Is Mathemagics Affected Students' Cognitive Learning Outcomes?

by Desy Nursinta

Submission date: 27-Oct-2022 01:43PM (UTC+0700)
Submission ID: 1936680490
File name: DESY_NURSINTA_AL_KHAROMAH_A510180209.docx (224.77K)
Word count: 4713
Character count: 27046

Jurnal Elemen, 9(1), 1-10, January 2023
https:/doi.org/10.29408/jel.v9i1.XXXX

e- ISSN: 2442 - 4226

Check for updates

Is Mathemagics Affected Students' Cognitive Learning Outcomes?

Desy Nursinta Al Kharomah [1 *], Muhammad Abduh [2]

[1,2] Primary Teacher Education, University of Muhammadiyah Surakarta, Central Java, Indonesia

[*] Correspondence: a510180209@student.ums.ac.id

Abstract

The Mathmagics method teaches the basic concepts of calculation by focusing on the psychological aspects of children. The Mathmagic method helps to make a basic calculation easier and simpler. The purpose of this research was to determine the effect of the mathemagics learning method on the mathematics cognitive learning outcomes of the fifth-grade students of Muhammadiyah 16 Karangasem elementary school. This research is quantitative and uses an experimental approach. This research used a quasi-experimental design as its method. The design of this research is the noneequivalent control group design. This design uses a control class and an experimental class. This research used a sample of fifth-grade students at Muhammadiyah 16 Karangasem elementary school. Data collection techniques in this research include observation and interview techniques followed by tests of students' cognitive learning outcomes. The data analysis technique in this research used instrument testing, prerequisite tests, and hypothesis testing. The results of the research stated that in the experimental class the average value obtained at the post-test was 80.38 while the control class obtained an average score of 60.76. The results of the hypothesis test using the independent sample t-test obtained sig 2 tailed on equal variances assumed and equal variances not assumed of $0.000 < 0.05$. Based on the results of this study, it can be concluded that the mathemagics learning method can be applied to mathematics learning, especially in the addition of fractions with different denominators. This mathemagics learning method is also effective for improving the ability to understand the basic addition of fractions with different denominators.

Keywords: Cognitive Learning Outcomes; Mathemagics Methods; Elementary School Students

Received: Date Month Year | Revised: Date Month Year
Accepted: Date Month Year | Published: Date Month Year

Introduction

Learning can be regarded as an interactive process in dealing with situations that are felt by each individual. A learning process can be seen as an activity directed towards goals and a process of doing it with various experiences. Rofii et al. (2018) stated that mathematics takes part to provide significant role in the field of education. Mathematics is also often seen as a way to find solutions to various problems in the everyday life. Minsih & Astuti (2015) stated that Mathematics is a science that is closely related to everyday life. Mathematical calculations can run all aspects of this life.

Mathematics has a purpose in helping to train students' mindsets so that they can solve problems, both problems in the field of mathematics itself and problems in the everyday life (Putri, Muslim, & Bintaro, 2019). Solving problems related to the field of mathematics studies can develop students' thinking about basic mathematical concepts that involve an assessment process. Self-assessment has an important role in learning mathematics so that the knowledge transfer process continues, through the results of the assessment, data regarding the level of students' abilities and information on certain concepts that have not been understood by students are obtained (Retnawati et al., 2017).

All the basics of contemporary science are regarded as mathematical subjects (Thalhah et al., 2019). The basis of mathematics can prosper the Indonesian nation through science and technology and can play a role in advancing the Indonesian state. It is realized that mathematics is a discipline that is the basis for knowing about another science. The most important field of study to learn is mathematics, this should be a fun lesson for the students so that later students become interested, and like, to learn mathematics subjects and in the end, the grades obtained by students are very satisfying and the students can apply mathematics learned in everyday life. Therefore, the mathematics possessed can be useful for themselves and others.

Many people think that learning mathematics is tough. Mundia (2012) stated that the one source of problems in learning mathematics that comes from students is that some students are influenced by the stereotype of beliefs held by many people that mathematics is a difficult subject. Most students assess mathematics as an abstract science so students are less interested in learning it. This is in line with the opinion of Murdiani (2018) that a subject whose material is abstract is mathematics. Mathematics does not simply make mathematics difficult to learn so students' interest in mathematics is less.

