

The Effect of Using Rolling Quiz Box Media to Improve the Critical Thinking Ability of Grade 3 Students at Madrasah Ibtidaiyah

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Abstract: This research aims to determine the effect of using Rolling Quiz Box media to improve students' critical thinking skills. The method in this research uses quantitative research of the Quasi Experiment type with a One Group Pretest-Posttest design. In this study, there are two study groups, namely the control class and the experimental class. At the beginning of the research, a pretest was given to see the students' initial understanding, and a posttest was given after the treatment for the control class teaching without media and the experimental class teaching using Rolling Quiz Box media. Clustered random sampling was utilized to choose 2 classes of 3rd-grade students MIN 12 Medan. From the results of data analysis, it can be concluded that the use of Rolling Quiz Box media, education that influences students' critical thinking skills, has proven beneficial. This study shows a significant increase in academic performance, as evidenced by a fairly large increase in the posttest average of the control group to 64.79 and the experimental group, namely 81.67.

Keywords: Rolling Quiz Box, Critical Thinking

Education plays an intense role in the success of every student who will take control of our nation and state. Education is also a platform for improving and advancing the quality of human resources. The efforts made to change this are how educators provide meaningful learning while creating learning innovations. Which can stimulate them to think critically from an elementary age. Many also find that students at the elementary school stage cannot think critically in-depth, which results in obstacles in the learning process. Critical thinking is a very focused way of forming students' cognitive abilities in analyzing the problems they will face, in this case, they can solve these problems. (Yasifa et al., 2023) (Tiara Ramadhani*, 2024). Berfikir kritis disebut juga kemampuan berfikir kreatif yang dimana mendukung peserta didik untuk mampu memecahkan masalah dan membimbing para peserta didik untuk dapat memunculkan ide-ide yang terbaru (Yusnaldi et al., 2023). Critical thinking is also called the ability to think creatively which supports students to be able to solve problems and guides students to be able to come up with the latest ideas. (Yolanza & Mardianto, 2022). In line with this definition, critical thinking is a learning procedure that encourages students to be more

motivated because it awakens their enthusiasm for learning, remembering that they will face real situations and then overcome these challenges by conducting research and practicing solutions. (Ritonga et al., 2023). Entering the context of Mathematics learning, it seems that critical thinking is not only taught to memorize and also know the steps in solving a problem, but here they are required to be able to apply it in the real world that they will live in everyday life, so when they are faced with In reality, they can find solutions and can evaluate the things they face. Based on the opinions above, it can be concluded that the ability to think critically is an ability that can change a person's perspective to be more critical, to become someone who can quickly solve problems and quickly get solutions to these problems.

In Piaget's cognitive perspective, elementary school students (ages 7 to 13 years) undergo the concrete operational thinking stage. In line with the concept of cognitive development, children in this age group generally have difficulty understanding abstract elements of mathematics. Due to its abstract nature, mathematics content tends to pose challenges for elementary school students as a whole. Referring to the results, based on the 2011

TIMSS (Trends in International Mathematics and Science Study) report, class VIII students in Indonesia achieved an average mathematics score that ranked 38th out of 42 countries measured. Indonesia is lagging when compared to other ASEAN countries such as Singapore, Thailand, and Malaysia (Mujiani, 2016). Learning mathematics is mandatory at every level of education, starting from elementary school (SD) to high school (SMA), this mathematics lesson is very important to teach to students because this learning is agreed as an important knowledge that must be present in everyday life, because in our daily lives, we use mathematics, how to localize things that will happen, buying and selling, doing things with calculations. (Siregar, 2022). The aim of mathematics learning at every level of education is to prepare students as early as possible to have a mature mindset and be able to reason logically. (Rahmadani et al., 2023). In line to teach mathematics, it is to equip students with the skills needed to develop critical, creative, innovative, rational, and analytical thinking abilities. (Lubis & Rambe, 2023). In learning Mathematics, we often find that most educators use strategies or methods that do not make students interested in learning Mathematics and also do not arouse great curiosity so learning Mathematics is often considered difficult and unpleasant learning. Meanwhile, learning Mathematics can stimulate children's thinking patterns to become more critical, by inviting them to always find a solution to problems. So, an educator must be able to create innovations or learning media that can make them think critically, and create media that is not only for evaluation but also for delivering fun material.

