ThufuLA: Jurnal Inovasi Pendidikan Guru Raudhatul Athfal
Volume 12 issue 2, 2024
http://dx.doi.org/10.21043/thufula.v12i2.28505
https://journal.iainkudus.ac.id/index.php/thufula
p-ISSN 2355-0163 | e-ISSN 2502-3845

THE EFFECT OF MAGNETIC MAZE MEDIA ON PROBLEM-SOLVING AND FINE MOTOR SKILLS IN 5-6 YEAR OLD CHILDREN AT TK ISLAM AL-ABRAR MAKASSAR

Sri Dewi Arianti[1] ✉, Muhammad Akil Musi[2], Syamsuardi[3], Angri Lismayani[4]

[1]Universitas Negeri Makassar, A.P Pettarani, Tidung, Rappocini, Kota Makassar, Indonesia
[2]Universitas Negeri Makassar, A.P Pettarani, Tidung, Rappocini, Kota Makassar, Indonesia
[3]Universitas Negeri Makassar, A.P Pettarani, Tidung, Rappocini, Kota Makassar, Indonesia
[4]Universitas Negeri Makassar, A.P Pettarani, Tidung, Rappocini, Kota Makassar, Indonesia
✉*Correspondence: srid71635@gmail.com*

Abstract: *Problem-solving and fine motor skills are critical for young children, as they mutually reinforce each other's development. Incorporating engaging and educational media tools in early childhood learning is essential to ensure effective and enjoyable activities. This study investigates the impact of magnetic maze media on the problem-solving and fine motor skills of children aged 5–6 years at Al-Abrar Islamic Kindergarten. The research employed a quasi-experimental design with a non-equivalent group approach. It used a purposive sampling technique to select 21 children from a population of 42 children as the experimental group. Data were analyzed using descriptive statistics and parametric tests, including normality and hypothesis testing. The findings indicate that magnetic maze media significantly enhances problem-solving and fine motor skills in children aged 5–6. This conclusion is supported by a paired-sample t-test, which revealed significant differences between children who engaged with the magnetic maze and those who did not. This study highlights the effectiveness of magnetic maze*

media as a learning tool for improving cognitive skills, particularly problem-solving and fine motor skills, in young children.

Keywords: *Magnet Maze Media, Problem-Solving Ability, Fine Motor Skills*

A. Introduction

Early Childhood Education (ECE) is an academic approach to educating children from birth to six years of age. According to the National Association for the Education of Young Children (NAEYC), ECE starts at birth and lasts until the child is eight. Infants and toddlers develop more rapidly during this period than in other periods.

Schools have an important role in laying the foundation for developing children's potential, especially in helping them achieve their mental, emotional, and physical goals. (Syamsuardi & Hajerah, 2018). Preschool education is important because it forms a person's intellectual potential and behavioral foundation early. Childhood is often called 'the golden age.' (Permendikbudristek No 5 Article 4 Point 3 Year, 2022) stipulates that the criteria for achieving early childhood development levels focus on aspects of child development, including religious and cultural values, Pancasila values, physical, mental, linguistic, and socio-psychological. The six aspects of development are unity and cannot be separated and interconnected. If there is a problem in one aspect of the child's development, it will impact other aspects of development. (Najamuddin et al., 2022).

Sujiono expressed his opinion regarding cognitive development, which means changes in thinking, understanding, and language patterns that allow children to reason, remember, develop creative strategies, think of ways to solve problems and connect sentences to make meaningful statements. (Retnaningrum, 2016).

Solving problems is an important skill for children. Critical thinking skills, problem-solving, and the ability to find cause-and-effect relationships are the goals of early childhood education. (Alucyana & Raihana, 2023).

The aspect of growth and development that needs to be developed is the development of fine motor skills. (Rahim

et al., 2022)Fine motor development is the development of children's movements using small muscles or body parts, and it is influenced by children's learning and practice opportunities. (Pura & Asnawati, 2019). Fine motor skills involve specific body parts using small muscles, fingers, and hands. These movements require careful eye and hand coordination. According to the Ministry of Health of the Republic of Indonesia (2014), fine motor skills are aspects related to the child's ability to perform movements that involve several parts of the body and are carried out by small muscles but require careful eye and hand coordination, such as observing something, pinching, writing, and so on. (Arpandjaman et al., 2023).

The goals of fine motor development are being able to operate small muscles, such as moving fingers, and being able to coordinate the speed of the eyes and hands; other benefits of developing fine motor skills are supporting other aspects of development, such as cognitive, language, and social skills. Because each aspect of development is not different from each other (Nurjani et al., 2019).

Learning media is a tool that can stimulate certain aspects of children's development so that they learn new things. Educational media is used to improve the quality of the teaching and learning process in schools. (Dewi, 2017).

The learning theory behind this study is constructivist. John Dewey developed the concept of problem-solving learning, which trains children's imagination. This concept can also prevent children from jumping to conclusions, considering possible solutions, and delaying decisions until evidence is available. (Lestari, 2020).

Activities that can develop children's cognitive skills through problem-solving strategies and stimulate children's sensory motor skills, especially in fine motor skills, include maze games, role-playing games, block games, dice-building games, and puzzle games. The provision of stimulation greatly influences child development because stimulation is important in child development (Virianingsih et al., 2021). In this study, researchers focused on using maze games to improve problem solving and fine motor skills. According to Woolflok's theory, mazes are closely related to children's cognitive abilities through clues to

solve simple problems. (Anggraini et al., 2020).