To create students' enjoyment in learning mathematics, it requires teachers to be creative and. In the learning process that the application of the teacher only explaining the material and assigning assignments will result in students getting bored more easily. This makes the learning atmosphere monotonous so that students get bored faster and feel that mathematics is a boring lesson. This is in line with the opinion of Suhardin (2020) stated that teachers who stand out by relying on the lecture method during learning, then giving assignments will make students bored in listening to their lectures, especially for teachers who sometimes give lectures for less focused material, talk about things that are less relevant to the lesson, it causes failure to achieve learning objectives.

Based on the current principle, teachers are no longer to lecture in front of students, but teachers who act as facilitators, motivators, and starters for the learning process in the classroom. Teachers are expected to be able to increase students' curiosity so that the potential of students can be developed so that eventually students become stimulated to develop the

mathematical knowledge gained to be wider and even better than what is taught by the teacher (Abduh, 2015).

The low interest of students in mathematics can lead to non-optimal learning outcomes. Akinsola & Olowojaiye (2021) argues that showing positive behavior when learning mathematics is the most crucial quality that pupils need to. This can happen because the success of students in a lesson is very dependent on their attitude toward the lesson.

Rima & Kusuma (2016) said that effective learning has conditions, one of which is by providing a supportive and pleasant environment so that the learning process takes place and improves student learning outcomes. That is why teachers must also pay attention to the learning components that can increase the ideally enjoyable learning outcomes.

The ideal learning applied to the learning process is with the teacher emphasizing the use of innovative learning methods. A similar opinion was expressed by Magdalena et al. (2020) teacher creativity in teaching is a demand in creating innovative learning. The quality of learning methods is related to teacher creativity and teacher innovation so teachers are required not to be monotonous. Teaching methods include the use of approaches, strategies, models, and learning methods. The application of models and methods in the classroom varies depending on the learning needs that are applied. The use of interactive learning methods and models can improve student learning outcomes so that students can understand well the material provided by the teacher and the learning outcomes obtained (Fakhri, Taufik, & Ismail, 2020). Pickard (2004) stated that learning outcomes are a useful influence as a measure of success or failure in a learning activity.

In conformity with the results, it exposed that average students faced difficulty in learning mathematics. The conclusion was drawn from the observations and interviews with fifth grade teachers at Muhammadiyah 16 Karangasem elementary school that the students of the elementary school found fractions with different denominators as the difficult lesson. It is easier for students to work on simple fractional material problems when they have given fractional material with different denominators, many students are confused and answer wrongly in solving the problem. In addition, in the learning process at the time of delivery of the fractional material, the teacher only uses conventional learning methods, not assisted by learning methods and learning media that make it easier to complete fractional material. While the use of this learning method can give students success in learning, and students are given convenience in learning.

An ideal mathematics learning can develop with students' mathematics learning outcomes (Batubara, 2019). The mathemagics learning method is one of the learning methods that makes it easier for students to work on problems with fractions with different denominators. A fun and creative method is the mathemagics learning method because it makes easier students to work on basic math problems. In addition, the mathemagics method also emphasizes students' understanding of the right basic mathematical concepts and does not apply complicated methods. According to Irawan & Febriyanti (2016) in principle, in the mathemagics method, every problem regarding calculations is carried out with the right strategy to get a simple, easy, fast, and precise answer.

The use of supporting media and games can attract students' attention during the learning process. Students' cognitive learning outcomes on the content of mathematics lessons can be improved through mathemagics learning methods. Students will prefer the media and games that are used rather than only being given material and questions that can make the students bored and feel that what they are learning will be difficult and scary. The mathemagics method is a game that invites students to play with numbers, so they can think about numbers, addition, multiplication, and more (Koirala & Goodwin, 2017).

The mathemagics method teaches basic calculation concepts such as addition, subtraction, multiplication, division, power, roots, and fractions by focusing on the mental aspects of children. This method helps make basic calculations easier and simpler, giving the initial impression that math is simple and fun (Irawan & Febriyanti, 2016). The mathemagics method in mathematics can support many classic games, ranging from simple games on basic arithmetic, or presenting tricks as a way of finding math problems (Mulcahy, 2018).

The selection of the method is not only appropriate, but also can make students enjoy learning it, interesting, and easy to understand by students. This is in line with the opinion of Maswar (2019) that the mathematics learning process that occurs in the classroom will be interesting and fun if varied and innovative learning methods are applied because learning methods also have a relationship to improving students' cognitive learning outcomes in the learning process.

