the environmental exploration method not only focuses on transferring knowledge, knowledge, understanding, and interpretation, but must also be balanced with improving the quality of teaching. Through science activities, children are invited to explore, find and utilize objects that are close to them, so that learning becomes more meaningful.

3. Effect of demonstration method on Problem Solving ability in Science Learning

   Description of the comparison of problem solving skills in children aged 5-6 years between the use of demonstration methods and the use of environmental exploration in Science learning aims to prove the hypothesis of research that is:

   H_o : $\mu_A = \mu_B$: There is no difference in the ability of problem solving in science learning between early childhood using the demonstration method with the use of environmental exploration methods.

   H_a : $\mu_A \neq \mu_B$: There is a difference in the ability of problem solving in science learning between early children who use the demonstration method with the use of environmental exploration methods.

   Keterangan:

   μ_A = average problem solving skills in science learning among early childhood using the demonstration method in Group B.

   μ_B = average problem solving skills in science learning among early childhood using environmental exploration methods.

Table 6
Comparison of posttest average value of experimental class and control class

		Posttest Eksperimen	Posttest Kontrol
N	Valid	12	12
	Missing	0	0
Mean		25.75	25.17
Std. Error of Mean		.719	.824
Median		25.00	26.00
Mode		24	26[a]
Std. Deviation		2.491	2.855

Based on the table, it is known that the average value (mean) of experimental class using demonstration method is 25,75, while the average value (mean) of control class using environmental exploration method is 25,17. In other words, the average value of the experimental class is greater than the average value of the control class . So it can be concluded that Ha is accepted and Ho is rejected which means there is a difference in the average ability of problem solving between the control class with the experimental class. This is also evidenced from the calculation of the independent sample test (table 4.22) which obtained the value of GIS. (2-tailed) of 0.001 which means that there is a significant difference between the ability of problem solving in the experimental class that uses the demonstration method and the control class that uses the method of environmental exploration.

This is supported by the advantages of the use of demonstration methods, namely:

1) help students know and understand well the course of a process or work system,

2) facilitate in providing various types of explanations about the concept of Science (Natural Science) and science ,

3) deficiencies that occur in the lecture method can be corrected through observation and concrete examples by presenting more real objects.[13]

Based on the overall results of this study can be concluded that there is a difference in the average problem-solving ability between the control class and the experimental class. That is, the use of demonstration methods in early childhood science learning has an impact on children's ability to solve

[13] Selmi Oktaria, "Penerapan Metode Demonstrasi Pada Pengembangan Sains Anak Usia Dini Di Tk Kasih Ibu Kecamatan Pajar Bulan Kabupaten Lahat" (IAIN Bengkulu, 2019).

problems. This is in line with research conducted by K. Anggun Cahyani, I N Jampel, and P. Rahayu Ujianti showed that there is an increase in cognitive development after the demonstration method is applied in the introduction of science.[14] The other research conducted by Pestamin M. Pandiangan in 2019 concluded that the addition of innovation in the implementation of learning activities with demonstration methods can improve the problem-solving ability of early childhood.[15]

It is also corroborated by research conducted by Selmi Okaria in 2019 concluded that using the demonstration method on the development of children's science after being treated with an experimental group using water media, dyes, funnels, bottles and a group of children making rainbows and mixing colors that can be known that changes in early childhood learning outcomes 5-6 years between pretest.[16]

The results of this study are surreptitiously in line with a statistical analysis that has revealed that the inquiry-based science and engineering treatment group (N = 62) has experienced greater gains over time in physical science knowledge, problem-solving skills, and motivational competence compared to the control group (N = 60), with intergroup effect sizes (Cohen's d) ranging from 0.27 to 1.28.[17]

The limitation of this study is when the paper boat trials are carried out repeatedly, because the material used is quickly wet. So, children pay less attention and understand when the movement of the boat caused by soap.

D. Conclusion

Based on the results of research on the ability of problem solving using demonstration methods and environmental exploration methods obtained the following conclusions, the ability of problem solving experimental class using demonstration methods, obtained an average value of 72.5 at the time of pretest. The value is in the range of 63-82, with the interpretation of BSH. As for the ability of problem solving at the time of posttest obtained an average value of 77.81 with BSH interpretation. That is, the ability of problem solving in children aged 5-6 years in the experimental class that uses demonstration methods in science learning is at a level developed as

[14] Ketut Anggun Cahyani, I Nyoman Jampel, and Putu Rahayu Ujianti, "Penerapan Metode Demonstrasi Untuk Meningkatkan Perkembangan Kognitif Anak Dalam Pengenalan Sains," *Urnal Pendidikan Anak Usia Dini Undiksha* 3, no. 1 (2015), https://doi.org/https://doi.org/10.23887/paud.v3i1.5762.

[15] Pestamin M. Pandiangan, "Peningkatan Kemampuan Pemecahan Masalah Melalui Metode Demonstrasi Pada Anak Kelompok B TK PKK Bandulan Malang" (Universitas Negeri Malang, 2019).

[16] Oktaria, "Penerapan Metode Demonstrasi Pada Pengembangan Sains Anak Usia Dini Di Tk Kasih Ibu Kecamatan Pajar Bulan Kabupaten Lahat."