Al-Abrar Islamic Kindergarten Makassar City Observations identified problem-solving problems in children aged 5-6. It was found that some children had difficulty understanding problems and tended to be confused and dependent on teacher guidance. Some children had difficulty finding alternative solutions, tended to repeat ineffective strategies, and were reluctant to try new methods. In group activities, some children were less able to communicate and share roles, which hindered the completion of tasks. The problems in children's fine motor skills development include some children having difficulty coordinating hand movements with what they see, such as coloring in lines or stringing beads. Some children get tired quickly or lose interest when doing activities that require acceptable muscle strength, such as cutting and writing. It is also seen that some children still show imprecision in fine motor tasks, such as not being able to cut according to the pattern in the picture or not being able to draw shapes precisely.

The problems identified in this observation show variations in problem solving and fine motor skills development in children aged 5-6 years at Al-Abrar Islamic Kindergarten Makassar City. This emphasizes the importance of interventions tailored to each child's needs through more intensive assistance and the introduction of activities that can stimulate the development of both abilities. Research on the problem of problem-solving skills in several kindergartens in Makassar City shows that children in Frater Bakti Luhur Kindergarten Makassar have a slow level of intellectual development (Musyahidah et al., 2019). In Al-Ghaniyyu Kindergarten, Gowa Regency, most children still need guidance from educators in doing tasks and activities such as classifying objects based on shape, color, and size and explaining the learning process (Fadilla, 2022). Finally, in the kindergarten of Tunas Inti Paud Centre Baturappe, Biringbulu District, Gowa Regency, it can be seen that some children are still lacking in their ability to solve problems; it can be seen in the teaching and learning process in the classroom that most children still need help in solving problems while playing (Lidia, 2023).

Research on the problem of fine motor skills in kindergartens in Makassar City is also in the spotlight. It can be seen in several

kindergartens that some children in Kartini Bukit Baruga Kindergarten have not developed their fine motor skills optimally, especially in activities that require coordination between eyes and hands, such as cutting, coloring picture patterns, holding pencils correctly, inserting laces or threads, wearing shoelaces, buttoning shirts, and so on. (Rahim et al., 2022)Some children at Nurul Fadhilah Kindergarten, Gowa Regency, have not been able to write some letters perfectly because the fine motor movements on the child's wrist are still stiff, so the child's ability to follow the curve of the line of each letter is still relatively low. (Febriyanty et al., 2023).

Teachers face several challenges, particularly in supporting children's cognitive, social, and motor development. One significant obstacle is the limited understanding among some teachers regarding the ideal developmental milestones for children in these areas. Additionally, teachers must consider the adequacy of school facilities and infrastructure to support children's cognitive growth and fine motor skills development (Khoiruzzadi et al., 2020). Insufficient physical activities and lack of appropriate stimulation for children further hinder their developmental progress (Amelia et al., 2021). Moreover, teachers often encounter limitations in learning resources, such as a shortage of educational game tools essential for fostering effective learning (Anjani et al., 2023). By paying attention to these obstacles, teachers can minimize obstacles in developing children's cognitive abilities in solving simple problems and motor skills, such as providing adequate facilities, involving parents, and creating a conducive learning atmosphere.

Looking at these characteristics or symptoms, researchers can see that the problem-solving and fine motor skills of kindergarten children in Makassar are low. Therefore, one thing that can be done to improve children's problem-solving and fine motor skills is to use magnetic maze game media. Games that use magnetic fields can develop aspects of cognitive development and possibly other developmental aspects, such as children's motor skills, social feelings, and creative development. *Magnetic maze* games can improve problem-solving skills, train children's attention and concentration, and improve eye and hand coordination. *Magnetic maze* can improve all aspects and skills of children

because this game can be modified according to the objectives to be achieved.

The explanation above is supported by research indicating that APE Maze activities help children develop problem-solving skills and enhance cognitive abilities, such as recognizing numbers, pronouncing numerical symbols, and identifying letters (Sianipar et al., 2022). Similarly, research by Soleha et al. (2018) demonstrated that using APE Maze can significantly improve children's fine motor skills. Additionally, a study by Kuswanto and Suyadi (2020) found that maze games are an effective learning method for enhancing children's intelligence. Through these games, children can solve fundamental object recognition problems using symbols. Based on the aforementioned studies, this research explores the effectiveness and importance of using magnetic mazes to improve cognitive skills, particularly problem-solving abilities and fine motor skills, in children aged 5 to 6 years.

B. Method

This study uses a quantitative approach; the main objective is to adjust the significance between the population's independent and dependent variables or outcomes. (Mehrad & Zangeneh, 2019). The design of this study is descriptive or experimental; the type of design used is quasi-experimental. The population in this study was 42 children aged 5-6 years, and the sample was used using a purposive sampling technique. The research sample consisted of 21 children. The design used in this study is Non-equivalent Control Group Design. In this design, there are two subjects where one gets treatment, and one group is a control group. Both obtained pre-test and post-test. Data collection techniques in this study consisted of tests, observation, and documentation. Data analysis techniques in this study include prerequisite tests and paired sample t-tests. The research instruments will be attached to the following Table 1 and Table 2.

Table 1. Research Instrument Problem-Solving Ability

Variable	Aspect	Indicator
Problem-Solving Skills	Observation ability	1. Children can recognize the problem to be solved 2. Children can recognize the goal of solving the problem
	Ability to understand problems	1. Children can explain the purpose of the problem to be solved 2. Children can describe the obstacles or barriers that must be avoided in the game
	Information processing ability	1. Children can identify patterns or rules in the information provided 2. Children can group or classify information based on similarities or specific criteria
	Ability to find solutions	1. Children can come up with various creative ideas or strategies to overcome the problems they face 2. Children can take measured risks in trying new solutions to solving problems

Table 2. Research Instruments Fine Motor Skills

Variable	Aspect	Indicator
Fine Motor Skills	Eye and hand coordination skills	1. Children can follow the movement of objects by focusing their gaze 2. Children can move objects in the desired direction
	Ability to control hand movements	1. Children can demonstrate better control in fine hand movements 2. Children can perform precise hand movements while playing
	Wrist flexibility ability	1. Children can respond quickly to changes 2. Children can hold and control small objects using their fingers and thumbs

Then, the data was analyzed using parametric statistics, namely the normality test, homogeneity test, and hypothesis test, using the paired sample t-test. The normality test is used to determine whether the data is normally distributed or not; the homogeneity test is used to determine whether the research data is homogeneous or not, and then the hypothesis test is carried out using the paired sample t-test with the basis for decision making as follows:

1) If *count> table with a significance level < 0.05, then H0 is rejected,* and H_a is accepted, meaning that the magnetic maze game media significantly affects children's problem-solving and fine motor skills.
2) If $t_{count} < t_{table}$ with a significance level > 0.05, then H_a is rejected, and H_0 is accepted, meaning that the magnetic maze game media does not affect children's problem-solving and fine motor skills.