21st-century education emphasizes the ability to learn and innovate, including critical thinking and problem solving, in this case, students can think inductively and deductively when facing various situations for various reasons, using systematic thinking; make decisions and solve problems, communicative and collaborative, where students can communicate and collaborate clearly with other group members, creative and innovative, where students can create new interesting ideas and create something with updates that have never existed before or can develop something that it was (Ndiung et al., 2019). Students are expected to have a good conceptual understanding in order to fully comprehend mathematics (Andamon & Tan, 2018).

Based on this description, the mathemagics learning method is expected to be able to help make the learning process easier for students and make it easier to solve problems with fractions with different denominators in a simple and fun way. This research aims to determine the effect of the use of mathemagics learning methods on cognitive learning outcomes in mathematics learning in class V elementary school.

Methods

The research used in this research is quantitative. The type of research used is experimental. In this research, the experimental form used was a quasi-experimental design. The experimental design used in this research is a quasi-experimental type of Nonequivalent Control Group Design. This research used two classes, where the first class was used as the control class and the second class was used as the experimental class. The class that is used as the control class uses conventional learning methods and the class that is used as the experimental class is the class that uses mathemagics learning methods. This research has several steps including (1)

Observation in getting the problem, (2) Formulating the problem, (3) Implementing the solution to the problem, (4) Performing data collection, (5) Performing data analysis.

This research was on students class V at Muhammadiyah 16 Karangasem elementary school. The location of school is at Jalan Srikaya Number 5, Karangasem, Laweyan District, Surakarta City, Central Java. The implementation of this research was carried out on August 1-13 August 2022. The population in this research was the fifth-grade students of Muhammadiyah 16 Karangasem elementary school which consisted of 60 students. In this research, some of the population was taken as a sample of this study, which amounted to 40 students. The samples taken in this study were two classes of Muhammadiyah 16 Karangasem elementary school students, namely class V A, which consisted of 20 students as the control class, and V B, which consisted of 20 students as the experimental class.

Purposive sampling was implemented as sample technique of this research. In this research, the sample was selected from two classes which the consideration that the class had homogeneous abilities and had achieved the same material, besides that in this class students were classified as moderate or inactive students and not too passive, the class was class V A. and V B. Research data were collected by observation, interviews, and tests. The test used is the cognitive learning outcome test, this test is used to determine differences in student learning outcomes through pre-test and post-test. The analytical technique used in this research is an instrument test to determine the validity, reliability, level of difficulty, discriminating power, and functioning of the distractors on the pre-test and post-test questions. After that, the prerequisite tests were tests for normality and homogeneity. And the last is hypothesis testing using an independent sample t-test.

Results

Before carrying out research in the control and experimental classes the fifth-grade students of Muhmmadiyah 16 Karangasem elementary school, the researchers first conducted an instrument test on students who were not used for research. The test subjects of the instrument were fifth-grade students of the Madrasah Ibtidaiyah Muhammadiyah Gonilan Special Program. Test the test instrument on the pre-test and post-test questions. To find out the validity, and reliability.

Pre-test instrument test of 20 (twenty) questions tested, it is known that there are 17 (seventeen) valid questions. The reliability of the pre-test instrument is high, this is indicated by the results of the test instrument reliability test r11 = 0.829. Meanwhile, to test the validity of the post-test instrument, from 20 questions there were 13 valid items, with high post-test instrument reliability of r11 = 0.808. Thus the pre-test instrument consisting of 17 valid and reliable questions and the post-test instrument with 13 valid and reliable items were used to obtain data on cognitive learning outcomes in fifth-grade students of Muhammadiyah 16 Karangasem elementary school.

The results of the study that the pre-test and post-test score data on students' cognitive learning outcomes in the experimental class and control class can be seen in table 1.

Tabel 1. Descriptive Statistics Learning Outcomes

		Experimental Class		Control Class	
	N	*Pre-test*	*Post-test*	*Pre-test*	*Post-test*
N	20	20	20	20	20
$\mathbf{X_{min}}$	20	11.76	53.84	23.52	38.46
$\mathbf{X_{max}}$	20	82.35	100.00	64.70	84.61
$\bar{X}$	20	51.4660	80.3800	45.2885	60.7645
SD	20	19.82120	14.65439	10.98057	14.31491

Descriptive statistical analysis of cognitive learning outcomes can be seen that the average value in the experimental class is higher than the control class. This is where the post-test average value in the experimental class is 80.38 while in the control class it is only 60.76.