Learning Media is a way or tool to support success in learning, with this learning media we can easily communicate with our students, and the delivery of material can be directly understood by students. (Risqi & Siregar, 2023). Learning media can be defined as an intermediary for conveying learning messages, which can be in the form of objects, animated videos, pictures, writing, and so on, both between teachers and students. (Yasifa et al., 2023). Media is also in the form of people, materials, or events that can improve conditions and empower students to acquire knowledge, skills, and attitudes. (Sitepu et al., 2023). Learning media is a link between students and teachers who will convey learning and can be well-received by students. (Putri Pramestia Ningrum & Dahlan, 2023). Learning media can be defined as tools used in the educational process, which can be understood

through auditory, visual, or reading means, to convey educational messages. This media can capture students' attention and emotions. (Alia Rohani & Anas, 2022).

Although there has been a lot of research on student's critical thinking abilities in learning mathematics there have also been many solutions offered, such as the use of Rolling Quiz Box media. (Azami et al., 2021). Where Media Rolling Quiz Box is a game using a small ball that is rolled on a board that already contains nails arranged crosswise and then under the board several boxes are arranged containing the questions to be answered. (Harwito et al., 2021). Made from styrofoam designed with thumbnails, and equipped with questions (Meiningsih, 2021). The benefits of the Rolling Quiz Box game are that it guides students in honing hand coordination, concentration, teamwork, and communication with peers or teams, all of which aim to measure students' skills in finding solutions and completing the game by following a predetermined path for each. However, in the research carried out here, the researcher designed the media that had been created again by adding a box for delivering material and evaluation material which was inserted with the flat shape material. This media was designed so that it was not only about delivering the material through lectures but also had a physical form of the shapes. Flat, so that students will later be able to develop a sense of courage in working on questions and solving problems using critical thinking processes. (Sari et al., 2024). Through this media, educators can see students' critical thinking abilities by enhancing them. This media is designed so that the basic skills of the material are met and can influence students' critical thinking abilities. With the help of a small ball to roll, the board is filled with nails and then there is a place for the ball to land and also a box containing questions and learning materials. The appearance of the Rolling Quiz Box is as follows:



Rolling Quiz Box Media

From the results of observations made by researchers at MIN 12, Medan City, specifically in class 3, the Rolling Quiz Box media has never been

used during their learning, especially in Mathematics subjects. However, when there is material for those who need media assistance, the Mathematics teacher at the school brings teaching aids for the learning being carried out. Based on the results of initial observations, the researchers gave an initial test to 270 students who were divided into 6 classes, where each class had scores that reached the KKM and scores that did not reach the KKM. The results are as follows:

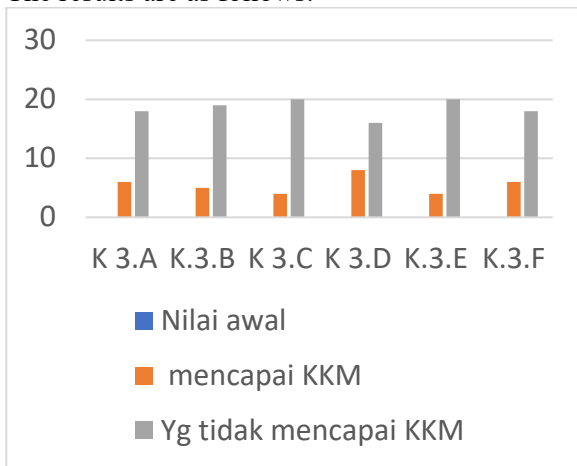


Figure 1. Diagram of the results of the initial critical thinking ability test for grade 3 students at Madrasah Ibtidaiyah

From this diagram, it can be seen that the critical thinking ability of class 3 students at Madrasah Ibtidaiyah, whose sample the researchers took from MIN 12 Medan City, is still relatively low. In addition to the data above, the results of interviews were obtained by researchers conducted with Mrs. May as the homeroom teacher of class 3. E, Mrs. Naili as the homeroom teacher of class 3. questions are influenced by several things, including 1. Factors originating from the students themselves, namely students lazy to read the questions, students not understanding what the instructions in the questions are asked for, answering questions students use their way without following the teacher's instructions, and lack of motivation and encouragement. Obtained by students to be more active in participating in the learning process. 2. External factors, including, the learning carried out by the teacher is acknowledged by the teacher as still conventional, explaining formulas and examples and then immediately giving practice questions, lack of use of learning media to support the ongoing learning process, no rewards received by students when they succeed