C. Results and Discussion

Research Results

In full, the discussion below examines the results obtained with the supporting theory used and the following description of the data:

Table 3. Frequency Distribution of Problem-Problem-solving ability of Experimental Group and Control Group (Pre-Test*)*

Interval	Category	Experiment		Control	
		Frequency	Percentage	Frequency	Percentage
8-15	Less	8	38,2%	2	9,6%
16-20	Fair	9	42,9%	15	71,5%
21-25	Good	4	19,1%	4	19,2%
26-32	Very Good	-	-	-	-
Total		21	100%	21	100%

Based on the information in Table 1 above, it can be seen that in the initial test given to the experimental group to determine children's problem-solving abilities, there were still 10 out of 21 children who were in the category of less or Not Developing (BB) this condition is caused by a lack of ability to observe, understand problems, process information, find solutions, or think creatively. However, 2 out of 21 children in the control group fell into the underdeveloped (BB) category for similar reasons. In addition, in the experimental group, 9 out of 21 children entered the developmental category (MB) because they showed their ability in these areas, such as the ability to observe and be active in processing information. They always wanted help from researchers. On the other hand, within the control group, 15 out of 21 children within the adequate category or Beginning to Create (MB) showed advancement in their capacity to watch, get an issue, prepare data, and discover arrangements. It is known at this stage that 4 out of 21 children within the test group are classified within the Great or Creating as Anticipated (BSH) category because children have been able to advance in a few development viewpoints. Within the control group, 4 out of 21 children were included in the excellent Creating As Anticipated (BSH) category for comparative reasons. However, it is known that at this organization, none of the children within the test group or control bunch can be classified as being

within the exceptionally great category or Creating Exceptionally Well (BSB). So, it can be concluded that the most noteworthy esteem within the pre-test comes about of the test gather was within the category of less or Not Creating (BB) with a rate of 38.2% and the control gather with a rate of 9.6%, at that point within the category of sufficient or Beginning to Create (MB) the test gather with a percentage of 42.9% and the control bunch 71.5%, and in the category of tremendous or Creating As Anticipated (BSH) the exploratory gather with a rate of 19.1% and the control bunch 19.2%.

Table 4. Frequency Distribution of Problem-Solving Ability of Experimental Group and Control Group (Post-Test)

Interval	Category	Experiment		Control	
		Frequency	Percentage	Frekuensi	Presentase
8-15	Less	-	-	-	-
16-20	Fair	1	4,8%	18	85,6%
21-25	Good	7	33,4%	3	14,3%
26-32	Very Good	13	61,9%	-	-
Total		21	100%	21	100%

Based on information from Table 2 above, in the ultimate test (post-test), no children fell into the category of less or Not Creating (BB) in both the exploratory and control bunches. Moreover, within the test bunch, some children fell into the category of adequate or Begun Creating (MB) as numerous as 1 out of 21 children. While in the control group, 18 out of 21 children were included in the sufficient or equivalent to Starting to Develop (MB), this shows that their ability to observe, understand problems, process information, and find solutions has developed. Furthermore, 7 out of 21 children in the test gathered dropped into the outstanding category of Developing as Expected (BSH). On the other hand, 3 out of 21 children in the control group were in the good category or Developing as Expected (BSH). This indicates that these children have been able to independently, without the help of a teacher, observe an object, understand a problem, process information provided both in oral and written form, and their ability to find solutions. Furthermore, there are 13 out of 21 children in the experimental group classified in the very good or Very Well Developed (BSB) category; this indicates that these children have been able to independently without the help

of the teacher and have even been able to analyze a problem, able to process the information provided, help their friends. While in the control group, no children were in the very good or Very Well Developed (BSB) category. From the recurrence table of post-test evaluation comes about within the test gather with a percentage of 4.8% within the adequate category and the control gather as much as 85.6%, whereas within the outstanding category with a rate of 33.4% within the exploratory bunch and 14.3% within the control gather. Within the exceptionally great category, with a rate of 61.9% within the exploratory gather, whereas within the control bunch, there were no children within the exceptionally great category.

The frequency distribution table of fine motor skills of children aged 5-6 years before and after treatment:

Table 5. Frequency Distribution of Fine Motor Skills of the Experimental Group and Control Group (Pre-Test)

Interval	Category	Experiment		Control	
		Frequency	Percentage	Frekuensi	Presentase
6-10	Less	10	47,6%	-	-
11-15	Fair	9	42,8%	13	61,9%
16-20	Good	2	9,6%	8	38,1%
21-24	Very Good	-	-	-	-
Total		21	100%	21	100%

Based on the information in Table 3 above, it can be seen that in the initial test given to the experimental group to determine the fine motor skills of children, there are still around 10 children who are in the category of less or Not Developing (BB) This condition is caused by poor hand-eye coordination skills, control of hand movements, and hand flexibility. In addition, 9 out of 21 children in the experimental group showed improvement in eye-hand coordination, hand control, and hand control and was designated as sufficient or beginning development (MB). The children can bend their arms, although they still need help from researchers. On the other hand, in the control group, 13 out of 21 children in appropriate or early developmental stage (DB) showed the development of hand-eye coordination, hand movement control, and hand flexibility. In this section, 2 of the 21 children in the test group were classified in the BSH category (Good or Expected

Development) because children can progress in many areas. For similar reasons, the control group consisted of 8 of 21 children in the category of well or developing as expected (BSH). However, it is now known that none of the children in the experimental or control groups fell into the very good or excellent (BSB) categories. Therefore, the highest value of previous test results of the test group in the BB category (less developed or not developed) with a rate of 47.6%, followed by sufficient, beginning, or development (MB) and 42.8% in the experimental group. Moreover, 61.9% in the control group, as expected, in the electric field (BSH), the experimental group was 9.6% and the control 38.1%.