By paying attention to the average pre-test and post-test scores, it can be concluded that the cognitive mathematics learning outcomes of students who were taught using the mathemagics method were better than students who only used conventional methods. This is in line with research conducted Marbun et al. (2019) shows that there is an increase between the average value of the pre-test that has not used mathemagics, which is 10.14 with the average value of the post-test, which is 16.72 when the mathemagics method has been applied.

After that, the prerequisite test was carried out. The prerequisite tests used are linearity and normality tests. The normality test is Shapiro Wilk. The results of the normality test can be seen in Table 2.

Table 2. Normality Test Shapiro Wilk

		Shapiro-Wilk		
	Class	Statistic	df	Sig.
Student Cognitive Learning Outcomes	Experimental Pre-test	.943	20	.267
	Experimental Post-test	.921	20	.106
	Control Pre-test	.946	20	.311
	Control Post-test	.945	20	.295

The results of the Shapiro-Wilk test in Table 2 show that the pre-test cognitive learning outcome variable in the experimental class is 0.267, then the pre-test sig in the control class is 0.311. Furthermore, the post-test sig in the experimental class is 0.106 and the post-test sig in the control class is 0.295. The four significant values are more than 0.05, which means that students' cognitive learning outcomes are normally distributed. After that, the homogeneity test was carried out.

The results of the homogeneity test analysis are presented in table 3.

Table 3. Homogeneity Test

		Levene Statistic	Sig.
Student Cognitive Learning Outcomes	Based on Mean	.215	.646
	Based on Median	.240	.627
	Based on Median and with adjusted df	.240	.627
	Based on trimmed mean	.211	.648

It can be seen in table 3 that the sig based on the mean of student learning outcomes is 0.646> 0.05, which means it is greater than 0.05 then the data is homogeneous.

The description that has been presented by the author, shows that the results of the analysis prerequisite test illustrate that the two sample groups are in a normal distribution and homogeneous. Therefore, it can be continued for the hypothesis testing stage. Hypothesis testing using independent sample t-test. The summary of the calculation results is presented in Table 4

Tabel 4. T Test (*Independent Sample T-Test*)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Hasil Belajar Siswa	Equal variances assumed	.215	.646	4.282	38	.000	19.61550	4.58076	10.34223	28.88877
	Equal variances not assumeda			4.282	37.979	.000	19.61550	4.58076	10.34206	28.88894

According to the independent sample t-test results, it inferred that sig 2 tailed at equal variances assumed and equal variances not assumed was 0.000 < 0.05. This indicates that Ha is accepted. It can be concluded that there is an influence between mathemagics learning methods on mathematics cognitive learning outcomes.

Therefore, the mathemagics learning method can be applied by teachers in the learning process as an effort to improve cognitive learning outcomes for the fifth grade of elementary school mathematics. The results of this research can be used as a reference in choosing the right learning method so that mathematics learning outcomes can increase.

Disscusion

Based on the description and analysis of the data that has been obtained, that class V A as the experimental class and class V B as the control class has carried out the pre-test by answering 17 multiple choice questions. The pre-test aims to determine the student's initial scores before being given treatment. The experimental class obtained an average pretest score of 51.4 while in the control class the average pre-test was 45.2. Meanwhile, through the post-test results, it is known that the experimental class learning outcomes after being treated with the mathemagics method were higher than the control class using conventional methods. This can be seen from the average value obtained by the experimental class is 80.38 and the control class is 60.76.

The results of the research show that students' activities in using mathemagics learning methods have a significant effect on students' cognitive mathematics learning outcomes. This is in line with research conducted by Dian (2021) which shows the use of the mathemagics method can influence the results of mathematics learning in the material of multiplication of two numbers. This research was conducted by multiplying 1 by 9 to students, the activity was continued by explaining the material to be taught along with the mathemagics method. During the treatment process, students were given multiplication questions with easy to difficult levels. This is because the method used is appropriate and fun for students.

In contrast to the research conducted by Marbun et al. (2019) he uses the mathmagic method with the help of using the scramble learning model in teaching and learning activities at the state high school 2 Bilah Hulu getting an increase between the average pre-test score and the post-test average value. The mathamagic method was chosen because mathmagic does not only prioritize speed, but also the truth and logic of the answers produced. According to Juliandri (2016), the learning methods are used and able to create new ideas and make students think creatively.