From the data above, it turns out that the same thing was also experienced by Bonita, 2021; Sudji, 2022; and Kusnanti, 2017 stated that the problem of their research was the lack of use of learning media during the teaching and learning process by teachers so that students felt bored in learning, teachers tended to only use the lecture method in learning, then teachers only wrote or described shapes on the blackboard, not bringing the shape of these material objects so that their thinking process is hampered, the teacher also only repeats learning activities using worksheets without interspersing them with varied activities. From the results, they conducted research on educational media at various levels of education, starting from elementary school (SD), and junior high school (SMP) to senior high school (SMA).

Then the researchers also looked at the effect of using the rolling quiz box media on the dominance of indicators of critical thinking abilities of madrasah ibtidaiyah students. The indicators in question are 1. Ability to provide simple explanations, 2. Building basic abilities, 3. Concluding, 4. Carrying out further explanations, 5. Organize strategies and tactics for solving problems (Enis, 2019). So, from the explanation above, researchers are interested in conducting research with the title "The Effect of Using Rolling Quiz Box Media to Improve Critical Thinking Ability of Grade 3 Students of Madrasah Ibtidaiyah".

METHOD

Research Design

This research is quantitative research whose results measure the existence of a variable (Salim & Haidir, 2019) in the form of a quasi-experiment. The design of this research is a group pretest-posttest design, where the sample in this research is divided into two groups, namely the experimental group and the Control group.

Desain one grup pretest-posttest

Control Class	Pre-Test	Dont Use Media	Post-Test
Kelas Eksperimen	Pre-Test	Use Media	Post-Test

The population used was taken using cluster sampling if the data source to be thorough is very broad, the sample is taken based on the specified population area (Sugiyono, 2015), namely Madrasah Ibtidaiyah students who have studied Mathematics at the basic level, numbering approximately 915, therefore the size of the research

population used Probability sampling technique with the formula created by Isaac and Michael in determining the sample to determine the sample size from a known population is described as follows:(Amin et al., 2023).

$$S = \frac{\lambda^2 \cdot N \cdot P \cdot Q}{d^2(N - 1) + \lambda^2 \cdot P \cdot Q}$$

$$s = \frac{3,841 \times 915 \times 0,5 \times 0,5}{0,05^2 \times (915 - 1) + 3,841 \times 0,5 \times 0,5}$$

$$s = \frac{878,62875}{2,285 + 0,96025}$$

$$s = \frac{878,62875}{3,24525}$$

$$s = 270,5$$

λ^2 = Chi Square whose value depends on the degrees of freedom and the degree of error. See = Chi-Square table (3.841).

N = Total population

P = Correct probability (0.5)

Q = Wrong probability (0.5)

d = The difference between the sample mean and the population mean. The difference can be 0.01; 0.05; and 0.10.

A sample of 270 students from 6 classes was obtained. Because this research uses cluster sampling, 2 classes will be taken which will later be used as a control class and an experimental class, namely classes 3C and 3E, totaling 48 students,

where the control class is treated without using media while the experiment is given treatment using media. The instrument for collecting data for students' critical thinking skills uses a test where this test has been validated by a material expert, namely Mrs. Lailatun Nur Kamalia Siregar.

This data was analyzed using the independent statistical test (t-test) $\beta_n/S\beta_n$ Where: t: follows the function t with degrees of freedom (df) to see whether there was an increase or not and the response was analyzed using hypothesis testing. This hypothesis test is obtained by comparing the average scores from the pretest and posttest. So that later the final results of this research can be seen through the hypothesis test and also from this test we know whether the Rolling Quiz Box media affects students' critical thinking abilities in MIN 12 Medan City.

