



The Effect of Using Math Bingo Game on Student Learning Outcomes of Grade 4 Math Lessons

Rachel Febriyanti^{1*}, Ika Lestari², Endang M. Kurnianti³, Herlina Usman⁴

^{1,2,3,4} State University of Jakarta, 13220 Jakarta, Indonesia

* rachelsilabann@gmail.com

Abstract. This study aims to see the effect of the use of educational media math bingo on the mathematics learning outcomes of fourth- grade students of SDN 09 Sunter Jaya. This study used an experimental research method with a research design of Nonequivalent Control Group Design. The population used in this study were 44 fourth-grade students of SDN 09 Sunter Jaya, while the sample was IV-B which amounted to 32 people as an experimental class and IV-C which amounted to 32 people as a control class. The data collection techniques used were observation and written tests with the decision-making criteria of the t-test in analyzing the data. The results showed that the experimental class experienced a greater improvement than the control class. The t-test shows the value of $\text{Sig. } 0.001 < \text{the significant level value of } 0.05$ which indicates that H_0 is rejected and H_1 is accepted. From the results of this study, it can be concluded that there is an effect of using educational media math bingo on the mathematics learning outcomes of fourth-grade students of SDN 09 Sunter Jaya.

Keywords: Learning outcomes, educational media math bingo, mathematics

1 Introduction

Based on the phenomenon of student disinterest in Mathematics. Generally, this subject is not liked by students, because it is considered difficult draining mind and boring. Mathematics learning itself is always available at every school level because it is expected to equip students with the ability to think logically, analytically, systematically, critically, and creatively. Students' disinterest in Mathematics is generally associated with the subject draining energy, Mathematics is considered a difficult subject because students already assume that Mathematics is complicated because it is always related to numbers, formulas and counting. Students also do not intend to learn it, except because of material demands (Aulia, 2020). Based on a survey conducted by the PISA (Program for International Student Assessment) in 2018, it is known that Indonesia's Mathematics score is 379 with the average score of the OECD (The Organization for Economic Co-operation and Development) countries of 489. This score is very behind the average score of 78 countries that participated in the survey. This makes a lot of Mathematics teachers and experts required to make innovations in learning Mathematics so that Mathematics becomes a subject that attracts the interest of all students in Indonesia.

For this reason, research should be carried out immediately, so that Mathematics is not considered too difficult. This can be done in a separate classroom with students who mostly study in elementary school. There are various ways of providing learning materials that will make students feel excited and improve learning outcomes. Some of these ways include using the right strategies, methods, and supporting media that will enhance learning activities.

Mathematics learning itself is always available at every school level because it is expected to equip students with the ability to think logically, analytically, systematically, critically, and creatively. (Aulia, 2020) said that students do not know that math has a very important role in everyday life. A real example in terms of buying and selling transactions that are often carried out by everyone must use the elements of counting in Mathematics. learning mathematics also indirectly trains a person to think rationally and use more logic. Mathematics also plays an important role in technology and science. However, in fact for students, most feel lazy, and uninterested and even students want to avoid the subject. (Alfin Nur Jiyanti, 2020) in the Preliminary Study of the Identification of Mathematics Learning Outcomes of Grade V Students at SDN Telang, 1 said The preliminary study also shows that the use of models and methods used by teachers is less varied, which results in low student learning outcomes. The keywords used in this preliminary study are "Mathematics learning outcomes", "learning models", and "fractions". For example, a preliminary study conducted to identify students' Mathematics learning outcomes at SDN Telang 1 showed that Mathematics learning at this school tended to be teacher-centered because it only used conventional learning models. This caused learners to become passive and unable to develop numeracy and logical thinking skills. As a result of the preliminary study, the research considers that the use of more varied and appropriate models and methods can help students develop numeracy and logical thinking skills, resulting in higher student learning outcomes.

Math bingo is a game that can help students understand material related to numbers and create fun learning conditions. Math bingo consists of two basic words, Math and bingo. Math comes from the English word meaning Mathematics, while bingo is the name of a game. The Math bingo media developed is a Math learning media in the form of a bingo game using fraction material. The game is assisted by a bingo board/box where the problem in the bingo box must be answered, namely with a horizontal, vertical, or diagonal line, then students who play this game will shout bingo (Alma Julianda Marleni, 2021).