Each stage in the mathemagics learning method can train students in solving mathematical connection ability questions such as in memorizing multiplication activities carried out to recall the multiplications that have been memorized so that the multiplications that have been memorized are not easy to forget and make it easier to calculate math problems, then the stages of student development given concrete examples related to fractional material, this is in line with one of the indicators of students' mathematical connections, namely applying mathematical concepts to other fields of study and daily life. In agreement with the statement Noto, Hartono & Sundawan (2016) said that the right mathematical connection assist students to make mathematical concepts concrete and be relate a concept to other concepts, which can enable students to view mathematics as a whole.

Mathemagics learning method provides opportunities for students to be active in learning through how to find answers to a trick or puzzle. That way it can help to train students in linking mathematical concepts with simple tricks to solve math problems. Improved learning outcomes and student involvement in mathemagic learning methods can be shown by the enthusiasm of students in the learning process activities, students will focus on participating in learning activities; students will not do other activities besides learning activities, eager to find answers and answer questions. It is proven by the active participation of students in learning, including the courage to answer questions.

The research process was carried out four times in each class. At the first meeting, the students in both the control class and the experimental class worked on the pre-test questions. The work on pre-test questions to measure the initial ability of students in the control class and the experimental class. At the second meeting in the control class, a material learning process was carried out on the basic concepts of adding fractions with different denominators. Presentation of the basic concept of adding fractions with different denominators using conventional learning methods. Meanwhile, in the experimental class at the second meeting, a

material learning process was carried out on the basic concepts of adding fractions with different denominators using the mathemagics learning method. The mathemagics learning method is assisted by material presented with easy-to-digest PowerPoint and an introduction to basic concepts with songs about the material. The use of these components aims to make it easier for students to know the basic concepts of addition in a fun and not-too-complicated way.

Then at the third meeting, the control class was taught about solving the addition of fractions with different denominators by equating the Least Common Multiple (KPK) first. Learning in the control class that uses conventional methods such as lectures, although there is an increase in learning outcomes and activeness, there are still many students who are reluctant to ask questions and argue, there are also some students who are passive in learning. In contrast, at the third meeting in the experimental class, the students were enthusiastic about learning the material being taught using the method of solving the addition of fractions with different denominators quickly and with the help of manipulation media. On the fourth day, students from the control class and the experimental class were given a post-test of mathematical cognitive learning outcomes on the subject of adding fractions with different denominators.

The mathemagics method can provide a setting to explore meaningful mathematical concepts (Matthews, 2021). The advantage of the mathemagics learning method is that it trains students to be able to improve students ability to solve simple math problems so that positive self-concepts grow, and improve students' arithmetic skills.

Thus, it can be concluded that the application of the mathemagics learning method affects being ability to improve students' cognitive learning outcomes in mathematics with different denominator fractions at Muhammadiyah 16 Karangasem elementary school in the 2022/2023 academic year.

Conclusion

Referring to the data analysis and discussion, it reported that mathemagics learning approaches impacted the fifth-grade students' cognitive learning results in mathematics. The effect can be seen from the difference in cognitive learning outcomes between the experimental class and the control class. The post-test average value of the experimental class was 80.38 while the control class got an average of 60.76. While the results of hypothesis testing using an independent sample t-test obtained sig 2 tailed on equal variances assumed and equal variances not assumed of 0.000 < 0.05 this means Ha is accepted. Thus, there is a significant influence on the application of the mathemagics method used on outcome of cognitive learning for fifth-graders at Muhammadiyah 16 Karangasem elementary school.

References

Abduh, M. (2015). Pengembangan Media Pembelajaran Tematik-Integratif Berbasis Sosiokultural bagi Siswa Kelas IV Sekolah Dasar. *Profesi Pendidikan Dasar*, *2*(2), 121–132. Retrieved from https://www.researchgate.net/publication/296704617

Akinsola, M. K., & Olowojaiye, F. B. (2021). Teacher Instructional Methods and Student Attitudes towards Mathematics. *International Electronic Journal of Mathematics Education*, *3*(1), 60–73. https://doi.org/10.29333/iejme/218

Andamon, J. C., & Tan, D. A. (2018). Conceptual understanding, attitude and performance in mathematics of Grade 7 Students. *International Journal of Scientific and Technology Research*, *7*(8), 96–105.

