

Problem Solving Ability in Early Children's Mathematics Learning

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Abstract

The problems in this study were (1) what kind of problem-solving abilities the children had before the use of beams in learning mathematics in group B at Kartika Kindergarten class X-1, (2) what kind of problem-solving ability of children had after using beam media in mathematics learning in group B at Kartika Kindergarten class X-1 (3) Is there a difference in problem-solving ability in group B at Kartika Kindergarten class X-1 before and after using a beam or block media. The general objective of this study is to determine whether there is an effect of using beam media on problem-solving abilities in early childhood mathematics learning. This study used a pre-experimental method; the research subjects were group B children in Kartika Kindergarten class X-1 Bandung. As for the data to be obtained is the result of observations, interviews, documentation, and tests. Researchers performed a pretest and posttest on group B to increase problem-solving abilities in early childhood mathematics learning. The results showed that there was an effect of beam media on the problem-solving ability in group B; they got an average of 22.66% in the initial test, while the final test was 27.26%.

Keywords: *Beam or Block Media, Early Childhood Problem Solving Ability*



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INTRODUCTION

Ruseffendi (Effendi, 2012) explained that problem-solving ability is very important in learning mathematics, not only for academic science but also it is important for those who will apply it in other fields of study and in everyday life. The problem-solving process is really needed because it relates to the life process of children, especially during the golden age. Problem-solving abilities can help children make decisions carefully, systematically, logically, and they will consider various points of view. Bluman (2011) describes four problem-solving steps, namely (1) Understanding the problem first and reading the problem carefully. Underline or write down the information contained in the problem. Decide what the goal is, (2) Choosing a strategy to solve the problem. In this step, trial and error will occur. It is believed that this second step is a strategy used to solve problems, (3) Implementing a strategy, implement it so that a solution is obtained. If it doesn't work, then look for other strategies, (4) Evaluating the answer by checking the answers and seeing if they make sense. Use estimation as a form for checking answers.

The world community, including in Indonesia, especially parents of early childhood, considers learning mathematics to be very difficult to teach. This is the assumption for most people that sometimes they become afraid of mathematics. Especially for early childhood, they should be trained in critical thinking, creative thinking, and finding alternative solutions. Anggorowati (2012) considers mathematics to be a universal science that underlies the development of modern technology and has various disciplines which can influence the progress of human thinking.

Not a few teachers rarely use supporting media to train early childhood cognition. In fact, educators must ensure that the media used in learning is appropriate and enjoyable so that it creates an attitude of creative thinking, and the media is considered to be helpful in the process of problems solving learning. Then, the approach used allows children to fully understand the concept in cognitive development, especially in problem-solving abilities.

The characteristics of the media, according to Musfiqon (2012: 30), must be adapted to the context of the lesson; among them are (1) All types of tools are useful and used as learning aids for teachers to students, (2) Fostering student interest in learning, (3) Improving the quality of learning, (4) Facilitating communication between teachers and students in learning. Childhood was happy with playing with beams and arranging beams into various forms of buildings (Nurrohmah, 2012). Beam media is one of the manipulative media used in mathematics learning. Amir (2014) states that the importance of manipulating objects in the form of games carried out in learning will have an influence on the problem-solving abilities of early childhood. Researchers use beam media that is assembled, grouped, integrated, perfected a design, or compiled a complete shape.

The demands of the times are getting higher; this has an impact on mathematics learning which is required to keep up with the times. Mathematics must be used as a tool to compete with other nations both in terms of thinking and generating new ideas in the process of life (Sadiq, 2009, p. 1). In this millennial era, it provides facilities for students to be able to solve problems or questions with multi-thinking and multi-ways Karlimah (2008). Learning mathematics in early childhood education is still considered less important. Many parents are only oriented to mathematical standards, namely calculation only. Problem-solving is part of logical mathematics. Logical mathematics requires creative and productive critical thinking skills, which are high-level competencies and can be viewed as basic competencies (Sudiarta, 2007).

Clements & Sarama (Pirrone, 2018) Building Block Play (BBP) in early childhood entering primary school years improves higher-order thinking skills in mathematics across gender and socioeconomic boundaries. Diana and Joan (Wahyuni, 2014) explained that using blocks for children can develop an understanding of reasoning, patterns of understanding, and problem-solving strategies they face. NCTM in Ashton (2014) Children's block play introduces and expands many mathematical concepts "Going beyond just sorting and arranging".

RESEARCH METHODS

This study used a pre-experimental method; the research subjects were group B children in TK (Kindergarten) Kartika X-1 Bandung. As for the data to be obtained is the result of observations, interviews, documentation, and tests.

FINDING AND DISCUSSION

Researchers have conducted research on the effect of block media on problem-solving abilities in early childhood mathematics learning. The results of this research obtained significant results, and the differences were clear.