RESULTS AND DISCUSSION

Results

The research was carried out by testing two classes consisting of 24 students each, who were students in class III of Madrasah Ibtidaiyah. The research subjects were students of class III MIN 12 Medan City, the trial was carried out on April 27, 2024. Before learning using the Rolling Quiz Box media which had been designed by researchers, students were given a test to measure the student's initial abilities (pre-test). The following is a grid of the Critical Thinking Ability Instrument for Medan City MIN 12 Students:

Critical Thinking Instrument Grid

BASIC COMPETENCIES	QUESTION INDICATORS	ASPECT	NO
3.10 Explain and determine the perimeter of flat shapes	Students can state the characteristics of one flat shape completely	Analyze and Focus Questions appropriately	1
4.10 Presenting and resolving problems related to flat shapes	Students can determine the type of flat shape according to the picture of the object	Involves a bit of guesswork	2
	Students can determine examples of flat shapes by looking around them	Constructing arguments	3
	Students can determine the number of perimeters of flat figures	Create and determine the results of consideration of balance problems	4
	Students can calculate the circumference of one of the flat shapes	Using logical strategies	5

Before analyzing the specified data, the researcher carries out a normality test to see whether the data is normal or not, to see it in the table below:

Table 1. Normality Test

One-Sample Kolmogorov-Smirnov Test		Unstandardized Residual
N		24
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	9.00491403
Most Extreme Differences	Absolute	.175
	Positive	.156
	Negative	-.175
Test Statistic		.175
Asymp. Sig. (2-tailed)		.056 ^c

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Based on the table above, it can be seen that the normality test on this research data shows a normal distribution, namely 0.056 and researchers can immediately carry out further data analysis.

The initial test carried out in this research was a Pre-Test to see the effect of using the Rolling Quiz Box media to improve the critical thinking skills of Grade III MIN 12 Medan City students. The data results can be seen in the following table:

Table 2. Data on Students' Critical Thinking Ability without Media Treatment

	N	Ran ge	Minim um	Maxim um	Me an	Std. Devia tion
Pretest Kontr ol	2 4	45	25	70	46. 46	15.77 6
Posttest Kontr ol	2 4	30	45	75	64. 79	9.026
Valid N (listwi se)	2 4					

This data reveals that the average score for the critical thinking pretest results of students in the Control class is 46.46 and the post-test is 64.79. The minimum pre-test in the control class is 25 and the post-test is 45. In the pre-test, the maximum value in the control class is 70. For the post-test, the maximum value in the control class is 75.

Table 3. Data on Students' Critical Thinking Ability after Media Treatment

	N	Ran ge	Mini mum	Maxi mum	Me an	Std. Devia tion
Pretest Ekseperi men	2 4	35	35	70	53. 75	9.237
Posttest Ekseperi men	2 4	20	75	95	81. 67	4.341
Valid N (listwis e)	2 4					

Meanwhile, the data above shows that the average score of the pretest results for students' critical thinking abilities in the Experiment class is 53.75 and the Post-Test is 81.67. The minimum pre-test score for the experimental class is 35 and the post-test minimum score for the experimental class is 75. For the pre-test, the maximum score for the experimental class is 70, while for the post-test the maximum score for the experimental class is 95.

Therefore, it can be concluded that there are differences in students' critical thinking abilities in Mathematics learning, especially in Flat Building material, between the experimental group given the Rolling Quiz Box media and the control group which used traditional methodology. The experimental group showed a superior average compared to the control group.

Table 4. Independent Sample Test T-test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
Hasil Belajar	Equal variances assumed	11.931	.001	9.751	46	.000	20.625	2.115	16.367	24.883	
	Equal variances are not assumed.			9.751	36.283	.000	20.625	2.115	16.336	24.914	

These findings show an increase in the average post-test score of students' critical thinking abilities reaching 81.67 in the experimental group and 64.79 in the control group. The median score for the experimental group was 80, compared with 62.5 for the control group. The mode of the experimental group is also 80, while the control group is 60. Based on the results obtained using the Independent Sample T-test test formula, the significance value (2-tailed) for the experimental class and control class is 0.000, which is smaller than 0.05. Thus, by the basis for decision-making in the Independent Sample T-Test, it can be concluded that the null hypothesis (Ho) is rejected and the alternative hypothesis (Ha) is accepted. This means that there is a significant influence on the critical thinking abilities of class 3 MIN 12 Medan City students who are taught using Rolling Quiz Box media. The data shows that in the control class which used image media, many students got grades below average. Meanwhile, students who studied using the Rolling Quiz Box media got satisfactory grades. The use of Rolling Quiz Box media can stimulate students to think critically and solve problems. Students become more enthusiastic and play an active role in the learning process.