Preliminary studies conducted at SDN 48 Lubuklinggau the results of observations of teachers and students of SD Negeri 48 Lubuklinggau in class IV in the process of teaching and learning Mathematics the media used are still classified as traditional media that have been used too often and are not related to today. The media is considered less interesting for students because it causes boredom. Plus now there is a COVID-19 pandemic, so learning is less effective and learning time is very short, making the teaching and learning process lack time if you do learning manually by writing on the blackboard and using simple media. Facing these problems, a teacher must be able to develop a learning media that can foster student interest in mathemat-

ics that is easy and efficient when used. Media that can make students interested and challenge them make students more active in learning Mathematics.

A study conducted proved that by using bingo game media in their research at SD Negeri Kadung Jenar there was an increase in learning outcomes, namely when the pretest was only 51.13% then increased to 72.66% after the post-test (Oktaviani, Dewi, & Kiswoyo, 2019). This shows that bingo game media can make the learning environment fun and effective, thus making students active. The media developed by the author is called bingo. Bingo is added to the word Math which means Mathematics. This Math bingo media not only contains bingo games but also added material that can make it easier for teachers when using it, so that the teaching and learning process during this pandemic can be intertwined easily, just by using one PowerPoint math bingo all includes the learning process and also evaluation. The purpose of this study was to determine the effectiveness of using the Math Bingo game on student learning outcomes in grade 4 elementary school mathematics.

2 Method

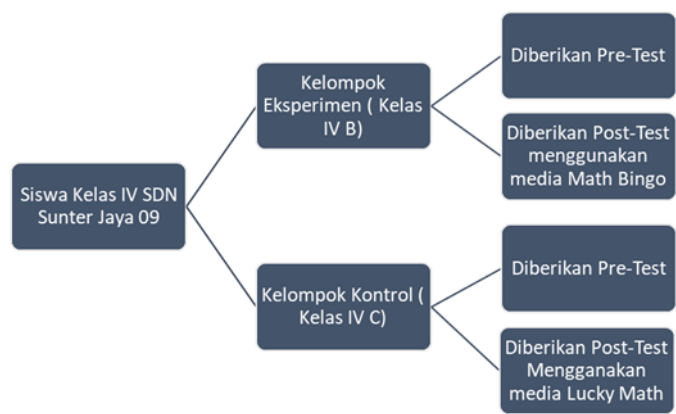
2.1 Research Approach

In this study, the type of research that researchers conducted was a type of experimental research with a quasi-experimental form.

2.2 Research Design

The design used in this study is a nonequivalent control group design. In this research design, treatment is given in the form of learning with Math bingo media for the experimental class while the control class is not given treatment in the form of learning with Math bingo media. Giving pretests to the two groups before being given treatment is intended to determine the initial ability of students' problem-solving related to the lesson to be taught, and then after different treatments, the two groups are given a posttest, where the posttest aims to determine the final ability of students' mathematical problem solving after different treatments.

Table 1. The Pre-Test Post-Test Non-Equivalent Control Group design.



2.3 Population and Sample

The population in this study were all grade IV odd semester students at SDN 09 Sunter Jaya, Tanjung Priok District, North Jakarta in the 2023/2024 school year. Thus, class IV C was obtained as an experimental group (a class that received the math bingo media learning model) and Class IV B as a control class (a class that did not get the math bingo media learning model).

2.4 Data Collection Technique

this study uses two variables, the independent variable is the Math bingo game and the dependent variable is student learning outcomes. Data collection methods in this study are observation, tests , and documentation.

2.5 Validity and Reliability

Instrument tests carried out with validity and reliability tests are used as measuring tools in research that are used to assess the accuracy of measuring instruments and their consistency. In this study, the validity test uses the Product Moment correlation technique from Karl Pearson. The reliability testing in this study uses the Split Half Method based on Spearman Brown. The data analysis technique used in this study is by validating the instrument through normality tests and homogeneity tests. In this study, the normality test uses a formula based on Kolmogorov Smirnov. The homogeneity testing in this study uses the Harley formula. The data analysis technique used in this research uses the normality test, homogeneity test, and hypothesis testing with decision making criteria from the t-test so that the null hypothesis (H0) is accepted or rejected.