Early Childhood Problem Solving Ability in Group B at TK Kartika X-I.

Researchers conducted research on group B aged 5-6 years, and at the time of the pretest, it was clear that the results of the field research were as follows

Data Table of Pretest Calculation Results

Problem Solving Ability of Children in Group B Kindergarten Kartika X-1

Calculation	Pretest
N	30
Total score	680

Average	22.67
Highest Score	36.00
Lowest Score	12.00
Deviation Standard	5.397

Initial Ability of Problem-Solving Ability in Group B of TK Kartika X-I.

The results of the research conducted by researchers before using block media on the problem-solving ability of early childhood care in the good, adequate and insufficient categories. From the data, the results of the calculation of the results of all aspects of the initial test of problem-solving abilities in group B at TK Kartika X-1 are as follows; in good criteria get a percentage of 3.3%, adequate categories get a percentage of 56.7% and in insufficient category 33.3%. When viewed from per aspect, the results of the calculation of the final test results are as follows:

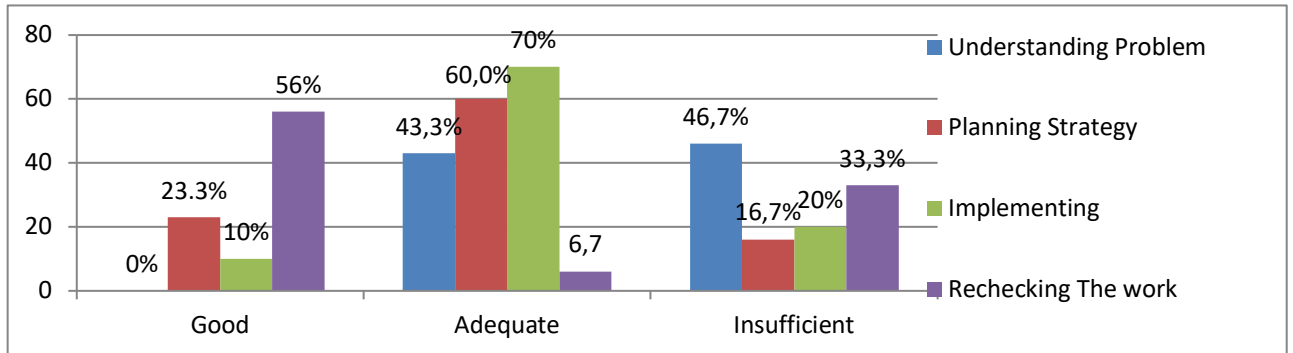
Results Table of Problem-Solving Ability in Group B

TK Kartika X-I before using block media.

No	Aspect	Criteria	Interval	F	%
1	Understanding Problem	Good	7-9	-	-
		Adequate	7-5	13	43.3%
		Insufficient	5-3	14	46.7 %
2	Planning Strategy	Good	7-9	7	23.3%
		Adequate	7-5	18	60.0%
		Insufficient	5-3	5	16.7%
3	Implementing	Good	7-9	3	10 %
		Adequate	7-5	21	70 %
		Insufficient	5-3	6	20%
4	Rechecking the work	Good	10-12	17	56%
		Adequate	10-8	2	6.7%
		Insufficient	8-6	10	33.3%

After conducting the initial research, the results of the pretest for group B children at TK Kartika X-I depicted in graphic form in order to get a clearer description by looking at each aspect of the 4 phases of the problem-solving process of early childhood are presented in graph 4.1:

Graph of Problem-Solving Ability in Group B at TK Kartika X-1 Before Using Block Media



Problem Solving Ability in Group B at TK Kartika X-1 After Using Beam Media.

Researchers conducted research in group B at TK Kartika X-1. Beam media is a manipulative media that he applies to group B, and if you see the results are as follows.

Data Table of Posttest Calculation Results of Problem Solving Ability for Group B at Kindergarten Kartika X-1

No	Aspect	Criteria	Interval	F	%
1	Understanding Problem	Good	7-9	-	-
		Adequate	7-5	2	73.3%
		Insufficient	5-3	7	23.3%
2	Planning Strategy	Good	7-9	9	63.3%
		Adequate	7-5	9	30.0 %
		Insufficient	5-3	2	6.7%
3	Implementing	Good	7-9	2	40%
		Adequate	7-5	7	56.7%
		Insufficient	5-3	1	3.3%