Discussion

In teaching Mathematics, teachers must show creativity and innovation to overcome various obstacles faced by students during the learning process. Student learning achievement really depends on the teacher's ability to teach professionally (Ariani & Octavia, 2018). Initial research shows that student learning outcomes are quite worrying. Most students do not understand the material provided, only copy questions during practice or exams, do not understand writing instructions, and do not use innovative media (Dharma et al., 2024). For this reason, the use of

Rolling Ball media can increase student creativity and activeness through the POE learning model in three main stages: predicting what will happen (predict), making observations and discussions to prove the prediction (observe), and explaining the results of observations and discussions (explain) (Abdurrahim et al., 2020). The same thing also happens in several studies that the rolling ball media influences student learning outcomes, where this media usually involves students in physical activity which makes them more active. This physical activity can increase student engagement and make them more interested in the material being taught (Sukmawati et al., 2022). The t-test was used to determine whether there was an influence of Rolling Ball media on learning. The research results showed a significant increase, indicating that the use of Rolling Ball media had a positive impact on student learning outcomes, based on the test results given. The use of this media allows students to be active in developing strategies. In this research, Rolling Ball media had a significant positive influence on student learning outcomes, including increasing conceptual understanding, motivation, student involvement, and development of practical skills. Research and case studies support that this method is more effective than traditional learning methods, making Rolling Ball media a valuable tool in education (Putri & Arif Budiman, 2021)

The use of this media allows students to be active in formulating strategies and thinking critically in doing everything. So, the research in this article was carried out on March 8-14 at MIN 1 Medan City. Learning was carried out in two classes, namely classes III C and III E. Class III E was the experimental class and III C was the control class. Learning activities in both classes were carried out by researchers' research needs and accompanied by the class teacher. This research was

conducted during 2 meetings in each class, namely the control class and the experimental class. The test was given twice to students to obtain data on research needs. The learning process begins with giving a pre-test to students, then they are given treatment, then at the end of the learning process, students are given a post-test to determine whether or not there is a significant influence from the use of Rolling Quiz Box media on students' critical thinking abilities.



Figure 2. Using Rolling Quiz Box Media

In the picture above, the Pre-Test was given to the control class and the experimental class, they only did it using their knowledge.

Now, for the picture above, teaching using the Rolling Quiz Box media was carried out in the Experimental class, namely class III E, they were very enthusiastic about learning using this learning media because the material was delivered using the media provided while explaining the material, it was interspersed with experiments with the students. Students before playing the Rolling Quiz Box media. They will be asked to make flat shapes with the help of rubber bands which will be formed on a rolling board. Here they are asked to be able to think about how to form flat shapes on nails on a rolling board, and how to form parallelograms, trapezoids, rhombuses, etc. with the help of rubber bands. After all, students have tried and the delivery of the material is complete, they will play the Rolling Quiz Box media, first, the groups are divided into 4 groups, then the first 2 groups come forward to play the media and explain the use of the media, after that each group takes turns rolling the ball on the board. Rolling to get the Quiz on the rolling board, after getting the part of the flat shape determined by the ball, the students take a question in the Evaluation Box, and so on until all groups have finished, then, when finished they are given time to discuss answering the evaluation paper that has been taken. Then when they have answered the question, the group with the most correct answers will be given a reward.

They enjoy learning and answering questions while playing learning media. They answered questions by the material that had been presented previously, and then after finishing playing the

media, a posttest was distributed to see whether or not there had been an improvement in students' learning and whether they had been able to develop problem-solving and critical thinking skills to answer the questions. Posttest.

So it can be compared with previous research that both studies using rolling ball media obtained good results for students. Both have different results, but both studies have a good impact on learning.