Table 6. Frequency Distribution of Fine Motor Skills of the Experimental Group and Control Group (Post-Test)

Interval	Category	Experiment		Control	
		Frequency	Percentage	Frekuensi	Presentase
8-15	Less	-	-	-	-
16-20	Fair	-	-	8	38,2%
21-25	Good	1	4,8%	13	61,8%
26-32	Very Good	20	95,2%	-	-
Total		21	100%	21	100%

According to the information in Table 4 above, in the final (experimental) examination, no children were in the categories of underdeveloped and underdeveloped (BB) in the experimental and control groups. Furthermore, in the experimental group, no children fell into the moderate category or Started Developing (MB). Within the control group, 8 out of 21 children were within the direct category or comparable to beginning to create (MB), indicating that their eye-hand coordination, controlling hand movements, and wrist flexibility have developed. In addition, in the experimental group, 1 out of every 21 children were in the category of good or expected development (BSH). In the control group, 13 out of every 21 children were in the category of good or expected development (BSH). This shows that these children can independently focus on their gaze, control hand movements, and relax their hands without the teacher's instructions. In addition, 20 of the 21 children in the experimental group were found to fall into the Very Good (BSB) category. This shows that

these children can independently, without direction from the teacher, focus on their gaze, control hand movements and wrist flexibility, and help their friends. On the other hand, no children in the control group were in the very good category or Developing Very Well (BSB).

Looking at the frequency table of the post-test results of the experimental group, there were no children in the standard group, 38.2% in the control group, and 4.8% in the ideal group. In the control group, it was 61.8%. In the test group, there are no children in the good group, with 95.2%, and in the control group, there are no children in the good group. After the tests, we can conclude that the highest value of the assessment results is in the Very Good or Expected Development (BSB) category.

Table 7. Pre-Post Test Data Descriptive Statistical Analysis of Problem Solving Ability of Experimental Group and Control Group

	N	Minimum	Maximum	Mean	Std.Deviation
Experimental problem solving pre-test	21	11	23	16.81	3.430
Experimental problem solving post-test	21	20	32	26.48	3.219
Control problem solving pre-test	21	12	24	18.00	2.950
Control problem solving post-test	21	17	21	19.05	1.203
Valid N (listwise)	21				

Based on the information in Table 5, it can be concluded that the minimum pre-test value of the experimental group is 11, while the control group has a minimum value of 12. The average pre-test value of the experimental group is 16.81 while the average pre-test value of the control group is 18.00, referring to the average pre-test value in the two groups; the problem-solving ability of the experimental group before receiving treatment was children tends to be the same as the control group.

Based on the information in the table above, it can be concluded that the experimental group's post-test had a minimum value of 32, and the overall average value of the experimental post-test results reached 26.48. In addition, the minimum post-test value in the control group was 17, and the overall average value of the

control group's post-test was 19.05. Judging from the average value in both groups, it can be said that the comparison of the average value of the experimental group is higher than that of the control group.

The analysis found that the experimental group showed a higher average score than the control group's average score. Therefore, it can be concluded that the experimental group has a very good ability to solve the problem. The average score increased significantly after receiving treatment using magnetic maze media compared to the group that did not receive the same treatment.

Table 8. *Pre-Post Test Data Descriptive Statistical Analysis of Fine Motor Skills of Experimental Group and Control Group*

	N	Minimum	Maximum	Mean	Std.Deviation
Pre-test motor skills halus experiment	21	6	21	11.00	3.950
Post-test motor skills halus experimen	21	20	24	22.05	1.071
Pre-test motoric halus control	21	11	18	15.05	2.037
Post-test motoric halus control	21	12	19	16.10	1.868
Valid N (listwise)	21				

Based on the information in Table 6, it can be concluded that the minimum pre-test value of the experimental group is a while the control group has a minimum value of 11. Moreover, the average pre-test value of the experimental group is 11.00, while the average pre-test value of the control group is 15.05. by referring to the average pre-test value in both groups, it can be concluded that children's fine motor skills in the experimental group tend to be lower than in the control group before receiving treatment.

Based on the information in the table above, it can be concluded that the experimental group's post-test had a minimum value of 20, and the overall average value of the experimental post-test results reached 22,05. In addition, the minimum post-test value in the control group was 12, and the overall average value of the control group's post-test was 16,10. Based on the average score of both groups, it can be said that the comparison of the average value of the experimental group is higher than that of the control group.

The analysis found that the experimental group had a higher average score than the control group. Therefore, it can be concluded that the fine motor skills of the children in the experimental group who received treatment using the magnetic maze language increased significantly compared to the group that did not receive the same treatment.