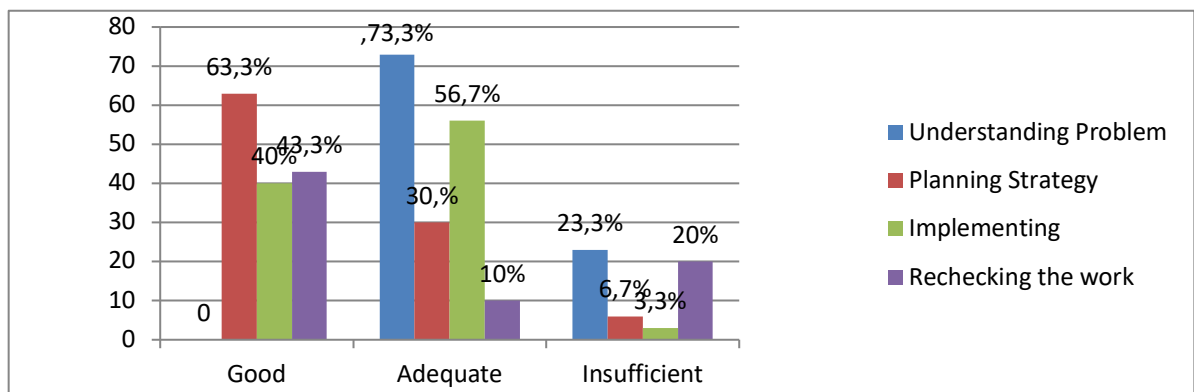
From the results data of the calculation of the results of all aspects of the final test of group B's problem-solving ability at TK Kartika X-1 are as follows; in the good criteria, it gets a percentage of 30%, the category is adequate to get a percentage of 50%, and in the poor category, it is 20%. When viewed from per aspect, the results of the calculation of the final test results are as follows:

Data Table of the Calculation of the Final Test Result of Problem Solving Ability in Group B at TK Kartika X-1

Calculation	Final Test
N	30
Total Score	818
Average	27.27
Highest Score	36
Lowest Score	15
Deviation Standard	5.741

The results of the research conducted by the researcher after using beam media on the ability to solve problems in early childhood in group B at TK Kartika X-1, in the aspect of understanding the problem skills, getting a presentation of 0% for the good category, 73.3% adequate and insufficient 23.3%, strategic planning skills in the good category 63.3%, adequate 30%, and insufficient 6.7%. Implementing strategy skills in the good category are 40%, 56.7% adequate, and insufficient 3.3% and on the skills to recheck the work in the good category is 43.3%, adequate 10%, and 20% insufficient.

The results of the posttest in group B at TK Kartika X-I are depicted in graphic form by looking at the overall aspect, and the four phases of the problem-solving process are presented in graph 4.2



Graph of Problem Solving Ability in Group B At TK Kartika X-1 at the time of the posttest

The Influence of Beam Media on Early Childhood Problem Solving Ability

After doing the initial and final research, here the researcher will explain the effect of beam media on the problem-solving ability of early childhood. Before seeing the results of this effect, the data normality test was carried out. Some data are not normally distributed because they do not have a

p value > 0.05. So the researchers conducted a non-parametric test or Man Whitney using the SPSS version 22 software as follows:

From the results of the Man Withney test, the value $Asymp.sig. (2-tailed) = 002$. It can be concluded that the insights are due to $Asymp.sig. (2-tailed) < 0.05$, then H_0 is rejected, so it can be concluded that there are differences in children's test scores at pretest and posttest. The next step is to do paired t-test (paired-sample t-test). Table 4.4 illustrates the results of the paired t-test.

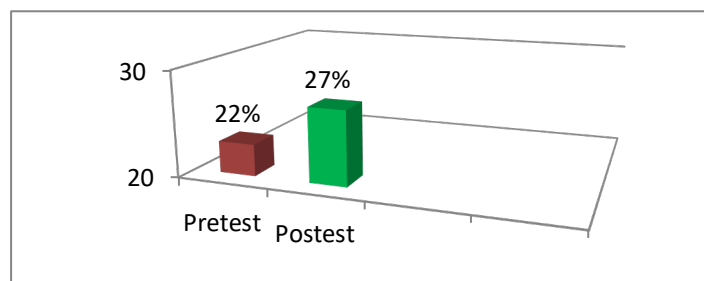
Table of Dependent Sample t-test results

Class	Treatment	Average	Sd	difference in average	T-Test Statistic	P-value	Description
B Group	Pretest	22.6667	5.39689	4,6	002	0.05	Significant
	Posttest	27.2667	5,74116				

From table 4.4 above, it appears that the results of the dependent sample t-test (paired-sample t-test) data in class B in early childhood problem-solving ability are significant because they have a p-value < 0.05. This shows that there is a significant difference in the problem-solving ability before and after the use of beam media on the problem-solving ability of early childhood. From this, it can be concluded that the beam media has an effect on the problem-solving ability of early childhood. This is evidenced by the average value before the implementation of the computer learning program, the average is 22.6667, and after

applying the use of beam media, the average is 27.2667.

The following is graph 4.5, which describes the average use of beam media on the problem-solving ability of early childhood in group B at TK Kartika X-1, Bandung, as follows.