Batubara, I. H. (2019). Improving Student's Critical Thinking Ability Through Guided

Discovery Learning Methods Assisted by Geogebra. *International Journal for Educational and Vocational Studies*, *1*(2), 116–119. https://doi.org/10.29103/ijevs.v1i2.1371

Dian, G. P. (2021). Pengaruh Metode Mathemagics Terhadap Hasil Pembelajaran Matematika pada Materi Perkalian untuk Siswa Tunarungu Kelas Dasar 5A di SLB B Karnnamanohara. *Jurnal Widia Ortodidaktika*, *10*(1), 45–56.

Fakhri, M., Taufik, M., & Ismail, A. D. (2020). Improvement of Mathematics Learning Outcomes by Applying The Missouri Mathematics Project Learning Model And Dienes Game Theory. *Mathematics Education Journal*, *4*(1), 95. https://doi.org/10.22219/mej.v4i1.11474

Irawan, A., & Febriyanti, C. (2016). Efektifitas Mathmagic dalam Peningkatan Hasil Belajar Matematika. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *6*(1), 85–92. https://doi.org/10.30998/formatif.v6i1.755

Juliandri, D. P. (2016). Meningkatkan Hasil Belajar Siswa Dengan Metode Pembelajaran Langsung. *Matematics Paedagogic*, *1*(1), 83–90. https://doi.org/10.24114/inpafi.v6i3.11115

Koirala, H. P., & Goodwin, P. M. (2017). Mathematics Teaching in the Middle School Online. *Mathematics Teaching in the Middle School*, *23*(1), 4. https://doi.org/10.5951/mathteacmiddscho.23.1.0004

Magdalena, I., Ramadhanty Wahidah, A., Rahmah, G., & Claudia Maharani, S. (2020). Pembelajaran Inovatif Dalam Pembentukan Karakter Siswa Kelas 1 Sd Negeri Pangadegan 2. *PENSA : Jurnal Pendidikan Dan Ilmu Sosial*, *2*(3), 376–392. Retrieved from https://ejournal.stitpn.ac.id/index.php/pensa

Marbun, N. E., Rohani, Muti'ah, R., & Suriyani. (2019). Pengaruh Mathmagic Dengan Model Pembelajaran Scramble Terhadap Hasil Belajar Siswa. *MES: Journal of Mathematics Education and Science*, *5*(1), 1–10.

Maswar, M. (2019). Strategi Pembelajaran Matematika Menyenangkan Siswa (Mms) Berbasis Metode Permainan Mathemagic, Teka-Teki Dan Cerita Matematis. *Alifmatika: Jurnal Pendidikan Dan Pembelajaran Matematika*, *1*(1), 28–43. https://doi.org/10.35316/alifmatika.2019.v1i1.28-43

Matthews, M. E. (2021). Selecting and Using Mathemagic Tricks in the Classroom. *The Mathematics Teacher*. https://doi.org/10.5951/mt.102.2.0098

Minsih, & Astuti, D. (2015). Peningkatan Motivasi Belajar Matematika Melalui Pada Siswa Kelas V Mi Muhammadiyah Ngasem Kecamatan Colomadu Tahun Pelajaran 2013 / 2014. *Profesi Pendidikan Dasar*, *1*(1), 78–84. Retrieved from http://eprints.ums.ac.id/28814/

Mulcahy, C. (2018). A Personal Approach to the Art of Mathemagic with a Deck of Cards. *Proceedings of Bridges 2018: Mathematics, Art, Music, Architecture, Education, Culture*, 7–14.

Mundia, L. (2012). The assessment of math learning difficulties in a primary grade-4 child with high support needs: Mixed methods approach. *International Electronic Journal of Elementary Education*, *4*(2), 347–366.

Murdiani. (2018). Meningkatkan Motivasi Dan Hasil Belajar Menjumlahkan Pecahan Melalui Model Pembelajaran Kooperatif Tipe Make A Match Siswa Kelas IV SDN Hariang Kecamatan Banua Lawas Kabupaten Tabalong. *Sagacious Jurnal Ilmiah Pendidikan Dan Sosial*, *4*(2), 35–40.

Ndiung, S., Dantes, N., Ardana, I. M., & Marhaeni, A. A. I. N. (2019). Treffinger creative learning model with RME principles on creative thinking skill by considering numerical ability. *International Journal of Instruction*, *12*(3), 731–744. https://doi.org/10.29333/iji.2019.12344a

Noto, M. S., Hartono, W., & Sundawan, D. (2016). Analysis of Students Mathematical Representation and Connection on Analytical Geometry Subject. *Infinity Journal*, *5*(2), 99. https://doi.org/10.22460/infinity.v5i2.216

Pickard, A. (2004). Sustaining Motivation and Fostering Excellence Education. *International Journal of Arts and Humanities Citation*, *4*(7).