Parametric Statistical Analysis
Normality test

The normality test aims to determine the distribution of the scores of each variable whether the data concerned is normally distributed or not. The basis for making normality test decisions is as follows:

a) Data can be said to be normally distributed if the P-Value (Sig.) > 0.05
b) Data can be said to be not normally distributed if the P (Sig.) Value < 0.05

Table 9. Normality Test of Problem-Solving Ability and Fine Motor Skills of Children in Experimental Group and Control Group

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
experimental fine motor pretest	.210	21	.017	.901	21	.036
experimental fine motor posttest	.184	21	.060	.920	21	.089
experimental solving pretest	.126	21	.200*	.957	21	.452
experimental solving posttest	.117	21	.200*	.974	21	.820
control fine motor pretest	.205	21	.021	.929	21	.131
control fine motor posttest	.139	21	.200*	.951	21	.355
control solving pretest	.167	21	.131	.951	21	.351
control solving posttest	.182	21	.066	.924	21	.104

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

The Kolmogorov-Smirnov and Shapiro-Wilk test menus are used to test the normality of the data above. Based on the output table of the normality test results, the Sig. The value of all classes is> 0.05, which means that from the results of the normality test above, all data is normally distributed.

Homogeneity Test

The homogeneity test is used to determine whether some population variants are identical. A variance homogeneity test is needed before comparing two or more groups so that the differences that exist are not caused by differences in basic data (inhomogeneity of the groups being compared) (Usmadi, 2020). The decision-making criteria for homogeneity testing through SPSS use the probability (significance) reference, namely:

1) If the Sig. If the value is more than 0.05, then the two data groups are declared homogeneous.
2) If the Sig. If the value is less than 0.05, then the two data groups are declared inhomogeneous.

Table 10. Test of Homogeneity of Problem-Solving Ability and Fine Motor Skills of Children in Experimental Group and Control Group

Result

Levene Statistic	df1	df2	Sig.
5.907	7	160	.000

Looking at the data based on the statistical results of the above homogeneity test output table, the significance value appears as 0.00. If the significance level or private value is 0.05 or more, it may imply that the population's variance is the same. Therefore, the significance value results can be concluded that the research samples of the experimental and control groups are similar or different.

Hypothesis Test

The hypothesis test was carried out to measure the problem-solving ability and fine motor skills of children aged 5-6 years at Al-Abrar Islamic Kindergarten Makassar City using the unpaired t-test. The t-test is used during hypothesis testing when the data used meets several conditions, such as normally distributed data, equal data variation, and data scales in the form of intervals and ratios; the following analysis is used in the t-test:

(1) If the significance value > 0.05, then H0 is accepted, and H_a is rejected.
(2) If the significance value <0.05, then H_0 is rejected H_a is accepted.

The hypothesis test results in this study used the paired sample

t-test following the pre-test and post-test data in the experimental and control groups.

Table 11. Hypothesis Test of Pre-Post Test of Problem-Solving Ability of Experimental Group and Control Group

Test	N	Statistika Deskriptif	Paired T-test		
		M (Std.D)	T	df	sig. (2-tailed
Experimental problem solving pre-test	21	16.81 (3.43)	-13.276	20	0,00
Experimental problem solving post-test	21	26.48 (3.21)			
Control problem solving pre-test	21	18.00 (2.950)	4,39	20	1,16
Control problem solving post-test	21	19.05 (1,203)			

From the results of hypothesis testing regarding problem-solving skills in the experimental group and control group before and after the intervention, the experimental group was given treatment using magnetic maze media while the control group was not given treatment; it can be seen that there is a significant effect. It can be seen that the sig value. In the experimental group, 0.00 < 0.05, and in the control group, 1.16 > 0.05, which means H0 is rejected and H1 is accepted, so it can be said that there is a significant difference in problem-solving ability between groups that get treatment using magnetic maze media and groups that do not get the same treatment.

Table 12. Hypothesis Test of Pre-Post Test of Fine Motor Skills of Experimental Group and Control Group

Test	N	Statistika Deskriptif	Paired T-test		
		M (Std.D)	T	df	sig. (2-tailed
Pre-test motor skills halus experiment	21	11.00 (3.950)	-12.521	20	0,00
Post-test motor skills halus experimen	21	22.05 (1.071)			
Pre-test motoric halus control	21	15.05 (2.037)	-2.896	20	0,09
Post-test motoric halus control	21	16.10 (1.868)			

From the results of hypothesis testing regarding fine motor skills in the experimental group and control group before and after the intervention, the experimental group was given treatment using magnetic maze media. In contrast, the control group was

not given treatment, and it can be seen that there was a significant effect. It can be seen that the sig value. In the experimental group, 0.00 < 0.05, and in the control group, 0.09 > 0.05, which means H0 is rejected, and H_1 is accepted, so it can be said that there is a significant difference in fine motor skills between groups that get treatment using magnetic maze media and groups that do not get the same treatment.

The hypothesis table of the test results of problem-solving ability and fine motor skills of children aged 5-6 years explains that there is a significant difference between the problem-solving ability and fine motor skills of the group given treatment using magnetic maze media and those of groups not treated using the same media (H_1 is accepted and H_0 is rejected).

Discussion

Problem-solving skills help children develop logical, critical, and systematic thinking skills to solve their problems. Children will use these skills in the future to deal with everyday problems. (Etnawati & Muthmainah, 2023)Acquiring problem-solving skills in children aged 5-6 involves many levels, including the ability to recognize individual symbols of a number, the ability to represent various objects in various forms of images or writing, the ability to solve simple problems that occur in everyday life, and the ability to solve problems creatively. (Sutama et al., 2024). If the child's ability to concentrate, remember, be creative, and process the information he gets is good, then his problem-solving ability will also be good. (Romanti & Rohita, 2021). Through maze games, children can creatively express themselves and solve problems in front of them, and they can distinguish the numbers on the paths in the maze column. (Lestari, 2020).