Average Graph of Problem Solving Ability Before and after using beam media

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the results of the research and discussion described in the previous chapter, it can be concluded that:

1. The influence of beam media on problem-solving abilities in early childhood mathematics learning provides a very important role for cognitive aspects, especially in the daily life of early childhood. This is evidenced by a fairly good increase in the aspect of understanding the problems; children can respond well to every problem they face.
2. The initial condition of the problem-solving ability in group B at TK Kartika X-1 before using beam media, it seems that they cannot understand step by step of the problem-solving ability process.
3. After the researcher carried out the treatment or stimulus with beam media, it proved that there was a significant increase in the problem-solving ability of children in less than two months compared to the untreated group.

Suggestion

Some suggestions (1) for the teacher should understand the stages or procedures for learning beam so that they can master and be able to see the child's development when playing beam while at the same time seeing the process of early childhood problem solving abilities, (2) The teacher should be oriented towards the child's learning process, it does not have to be oriented towards the final result, (3) TK Kartika XI manager is expected to be able to facilitate beam media facilities and infrastructure so that more beam units and various types of beams are available in the beam center, (4) TK Kartika XI TK managers should add educators to student ratios that exceed the ratio 1: 15 in order to be well conditioned, (5) Further researchers are expected to conduct more comprehensive and in-depth research on the effect of beam media on problem-solving abilities in early childhood mathematics learning and are expected to innovate in media design and also have a longer time in doing research so that the optimal final result will be seen, (6) Researchers are expected to be able to see aspects of problem-solving abilities from another point of view and more broadly in understanding the factors of problem-solving abilities that can stimulate greater so that learning objectives are achieved properly.

REFERENCES

- Amir, A. (2014). Pembelajaran matematika SD dengan menggunakan media manipulatif. In *Forum Paedagogik Jurnal Pendidikan Agama Islam*, 6(1).
- Anggorowati, R. (2013). Penggunaan Media Manipulatif Mika Transparan Dalam Pembelajaran Matematika Materi Penjumlahan Pecahan Untuk Meningkatkan Hasil Belajar Siswa Kelas IV SD Islam Al Furqon Bulak Surabaya. *Jurnal Penelitian Pendidikan Guru Sekolah Dasar*, 1(1), 1-6.

- Ashton, E. (2007). Children's mathematical thinking. *New Brunswick Curriculum Framework for Early*.
- Bluman, G Allan. (2011). *Math Word Problem DeMYSTiFieD*. New York. Mc Graw Hill. ISBN :978-0-07-176386-8, MHID : 0-07-176386-4.
- Effendi, L. A. (2012). Pembelajaran matematika dengan metode penemuan terbimbing untuk meningkatkan kemampuan representasi dan pemecahan masalah matematis siswa SMP. *Jurnal Penelitian Pendidikan*, 13(2), 1-10.
- Karlimah. (2008). "Matematika Untuk Siswa Berbakat Akademik. Menembangkan Pendidikan Unggul dan Bertaraf Internasional". *Seminar Internasional Membangun Pendidikan Berkualitas*. ISBN : 978979379-0. Bandung : UPI Pres.
- Musfion. (2012). *Pengembangan Media & Sumber Pembelajaran*. Jakarta: Pustaka Publisher.
- Nurrohmah, S. (2012). Meningkatkan Kemampuan Keaksaraan Anak dengan Permainan Balok Geometri Huruf. *Jurnal Pendidikan Anak*, 1(2).
- Pirrone, C., Tienken, C. H., Pagano, T., & Di Nuovo, S. (2018, January). The Influence of Building Block Plays on Mathematics Achievement and Logical and Divergent Thinking in Italian Primary School Mathematics Classes. In *The Educational Forum* (Vol. 82, No. 1, pp. 40-58). Routledge.
- Shadiq, F. (2007). Apa dan mengapa matematika begitu penting. *Departemen Pendidikan Nasional Direktorat Jenderal Peningkatan Mutu Pendidik Dan Tenaga Kependidikan Pusat Pengembangan Dan Pemberdayaan Pendidik Dan Tenaga Kependidikan (PPPPTK) Matematika*, 1-10.
- Sudiarta, I. G. P. (2007). Pengembangan Pembelajaran Berpendekatan Tematik Berorientasi Pemecahan Masalah Matematika Terbuka untuk Mengembangkan Kompetensi Berpikir Divergen, Kritis dan Kreatif. *Jurnal Pendidikan dan Kebudayaan*, 13(69), 1004-1024.
- Wahyuni, D. (2016). Mengembangkan Kemampuan Kognitif Anak melalui Bermain Rancang Bangun Balok di Paud IT Al Fatih Kota Banda Aceh. *Jurnal Ilmiah Mahasiswa Pendidikan Anak Usia Dini*, 1(1).