Putri, B. B. A., Muslim, A., & Bintaro, T. Y. (2019). Analisis Faktor Rendahnya Minat Belajar Matematika Siswa Kelas V Di Sd Negeri 4 Gumiwang. *Jurnal Educatio FKIP UNMA*, *5*(2), 68–74. https://doi.org/10.31949/educatio.v5i2.14

Retnawati, H., Kartowagiran, B., Arlinwibowo, J., & Sulistyaningsih, E. (2017). Why are the mathematics national examination items difficult and what is teachers' strategy to overcome it? *International Journal of Instruction*, *10*(3), 257–276. https://doi.org/10.12973/iji.2017.10317a

Rima, E. W., & Kusuma, S. (2016). *Menjadi Guru Hebat dengan Hypnoteaching*. Jakarta: Kata Pena.

Rofii, A., Sunardi, S., & Irvan, M. (2018). Characteristics of Students' Metacognition Process At Informal Deduction Thinking Level in Geometry Problems. *International Journal on Emerging Mathematics Education*, *2*(1), 89. https://doi.org/10.12928/ijeme.v2i1.7684

Suhardin. (2020). Penguatan Kemampuan Guru Menggunakan Lecture Strategy Dalam Pembelajaran Jarak Jauh (Pjj) Di Tengah Pandemi Covid-19. *Jurnal Syntax Transformation*, *1*(7), 387–396. https://doi.org/10.46799/jst.v1i7.94

Thalhah, S. Z., Tohir, M., Nguyen, P. T., Shankar, K., & Rahim, R. (2019). Mathematical issues in data science and applications for health care. *International Journal of Recent Technology and Engineering*, *8*(2 Special Issue 11), 4153–4156. https://doi.org/10.35940/ijrte.B1599.0982S1119

Is Mathemagics Affected Students' Cognitive Learning Outcomes?

ORIGINALITY REPORT

9%	9%	11%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	ejournal.unib.ac.id Internet Source	1%
2	jurnal.untan.ac.id Internet Source	1%
3	R A Hakim, Dafik, I M Tirta. "The study of the implementation of research-based learning model to improve the students' proving skills in dealing with the resolving efficient dominating set problem", Journal of Physics: Conference Series, 2021 Publication	1%
4	ejurnal.bunghatta.ac.id Internet Source	1%
5	jurnal.fkip.unila.ac.id Internet Source	1%
6	A.M. Irfan Taufan Asfar, A.M. Iqbal Akbar Asfar, Darmawati, Dedi Darmawan. "The Effect of REACE (Relating, Exploring, Applying, Cooperating and Evaluaring) Learning Model	1%

Toward the Understanding of Mathematics Concept", Journal of Physics: Conference Series, 2018
Publication

7 Syamsul Huda, Munifah, Muhamad Syazali, Syarifah Sri Rahayu, Rofiqul Umam. "THE EFFECTIVENESS OF TWO STAY TWO STRAY, SOMATIC, AUDITORY, VISUALIZATION, INTELLECTUALLY, AND AUDITORY LEARNING TO IMPROVING NUMERICAL ABILITY", Humanities & Social Sciences Reviews, 2020
Publication
1 %

8 ejournal.radenintan.ac.id
Internet Source
1 %

9 L Masruroh, Dafik, Suprapti. "The analysis of the implementation of multi techniques based learning media in improving the elementary school students' higher order thinking skill in solving exponential problem", Journal of Physics: Conference Series, 2020
Publication
1 %

10 R Diani, Y Yuberti, S Anggereni, G N Utami, A Iqbal, I Kurniawati. "ECIRR (Elicit, Confront, Identify, Resolve, Reinforce) learning model with the pictorial riddle method: is it effective in reducing physics misconceptions?", Journal of Physics: Conference Series, 2020
Publication
1 %

11	www.scilit.net Internet Source	1 %
12	www.syekhnurjati.ac.id Internet Source	1 %
13	repo.uinsatu.ac.id Internet Source	1 %

Exclude quotes	Off	Exclude matches	< 1%
Exclude bibliography	On		