Research data shows that the problem-solving ability of children aged 5-6 years in Al-Abrar Islamic Kindergarten before being given magnetic maze treatment in the experimental group had an average value of 16.81, and the average value in the control group before treatment was 18.00. This can be seen from the lack of observation skills, such as not being able to recognize the problems faced, understand problems, such as not being able to explain the meaning of the problem, process information, such as understanding the rules in the information provided, and find

solutions such as coming up with creative ideas or strategies to overcome the problems faced. After being given treatment, the average score in the experimental group was 26.48, so the average score in the experimental group increased to 9.67, and the average value of the control group that was not given treatment using magnetic maze media was 19.05, indicating an increase in the average value of 1.05. This statement is supported by the results of descriptive and parametric statistical tests, which show a significant increase in the average score in the experimental group compared to the control group, which was not given treatment using magnetic maze media.

Research (Rahmawati et al., 2024) Teachers commonly use problem-solving methods to provide appropriate knowledge to children during class so that the understanding provided can be accepted by children by achieving certain competencies through fun activities. (Yuniwanti et al., 2024). Problem-solving is the basis of executive function skills, which involves identifying problems, finding alternative solutions, and applying the best solutions in new situations. These skills also play an important role in developing critical, analytical, and creative thinking skills. (Aliyah et al., 2023) Maze media helps children to think logically and solve problems in a fun way.

Fine motor skills are one of the developmental aspects emphasized in early childhood education. (Isnaini & Katoningsih, 2022)Fine motor skills are developed from an early age to coordinate the eyes and hands. Developing fine motor skills, such as daily life activities, essential self-care, and academic skills, is necessary for children's independence. For infants, fine motor skills are needed to explore, manipulate, and play with objects in the environment around them. (Faber et al., 2024)Threading Beads; TB, Drawing Trail; DT.

The data from the results of the study of fine motor skills of children aged 5-6 years at Al-Abrar Islamic Kindergarten in the experimental group before being given treatment using magnetic maze media had an average value of 11.00 and the average value of the control group before being given treatment was 15.05. This is due to their lack of skills in coordinating eyes and hands, controlling hand movements, and wrist flexibility. After being given treatment using magnetic maze media, the average value

in the experimental group increased significantly by 11.05 so that the total average value of children's fine motor skills in the experimental group became 22.05, and an increase in the average value in the control group by 1.05 so that the total average value in the control group that was not given treatment was 16.10. Therefore, it can be said that learning using magnetic maze media also significantly improves the fine motor skills of children aged 5-6 years at Al-Abrar Islamic Kindergarten. This statement is supported by the results of descriptive and parametric statistical tests, which show that the average score of fine motor skills of children in the experimental group treated using magnetic maze media increased. A significant comparative change was compared to the group not treated using the media.

Research conducted (Harahap, 2020) Highlighted that children's fine motor skills often get less attention in learning, and most children focus more on introducing mathematics, writing, and spelling in class. However, using magnetic maze media can help develop children's fine motor skills through activities that prioritize hand-eye coordination. In line with Harahap's research, the research conducted by (Pratiwi et al., 2018) The results also show that the magnetic maze board game is valid and functional. This tool can improve children's fine motor skills through fun and engaging activities. Finally, research at TK Negeri Pembina Kota Tasikmalaya was conducted by (Soleha et al., 2018) His research shows that using APE Maze can improve children's fine motor skills. This is evidenced by an increase in the teacher's ability to plan daily learning, the teacher's ability in the learning process, and the teacher's ability to use APE Maze and the early childhood fine motor skills from each cycle.

Problem-solving improves children's ability to use the scientific method effectively to investigate particular objects or events in their environment. It encourages children to gain experience and information about particular objects or topics through play, experimentation, and interaction with their environment. (Wahyuti et al., 2023). Children who enjoy solving problems tend to be more independent and confident. They can better face challenges and difficulties, helping them become more independent. (Putri, 2020).

It is important to stimulate fine motor skills from an early age.

Children must learn many valuable skills for daily activities such as bathing, eating, and dressing. These skills also help children explore and express themselves in different ways. (Nurlaili, 2019). Movements that use small muscles or fine muscles, this development requires the cooperation of eyes and hands, called fine motor. With good hand-eye coordination, good development will improve children's fine motor skills (Anugrah et al., 2024). Children's fine motor coordination is more perfect at 5-6 years old; their hands, arms, and body move under eye coordination. Children can also create and carry out more compound activities (Herlina & Amal, 2021).

D. Conclusion

It can be concluded that this magnetic maze game media can improve children's problem-solving skills in observation, understanding problems, processing information, and finding solutions. The results of the t-test that has been carried out show that the post-test significance value in the experimental group shows a value of 0.00 < 0.05, and in the control group shows a value of 1.16 > 0.05. This media can also improve children's fine motor skills in eye and hand coordination ability, ability to control hand movements, and ability flexibility of hand movements based on the results of the t-test on fine motor skills 0.00 < 0.05 and in the control group showed a value of 0.09> 0.05. By using the basis of decision-making (if the significance value <0.05, then H_0 is rejected and H_a is accepted) thus, it can be said that there is a difference in the significance value in problem-solving ability and fine motor skills in groups that play using magnetic maze media and groups that do not play using magnetic maze media at Al-Abrar Islamic Kindergarten Makassar.

Based on the research conducted, it is suggested that further researchers should redevelop learning media, especially magnetic maze media, which emphasizes problem-solving and fine motor skills in early childhood.

References

Aliyah, N., Tabroni, I., Jixiong, C., & Wei, Z. (2023). Pengembangan Media Labirin Lalu Lintas untuk Menstimulasi Permasalahan

Anak Usia 4-5 Tahun. *Journal of Computer Science Advancements*, *1*(April), 92–102.