3 Research Result and Discussion

3.1 Research Result

Data collection used in this study is observation to determine the implementation of the Bingo game method and the test is used to determine students' knowledge in learning mathematics fraction material in the form of essay questions.

The validity of the items is used to measure an instrument to be used in research. The validity of the items was first tested by experts to correct the suitability of the instrument grid sentences for each item and the suitability of the sentences on the questions so that students can understand when answering the questions. Furthermore, a field test was carried out to find out whether the instrument was suitable for use or not in research. The essay questions used in this study were tested on 32 students in class IV A at SDN 09 Sunter Jaya using the product moment formula analyzed with SPSS 29 for windows with a significant level of 5%. The number of items tested was 16 items. After testing, it turned out that all questions were valid, so researchers used 16 items to be tested in the field.

From the results of the expert test and field test, the value $r_{tabel} = 0.398$ with a significant level of 5% with the provisions if $r_{hitung} > r_{tabel}$ then the essay question is said to be valid, so that all essay questions can be used to measure students' mathematics learning outcomes using the Bingo game method on fraction material for grade IV students of SDN 09 Sunter Jaya.

The reliability test of this question is carried out after the validity test. After the validity test using 16 items. Then tested for reliability using 16 items. After 16 valid items were retested in the field at SDN 09 Sunter Jaya Ampenan and the results remained the same valid. Based on the calculation to test the reliability of the question items as a whole, it was carried out using the Cronbach's Alpha technique, which was analyzed using SPSS 29 for windows. The resulting reliability coefficient is 0.706.

Table 2. Reliability Test

Reliability Statistics

Cronbach's Alpha	N of Items
.706	16

From the reliability test using the SPSS 29 for windows application, it explains that after the reliability test is carried out, the Cronbach's Alpha value is 0.706, which means that all variables are reliable with a good decision, because they have an alpha coefficient value above 0.374.

Then the data normality test was carried out using the SPSS 29 for windows application program, using the Kolmogrov-Smirnov technique, which is a data normality test calculation formula used for small samples. The basis for decision making in the Kolmogrov-Smirnov normality test, namely if the sig value ≤ 0.05 , then

the data is not normally distributed, and if the sig value ≥ 0.05 , then the data is normally distributed.

Table 3. Normality Test

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Unstandardized Residual	.099	32	.200 [*]	.960	32	.280
Unstandardized Residual	.091	32	.200 [*]	.978	32	.741
Unstandardized Residual	.093	32	.200 [*]	.955	32	.194
Unstandardized Residual	.142	32	.098	.842	32	<.001

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the results of the normality test in the table that has been presented in the Kolmogrov-Smirnov column in the experimental pre-test, experimental post-test, 5% significance class with the test criteria that the data is normally distributed if the significance obtained is > 0.05 . Conversely, it is said that the data is not normally distributed if the significance obtained is < 0.05 .

Table 4. Homogeneity Test

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
pretest	Based on Mean	.362	1	62	.549
	Based on Median	.028	1	62	.869
	Based on Median and with adjusted df	.028	1	56.110	.869
	Based on trimmed mean	.296	1	62	.589
posttest	Based on Mean	29.056	1	62	<.001
	Based on Median	21.864	1	62	<.001
	Based on Median and with adjusted df	21.864	1	47.006	<.001
	Based on trimmed mean	29.965	1	62	<.001

The homogeneity test aims to find out and have the same variant or not. Data is said to be homogeneous if the significant value is more than 0.05, while it is said to be inhomogeneous if the significance value is smaller than 0.05. The homogeneity test was used to determine the level of similarity of variance between two groups, namely the experimental group and the control group with the help of SPSS 29 for windows. The results of homogeneity testing in this study are using the pre-test and post-test results can be seen in Table 4.