[17] Xunyi Lin et al., "Using an Inquiry-Based Science and Engineering Program to Promote Science Knowledge, Problem-Solving Skills and Approaches to Learning in Preschool Children," *Early Education and Development* 32, no. 5 (2021): 695–713, https://doi.org/https://doi.org/10.1080/10409289.2020.1795333.

expected. Then on the ability of problem solving control class using environmental exploration methods, obtained an average value of 63.75 at the time of pretest. The value is in the range of 63-82, with the interpretation of BSH. As for the ability of problem solving at the time of posttest obtained an average value of 76.19 with BSH interpretation. That is, the ability of problem solving in children aged 5-6 years in the control class that uses environmental exploration methods in science learning is at a level developed as expected. Where this is in line with the objectives of the environmental exploration method, the environmental exploration method not only focuses on transferring knowledge, knowledge, understanding, and interpretation, but must also be balanced with improving the quality of teaching. Through science activities, children are invited to explore,find and utilize objects that are close to them, so that learning becomes more meaningful. While the difference in problem solving skills in science learning can be seen from the results of the average value (mean) experimental class using the demonstration method is 25.75, while the average value (mean) control class using environmental exploration method is 25.17. In other words, the average value of the experimental class is greater than the average value of the control class . So it can be concluded that Ha is accepted and Ho is rejected which means Ha : (2)_a (2)_b:there is a difference in the ability of problem solving in science learning between early childhood using the demonstration method with the use of environmental exploration methods.

References

Arikunto, Suharsimi. *Prosedur Penelitian : Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta, 2011.

Bahar, Mehmet, and Pelin Aksut. "Investigation on the Effects of Activity-Based Science Teaching Practices in the Acquisition of Problem Solving Skills for 5-6 Year Old Pre-School Children." *Journal of Turkish Science Education* 17, no. 1 (2020): 22–39. https://doi.org/10.36681/tused.2020.11.

Cahyani, Ketut Anggun, I Nyoman Jampel, and Putu Rahayu Ujianti. "Penerapan Metode Demonstrasi Untuk Meningkatkan Perkembangan Kognitif Anak Dalam Pengenalan Sains." *Urnal Pendidikan Anak Usia Dini Undiksha* 3, no. 1 (2015). https://doi.org/https://doi.org/10.23887/paud.v3i1.5762.

Clawson, Putri, and Ratna Yuwita. "Application of Demonstration Method in Measuring Activities to Increase Children Cognitive Development." *JURNAL TA'LIM: Jurnal Ilmu Pendidikan Dan Keguruan* 6, no. 2 (2018): 90–119.

Fettig, Angel, Tia R. Schultz, and Michaelene M. Ostrosky. "Storybooks and Beyond: Teaching Problem Solving Skills in Early Childhood Classrooms." *Young Exceptional Children* 19, no. 3 (2016): 18–31. https://doi.org/https://doi.org/10.1177/1096250615576803.

Haenilah, Een Yayah, Hermi Yanzi, and Rizky Drupadi. "The Effect of the Scientific Approach-Based Learning on Problem Solving Skills in Early Childhood: Preliminary Study." *International Journal of Instruction* 14, no. 2 (2021): 289–304.

Joseph, Gail E., and Phillip S. Strain. "Teaching Young Children Interpersonal Problem-Solving Skills." *Young Exceptional Children* 13, no. 3 (2010): 28–40. https://doi.org/https://doi.org/10.1177/1096250610365144.

Lin, Xunyi, Weipeng Yang, Lizhen Wu, Lifen Zhu, Duanping Wu, and Hui Li. "Using an Inquiry-Based Science and Engineering Program to Promote Science Knowledge, Problem-Solving Skills and Approaches to Learning in Preschool Children." *Early Education and Development* 32, no. 5 (2021): 695–713. https://doi.org/https://doi.org/10.1080/10409289.2020.1795333.

Nadila, Putri. "The Importance of Practicing Problem Solving in Early Childhood through Play." *Pedagogi: Jurnal Ilmu Pendidikan* 21, no. 1 (2021): 51–55. https://doi.org/https://doi.org/10.24036/pedagogi.v21i1.965.

Oktaria, Selmi. "Penerapan Metode Demonstrasi Pada Pengembangan Sains Anak Usia Dini Di Tk Kasih Ibu Kecamatan Pajar Bulan Kabupaten Lahat." IAIN Bengkulu, 2019.

Pandiangan, Pestamin M. "Peningkatan Kemampuan Pemecahan Masalah Melalui Metode Demonstrasi Pada Anak Kelompok B TK PKK Bandulan Malang." Universitas Negeri Malang, 2019.

Sukmadinata, Nana Syaodih. *Metode Penelitian Pendidikan*. Bandung: Remaja Rosdakarya, 2017.

Undang-Undang Sistem Pendidikan Nasional, Pub. L. No. 20 (2003).

Webster-Stratton, Carolyn, and M Jamila Reid. "Strengthening Social and Emotional Competence in Young Children-The Foundation for Early School Readiness and Success: Incredible Years Classroom Social Skills and Problem-Solving Curriculum." *Infants and Young Children* 17, no. 2 (2004): 96–113. https://doi.org/10.1097/00001163-200404000-00002.