CONCLUSION

Based on the findings presented in the research, it can be concluded that the experimental group showed a more significant increase in post-test scores compared to the control group. Through data analysis using SPSS 22, it was discovered that the post-test score for the experimental group reached 81.67, while the control group reached 64.79. The advantage of using Rolling Quiz Box media as proven in this research lies in its ability to improve students' critical thinking skills, especially in the area of Bangun Datar material. Therefore, it can be concluded that the use of the Rolling Quiz Box learning media is more effective in improving students' critical thinking skills, especially in acquiring Flat Build material in class III MIN 12 Medan City.

REFERENCES

- Abdurrahim, Mukhamad, N., & Yuli, H. (2020). Pengaruh Penggunaan Media Rolling Ball Dalam Model Pembelajaran Predict , Observe , Explain (POE) Terhadap Hasil Belajar Kimia Pada Materi Laju Reaksi the Effect of Using Rolling Ball Media in Predict , Observe , Explain (Poe) Learning Models on Chemi. *Jurnal Zarah*, 8(1), 44–49. <https://ojs.umrah.ac.id/index.php/zarah/article/view/2130/959>
- Alia Rohani, & Anas, N. (2022). Pengembangan Media Komik Dengan Menggunakan Aplikasi Comic Page Creator Untuk Meningkatkan Kemampuan Membaca Siswa Kelas 2 Sekolah Dasar. *Jurnal Cakrawala Pendas*, 8(4), 1287–1295. <https://doi.org/10.31949/jcp.v8i4.3134>
- Amin, N. F., Garancang, S., & Abunawas, K. (2023). Konsep Umum Populasi dan Sampel dalam Penelitian. *Jurnal Pilar*, 14(1), 15–31.
- Ariani, S., & Octavia, M. (2018). Inovasi Pembelajaran Matematika Metode Rolling Question Untuk Meningkatkan Kreatifitas Dan Kemampuan Berfikir Siswa Di Kelas Vii Smpn 3 Ciawigebang Kabupaten Kuningan. *Euclid*, 5(1), 55. <https://doi.org/10.33603/e.v5i1.706>