Table 5. Hypothesis Test

		Independent Samples Test									
		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
Nilai posttest	Equal variances assumed	29.056	<.001	-5.985	62	<.001	<.001	-38.750	6.475	-51.693	-25.807
	Equal variances not assumed			-5.985	37.435	<.001	<.001	-38.750	6.475	-51.864	-25.636

Based on the hypothesis test results that have been presented because the data is normally distributed and homogeneous, what must be considered is the Equal Variances Assumed column to determine the hypothesis can be done by comparing the *thitung* value of 6.475 and a significance of 0.001. For *ttabel* is sought at a significant level of 5% with degrees of freedom (df) $n-2$ or $45-2 = 43$. With a 2-sided test (significance = 0.05) the results obtained for *ttabel* are 2.021 because *thitung* is greater than *ttabel*, H_a is accepted and H_o is rejected. So, as the basic rules for decision making in the Independent Sample T-test test, it can be concluded that there is an effect of using the Bingo game method on the mathematics learning outcomes of fourth grade students on fraction material at SDN 09 Sunter Jaya Lesson 2023/2024. Based on the observations of researchers in the experimental class, students seemed more enthusiastic and easier to remember what was explained in front using the bingo game method compared to the control class which used the snakes and ladders game method. Experimental class students also looked more concentrated and focused on paying attention to the front, in contrast to the control class when told to rework fraction problems. From the description above, it can be seen that there is a difference between students taught using the bingo game method and students taught using the Lucky Math game method.

3.2 Discussion

Based on the results of the research and data analysis that has been carried out by researchers, it is concluded that there is a difference in students' mathematics learning outcomes on fraction material through the use of the Bingo game method. The results were shown from the pretest average value of the experimental group of 44.37 after being given treatment with the Bingo Game method, the posttest average value of the experimental group increased to 92.25 while the control group pretest average value was 38.28 and the control group posttest average value increased to 67.25. After it is known that there is a difference in the results of improving the mathematics learning outcomes of students from each class, the researcher then analyzes the hypothesis that has been presented in the previous chapter, namely by using the SPSS 29 for windows program and obtained the value $thitung \geq ttabel$, namely $4.585 \geq 2.021$, and the sig value ≤ 0.05 , namely $0.000 \leq 0.05$. Then H_o is rejected and H_a is accepted. This shows that there is an effect of using the Bingo game method in terms of the mathematics learning outcomes of grade IV students on fraction material at SDN 09 Sunter Jaya.

The results of this study are in line with research conducted by Nursaminah et al. (2023) that learning using Math Bingo media has an influence on the learning outcomes of fourth grade students. The results showed that the use of the Bingo game method can help students understand math learning. So that there is a significant change in student learning outcomes before the application of Marh Bingo media and after the application of the media.

However, research conducted by Endang et al. (2023) showed results stating that math bingo games had an effect, but not far from the educational games conducted in

the control class. And there are obstacles when explaining students the rules of the math bingo game.

From the results of the research and discussion above, it can be concluded that learning using Math Bingo media can affect the learning outcomes of fourth grade mathematics students at SD Negeri Sunter Jaya 09 Pagi. Through this media, students can play and learn, so that learning math does not seem scary and boring. The use of Math Bingo media is proven to be effective in learning grade IV mathematics, which is indicated by a significant increase in the average score of grade IV students after applying Math Bingo media.

4 Conclusion

This study aims to see the effect of the use of educational media math bingo on learning grade IV elementary school mathematics on the material of Operation of Numbers. Based on the results of research conducted using observation and written tests, it can be concluded that there is an influence in student learning outcomes after the application of learning using educational media math bingo. This research helps educators to create a happy and fun classroom atmosphere when learning math, so that students do not feel bored and monotonous about learning math by using educational media math bingo.