Alucyana, & Raihana. (2023). Pembelajaran Saintifik dalam Mengembangkan Kemampuan Berpikir Kritis dan Memecahkan Masalah pada Anak. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *7*(1), 829–841. https://doi.org/10.31004/obsesi.v7i1.4096

Amelia, R. P., Ilyas, S. N., & Bachtiar, M. Y. (2021). Pengaruh bermain playdough terhadap kemampuan kognitif anak usia 5-6 tahun di taman kanak-kanak. *Tematik: Jurnal Pendidikan Anak Usia Dini*, *9363*(4), 1–9. http://eprints.unm.ac.id/id

Anggraini, W., Nasirun, M., & Yulidesni. (2020). Penerapan Strategi Pemecahan Masalah Dalam Meningkatkan Kemampuan Kognitif Pada Anak Kelompok B. *Jurnal Ilmiah Potensia*, *5*(1), 31–39. https://doi.org/10.33369/jip.5.1.31-39

Anjani, R., Novianti, N., Nuraeni, C., Jannah, R., Mariam Nabila, S. W., & Widjayatri, R. D. (2023). Pengaruh Media Busy Book Terhadap Kemampuan Pemecahan Masalah Anak Usia 3-4 Tahun. *Journal of Early Childhood and Character Education*, *3*(1), 15–40. https://doi.org/10.21580/joecce.v3i1.12650

Anugrah, S., Muhammad Yusri Bachtiar, Muhammad Akil Musi, Rika Kurnia R, & Halifah, S. (2024). Pengaruh Kegiatan Mozaik Terhadap Kemampuan Motorik Halus Anak Usia 5-6 Tahun. *Anakta : Jurnal Pendidikan Islam Anak Usia Dini*, *2*(1), 45–53. https://doi.org/10.35905/anakta.v2i1.6537

Arpandjaman, Suharto, Nur, A., & Sudaryanto. (2023). Efektivitas Kombinasi Senam Otak Dan Alat Permainan Edukatif Maze Papan Alur Terhadap Peningkatan Motorik Halus Pada Anak Taman Kanak-Kanak Aisyiyah Bustanul Athfal Ranting Malimongan Tua Kota Makassar. *Media Fisioterapi Politeknik Kesehatan Makassar*, *13*(1), 1. https://doi.org/10.32382/mf.v13i1.3175

Dewi, K. (2017). Pentingnya Media Pembelajaran Untuk Anak Usia Dini. *Raudhatul Athfal; Jurnal Pendidikan Islam Anak Usia Dini*, *1*(1), 81–96. https://doi.org/https://doi.org/10.19109/ra.v1i1.1489

Etnawati, S., & Muthmainah. (2023). Needs assessment pengembangan media maze game on PC untuk meningkatkan kemampuan pemecahan masalah anak. *Jurnal Pendidikan Anak*, *12*(1), 88–96.

Faber, L., Schoemaker, M. M., Derikx, D. F. A. A., Seetsen- van Schelven, H., Hartman, E., & Houwen, S. (2024). Qualitative age-related changes in fine motor skill performance among 3- to 6-year-old typically developing children. *Human Movement Science*, *93*, 103169. https://doi.org/10.1016/j.humov.2023.103169

Fadilla, D. N. (2022). *Pengaruh Penggunaan Metode Proyek Terhadap Kemampuan Pemecahan Masalah Anak Usia 4-5 Tahun Di TK Al-Ghaniyyu Kabupaten Gowa*.

Febriyanty, D., Herlina, Amal, A., & Dzulfadhilah, F. (2023). Pengaruh Penggunaan Media Fall Sweater Writing Skill Terhadap Kemampuan Motorik Halus Anak Usia Dini. *Journal Ininnawaparaedu*, *01*(01), 20–25.

Harahap, D. (2020). *Pengembangan Alat Permainan Maze Magnetik Untuk Keterampilan Motorik Halus Pada Kelompok A di Taman Kanak-Kanak*. Univarsitas Sriwijaya.

Herlina, & Amal, A. (2021). Pengaruh Keterampilan Origami dalam Menigkatkan Kemampuan Motorik Halus Anak Usia 5-6 Tahun Pada TK Sulawesi Kota Makassar. *Seminar Nasional Hasil Penelitian 2021 'Penguatan Riset, Inovasi Dan Kreativitas Penelitian Di Era Pandemi Covid-19'*, 1217–1225.

Isnaini, R., & Katoningsih, S. (2022). Problematics of Improving Fine Motor Abilities of Children Age 5-6 Years. *Early Childhood Research Journal (ECRJ)*, *4*(1), 58–64. https://doi.org/10.23917/ecrj.v4i1.11857

Khoiruzzadi, M., Barokah, M., & Kamila, A. (2020). Upaya Guru Dalam Memaksimalkan Perkembangan Kognitif , Sosial dan Motorik Anak Usia Dini. *Journal of Early Childhood Education and Development*, *2*(1), 40–51. https://doi.org/https://doi.org/10.15642/jeced.v2i1.561

Kuswanto, A. V., & Suyadi. (2020). Sistematika Lieratur Review: Permainan Maze Dalam Mengembangkan Perkembangan Anak Usia Taman Kanak-Kanak. *Pendidikan Anak Usia Dini*,

4(2), 119–124.

Lestari, L. (2020). Pentingnya mendidik problem solving pada anak melalui bermain. *Jurnal Pendidikan Anak*, *9*(2), 100–108. https://doi.org/10.21831/jpa.v9i2.32034

Lidia. (2023). *Peningkatan Kemampuan Pemecahan Masalah Melalui Puzzle Tetris Pada Anak Kelompok B Di TK Pusat PAUD Tunas Inti Baturappe KecamatanBiringbulu Kabupaten Gowa*.

Mehrad, A., & Zangeneh, M. (2019). Comparison Between Qualitative and Quantitative Research Approaches: Social Sciences. *International Journal For Research In Educational Studies*, *5*((ISSN: 2208-2115)), 1–7.