- Azami, B., Dessolina, D., Kristina, E., Pratiwi, M., Handayani, N., Freticilia, S. G., & Leonard, L. (2021). Pengembangan Media Pembelajaran Rolling Ball untuk Materi Fungsi dan Invers. *Journal of Instructional Development Research*, 2(2), 69–80.
- Dharma, S., Novita, A., Simanjorang, B., Wulandari, D., & Silva, F. (2024). *Rolling Stick sebagai Upaya Meningkatkan Minat Belajar Peserta Didik Kelas 2 SDN 066057 Medan Denai Dalam Pembelajaran PPKn*. 8, 25102–25109.
- Harwito, A. P., Iriansyah, H. S., & Barkah, A. S. (2021). Prosiding Seminar Nasional Pendidikan STKIP Kusuma Negara III Pengembangan Media Rolling Ball pada Mata Pelajaran PKN Materi Hak dan Kewajiban. *Prosiding Seminar Nasional Pendidikan STKIP Kusuma Negara III*, 794–799.
- Lubis, J. A., & Rambe, A. H. (2023). Pengembangan Alat Peraga Matematika Berbasis Metode Montessori pada Papan Perkalian di Kelas II MI. *EduInovasi: Journal of Basic Educational Studies*, 3(2), 494–512. <https://doi.org/10.47467/edui.v3i2.1405>
- Meiningsih, S. (2021). Rolling Ball - Learning Cell dalam Pembelajaran untuk Meningkatkan Keterampilan Menulis Bahasa Inggris Siswa. *Jurnal Paedagogy*, 8(2), 190. <https://doi.org/10.33394/jp.v8i2.3511>
- Mujiani, dwi safitri. (2016). Pengaruh Media Pembelajaran dan Pecerdasan Hasil Belajar Matematika Siswa. *Jurnal Pendidikan Dasar*.
- Putri Pramestia Ningrum, & Dahlan, Z. (2023). Pengembangan Media Swivel Wheel Untuk Meningkatkan Hasil Belajar Siswa Pada Mata Pelajaran IPS Di Kelas VI Sekolah Dasar. *Jurnal Elementaria Edukasia*, 6(2), 250–262. <https://doi.org/10.31949/jee.v6i2.5363>
- Putri, S. N., & Arif Budiman. (2021). Jurnal Pengetahuan Islam. *Indonesian Journal of Educational Science (IJ)*, 2(1), 17–31. <http://ojs.iaisumbar.ac.id/index.php/ikhtisar/article/view/26%0Ahttps://ojs.iaisumbar.ac.id/index.php/ikhtisar/article/download/26/46>
- Rahmadani, A., Wandini, R. R., Dewi, A., Zairima, E., & Putri, T. D. (2023). Upaya Meningkatkan Berpikir Kritis dan Mengefektifkan Pendekatan Kontekstual dalam Pembelajaran Matematika. *Edu Society: Jurnal Pendidikan, Ilmu Sosial Dan Pengabdian Kepada Masyarakat*, 2(1), 427–433. <https://doi.org/10.56832/edu.v2i1.167>
- Risqi, W., & Siregar, N. (2023). Media Papan Pintar Materi Perkalian dalam Pembelajaran Matematika Permulaan di Sekolah Dasar. *Jurnal Ilmiah Pendidikan Profesi Guru*, 6(2), 1–9.
- Ritonga, N. M., Anas, N., & Rohani, R. (2023). Pengaruh Model Problem Based Learning (PBL) Terhadap Kemampuan Berpikir Kritis Siswa Pada Materi Sistem Peredaran Darah. *JUPEIS: Jurnal Pendidikan Dan Ilmu Sosial*, 2(4), 37–40. <https://doi.org/10.57218/jupeis.vol2.iss4.835>
- Sari, I. R., Puspitasari, E., Riau, U., Pekanbaru, K., & Riau, P. (2024). *Pengaruh Media Rolling Ball Terhadap Kemampuan Kerja Sama Anak Usia 5-6 Tahun TK Tri Insani Permata Pekanbaru*. 2(1), 423–431.
- Siregar, L. N. K. (2022). Pengaruh Penggunaan Media Alat Peraga (Garis Bilangan) terhadap Hasil Belajar Matematika Siswa di Sekolah Dasar. *Edukatif: Jurnal Ilmu Pendidikan*, 4(2), 2501–2509. <https://doi.org/10.31004/edukatif.v4i2.2369>
- Sitepu, N. P. S. B., Salminawati, & Rambe, R. N. (2023). Pengaruh Media Gambar Tunggal Terhadap Keterampilan Menulis Paragraf Deskripsi Siswa Kelas V MIN 11 Kota Medan. *Jurnal Pendidikan Dan Ilmu Sosial*, 1(4), 238–251.
- Sukmawati, S., Jamaluddin, J., Sastrawati, A. T. S., Lagole, D. ., Nuraisyah, A. F., Bandaso, P., & Rezaldi, R. (2022). Implementasi Pemanfaatan Media Rolling Ball Games Dalam Pembelajaran PPKN. *Jurnal Kewarganegaraan*, 6(1), 685–692. <https://journal.upy.ac.id/index.php/pkn/article/view/2600>
- Tiara Ramadhani*, R. R. W. (2024). No TBerpikir Kritis Dalam Pembelajaran Matematika SD/MI. *Journal of International Multidisciplinary Research*, 2(1), 33–37. <https://doi.org/https://doi.org/10.62504/h6nk4189>
- Yasifa, A., Hasibuan, N. H., Siregar, P. A., Zakiyah, S., Anas, N., Negeri, U. I., Utara, S., William, J., Ps, I. V, Estate, M., Percut, K., Tuan, S., & Serdang, D. (2023). Implementasi Pembelajaran STEM pada Materi Ekosistem terhadap Kemampuan Berpikir Kritis Peserta Didik. *Journal on Education*, 5(4), 11385–11396.
- Yolanza, R., & Mardianto, M. (2022). Analisis Kemampuan Berfikir Kritis Siswa Sekolah Menengah Atas Pada Mata Pembelajaran Pendidikan Agama Islam. *Belajea: Jurnal Pendidikan Islam*, 7(1), 27. <https://doi.org/10.29240/belajea.v7i1.4339>
- Yusnaldi, E., Wibowo, S. P., Azzahra, S., Sitorus, P. A., Hutasuhut, N. A., & Nadya, L. (2023). *Strategi Guru dalam Meningkatkan Keterampilan Berpikir Kritis Siswa dalam Pembelajaran IPS di SD / MI*. 7, 32160–32166