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References

1. Alfin Nur Jiyanti, d. (2020). Studi Pendahuluan Identifikasi Hasil Belajar Matematika Siswa Kelas V di SDN Telang 1.
2. Alma Julianda Marleni, d. (2021). PENGEMBANGAN MEDIA PEMBELAJARAN MATH BINGO PADA MATA PELAJARAN MATEMATIKA MATERI PECAHAN KELAS IV SD. *AULADUNA: Jurnal Pendidikan Dasar Islam*, 160-167.
3. B, P. (2018). PEMAHAMAN KONSEP MATEMATIKA SISWA MELALUI MODEL PEMBELAJARAN AIR (AUDITORY , INTELLECTUALY, REPETITION) DAN MODEL PEMBELAJARAN COURSE REVIEW HORAY PADA SISWA KELAS XI IPA SMA BUDI UTOMO JOMBANG. *Jurnal Ilmiah Soulmath*.
4. D. Sawitri, E. R. (2018). "Modul PKT. 08 -Penilaian Hasil Belajar,".
5. DAMAYANTI, D. F. (2019). PENGEMBANGAN MEDIA PEMBELAJARAN "BINGO+" MENGGUNAKAN METODE EDUTAINMENT PADA MATERI BILANGAN. *Repository UMSU*.
6. dkk., Nursaminah. (2023). Pengaruh Metode Permainan Bingo Terhadap Hasil Belajar Matematika Siswa Kelas III SD Tema 5 Subtema 2 . *Seminar Nasional Paedagoria*.

7. Endang Sulistyowati, d. (2023). THE EFFECTIVENESS OF ETHNOMATEMATICS BASED LEARNING ON MATHEMATICS ABILITY OF ELEMENTARY SCHOOL STUDENTS: A META-ANALYSIS STUDY. *Al-Bidayah : jurnal pendidikan dasar Islam*.
8. Isna Wulandari, d. (2020). Efektivitas Permainan Kartu sebagai Media Pembelajaran Matematika. *E-DIMAS: Jurnal Pengabdian kepada Masyarakat*, 127-131.
9. Kartikasari, H. U. (2022). MENINGKATKAN HASIL BELAJAR MATEMATIKA DENGAN PENDEKATAN STEAM DI SEKOLAH DASAR. *JURNAL PENDIDIKAN DAN KEBUDAYAAN*, 337-348.
10. Meisya Widyasusanti, I. S. (2022). PENGEMBANGAN MEDIA PEMBELAJARAN E-LEARNING BERBASIS MOODLE PADA MATERI PECAHAN SENILAI KELAS IV SEKOLAH DASAR. *Prima Magistra: Jurnal Ilmiah Kependidikan*.
11. Muawannah. (2020). "Tipe Hasil Belajar," . *Repository.lainkudus.Ac.Id*.
12. Rahmat Gunawan, T. H. (2022). RANCANG BANGUN GAME EDUKASI PERHITUNGAN DASAR MATEMATIKA SEKOLAH DASAR KELAS 3, 4 DAN 5 MENGGUNAKAN CONSTRUCT 2. *Jurnal Interkom: Jurnal Publikasi Ilmiah Bidang Teknologi Informasi dan Komunikasi*.
13. Rohman, S. N. (2021). Kemampuan Pemahaman Konsep Pada Pembelajaran Matematika Menggunakan Metode Penemuan Terbimbing Di SMA Negeri 14 Palembang. *Jurnal Penelitian Pendidikan Matematika*, 165-173.
14. Setiyawan, H. (2018). METODE PERMAINAN BINGO MATEMATIK PADA MATERI OPERASI HITUNG PECAHAN TERHADAP HASIL BELAJAR SISWA KELAS IV. *Jurnal Matematika dan Pembelajaran*, 101-110.
15. Tian Oktaviani, E. R. (2019). 47PENERAPAN PEMBELAJARAN AKTIF DENGAN METODE PERMAINAN BINGO UNTUK MENINGKATKAN HASIL BELAJAR MATEMATIKA. *Jurnal Mimbar Ilmu*.
16. Tika Evi, d. (2021). Meta Analisis Efektivitas Model Problem Based Learning dan Problem Solving Terhadap Kemampuan Berpikir Kritis Mata Pelajaran Matematika Siswa Sekolah Dasar. *EDUKATIF: JURNAL ILMU PENDIDIKAN*.
17. ULFA, A. R. (2022). PENGARUH MEDIA MATH BINGO TERHADAP PENINGKATAN KEMAMPUAN PEMECAHAN MASALAH MATEMATIKA PADA MATERI SISTEM PERSAMAAN LINEAR KELAS VIII SMP TERPADU DAMPASAN KABUPATEN CIAMIS. *Repository.UIN*.

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