Musyahidah, U., Sriwahyuni, & Darwis. (2019). Hubungan Antara Bermain Mengenal Warna Dengan Perkembangan Kognitif Anak Di Tk Frater Bakti Luhur Makassar. *Jurnal Ilmiah Kesehatan Diagnosis*, *14*(3), 257–261. https://doi.org/10.35892/jikd.v14i3.251

Najamuddin, N., Fitriani, R., & Puspandini, M. (2022). Pengembangan Bahan Ajar Science, Technology, Engineering, Art and Mathematics (STEAM) Berbasis Loose Part untuk Meningkatkan Kemampuan Pemecahan Masalah Anak Usia Dini. *Jurnal Basicedu*, *6*(1), 954–964. https://doi.org/10.31004/basicedu.v6i1.2097

Nurjani, Y., Jubaedah, E., Nurjayati, S., & Aliyah, S. (2019). Upaya Mengembangkan Motorik Halus Anak Usia Dini Melalui Kegiatan Menggunting. *Journal Of SPORT (Sport, Physical Education, Organization, Recreation, Training)*, *3*(2), 85–92.

Nurlaili. (2019). *Modul Pengembangan Motorik Halus Anak Usia Dini*.

Permendikbudristek No 5 Pasal 4 Poin 3 Tahun. (2022). Peraturan Menteri Pendidikan, Kebudayaan, Riset, Dan Teknologi Republik Indonesia Nomor 5 Tahun 2022 Tentang Standar Kompetensi Lulusan Pada Pendidikan Anak Usia Dini, Jenjang Pendidikan Dasar, Dan Jenjang Pendidikan Menengah. *Gastronomía Ecuatoriana y Turismo Local.*, *1*(69), 5–24.

Pratiwi, I., Syafdaningsih, & Rukiyah. (2018). Pengembangan Alat Bermain Papan Magnetik Maze Untuk Anak. *Cakrawala Dini:*

Jurnal Pendidikan Anak Usia Dini, *9*(2), 138–147. https://doi.org/10.17509/cd.v9i2.11156

Pura, D., & Asnawati. (2019). Perkembangan Motorik Halus Anak Usia Dini Melalui Kolase Media Serutan Pensil. *Jurnal Ilmiah Potensia*, *4*(2), 131–140.

Putri, K. (2020). Identifiasi Kemampuan Pemecahan Masalah Pada Anak TK B Di Gugus IV Kecamatan Banguntapan, Bantul. *Pendidikan Guru PAUD S1*, *IX*(5), 386–395.

Rahim, A., Rusmayadi, & Marhamah, A. (2022). Meningkatkan Kemampuan Motorik Halus Anak Melalui Kegiatan Membuat Bentuk Baju dengan Tekhnik Menjahit pada Kelompok B di TK Kartini Bukit Baruga Makassar Sulawesi Selatan. *Jurnal Pemikiran Dan Pengembangan Pembelajaran*, *4*(1), 216–225. http://www.ejournal-jp3.com/index.php/Pendidikan/article/view/217

Rahmawati, D., Saputri, A., Septiana, R., Utami, W., & Amanda, R. (2024). Pengimplementasian Media Circle Maze untuk Menstimulasi Kemampuan Problem Solving Anak Usia Dini. *Journal of Education Research*, *5*(2), 2230–2236.

Retnaningrum, W. (2016). Peningkatan Perkembangan Kognitif Anak Usia Dini Melalui Media Bermain Memancing. *Jurnal Pendidikan Dan Pemberdayaan Masyarakat*, *3*(2), 207–218.

Romanti, S., & Rohita, R. (2021). Peran Guru Meningkatkan Kemampuan Anak Dalam Memecahkan Masalah Di Sentra Bahan Alam. *Jurnal Anak Usia Dini Holistik Integratif (AUDHI)*, *3*(1), 1. https://doi.org/10.36722/jaudhi.v3i1.587

Sianipar, A., Yuslia, M., Nursihab, M., Jannah, M., Silitonga, R., & Widjayantri, D. (2022). Efektivitas Ape Maze Terhadap Perkembangan Kognitif Anak Usia 5-6 Tahun. *Abata : Jurnal Pendidikan Islam Anak Usia Dini*, *2*(2), 210–223. https://doi.org/10.32665/abata.v2i2.559

Soleha, A., Yasbiati, & Muslihin, H. (2018). penggunaan alat permainan edukatif (APE) Maze untuk meningkatkan motorik halus anak usia 4-5 Tahun Di TK Negeri Pembina Kota Tasikmalaya. *Jurnal Paud Agapedia*, *2*(2), 175–186.

Sutama, I. W., Astuti, W., & Pramono. (2024). Improving 21st Century Competencies: Implementing Problem- and Project-Based Digital Maze Games in Early Childhood. *Jurnal Pendidikan Anak Usia Dini Undiksha*, *12*(1), 177–185. https://doi.org/10.23887/paud.v12i1.69997

Syamsuardi, & Hajerah. (2018). Penggunaan Model Pembelajaran pada Taman Kanak-Kanak Kota Makassar. *Jurnal CARE (Children Advisory Research and Education)*, *2*(5), 1–7. http://e-journal.unipma.ac.id/index.php/JPAUD/article/view/3104

Usmadi. (2020). Pengujian Persyaratan Analisis (Uji Homogenitas dan Normalitas). *Inovasi Pendidikan*, *7*(1), 50–62.

Wahyuti, E., Purwadi, & Kusumaningtyas, N. (2023). Analisis Kemampuan Pemecahan Masalah Melalui Pembelajaran Literasi Baca Tulis Dan Numerasi Pada Anak Usia Dini. *Enggang: Jurnal Pendidikan, Bahasa, Sastra, Seni, Dan Budaya*, *3*(2), 1–12.

Yuniwanti, R., Hapidin, & Nurjannah. (2024). *Pengembangan Model Permainan Tradisional Engklek Puzzle untuk Meningkatkan Keterampilan Pemecahan Masalah Anak Usia 5-6 Tahun*. *5*(2), 337–349. https://doi.org/10.37985/murhum.v5i2.869

This page intentionally left blank