

## The Effectiveness of Using Quizizz in Numerational Literacy Skills of Fractional Materials in 3<sup>rd</sup> Grade Students of Elementary School

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### Abstract

The purpose of its application in this study is to determine the effectiveness of using *Quizizz* game-based application media in numeracy literacy skills. The method implemented in this research is a combination method with Explanatory Sequential Designs. The data collection technique used is a matter of numeracy literacy test material assisted by *Quizizz*, e-questionnaire assisted by google form, and interview sheet. The subjects used were 25 students of class III C Ibnu Batutah SD IT Harum for the 2021/2022 academic year. The results of data processing, the average value obtained by students with *Quizizz* media on all indicators is 81.80 with a percentage of 80% of students belonging to the complete group, compared to the average value obtained by students who only use *paper*, which is 68.80 with a percentage of 40% of students belonging to the complete group. In further testing using SPSS version 25 through the paired sample t-test the value of sig (2-tailed) is smaller than 0.05, namely  $0.000 < 0.05$ , meaning  $H_0$  is rejected and  $H_1$  is accepted. The results of the open questionnaire and interview process showed that all students gave positive responses in using the *Quizizz* application media when working on questions. This study concludes that there is an influence in the use of *Quizizz* application media in numeracy literacy skills in third third gradients of SD IT Harum.

**Keywords:** Effectiveness, Numeracy literacy, *Quizizz*

### Abstrak

Tujuan dilaksanakannya penelitian ini guna mengetahui efektivitas penggunaan media aplikasi berbasis permainan *Quizizz* dalam keterampilan literasi numerasi materi pecahan. Metode yang diimplementasikan dalam penelitian ini ialah metode kombinasi dengan *Explanatory Sequential Designs*. Teknik pengumpulan data yang digunakan ialah soal tes literasi numerasi materi pecahan berbantu *Quizizz*, e-kuesioner berbantu *google form* dan lembar wawancara. Subjek yang digunakan 25 siswa kelas III C Ibnu Batutah SD IT Harum tahun ajaran 2021/2022. Hasil keseluruhan pengolahan data, nilai rata-rata yang didapatkan siswa dengan media *Quizizz* pada seluruh indikator yaitu 81,80 dengan presentase 80% siswa yang termasuk kedalam kelompok tuntas, di bandingkan dengan nilai rata-rata yang didapat siswa yang hanya menggunakan *paper* yaitu 68,80 dengan presentase 40% siswa yang termasuk kedalam kelompok tuntas. Pada pengujian lebih lanjut menggunakan SPSS versi 25 melalui uji *paired sample t-test* nilai sig (2-tailed) lebih kecil dari 0,05 yakni  $0,000 < 0,05$  artinya  $H_0$  ditolak dan  $H_1$  diterima. Adapun hasil terhadap proses kuesioner terbuka dan wawancara menunjukkan bahwa seluruh siswa memberikan tanggapan yang positif dalam menggunakan media aplikasi *Quizizz* saat mengerjakan soal. Kesimpulan akhir dalam penelitian ini bahwa terdapat pengaruh dalam penggunaan media aplikasi *Quizizz* dalam keterampilan literasi numerasi pada materi pecahan siswa kelas III SD IT Harum.

**Kata kunci:** Efektivitas, Literasi Numerasi, *Quizizz*

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## INTRODUCTION

Numerical literacy skills are a person's activity in using numbers, and also various symbols related to mathematics to solve practical problems in everyday life and examine the information presented in the form of tables, charts, graphs, etc. Then, the results of the analysis are used to predict and determine a decision (Ekowati & Astuti, 2019). In line with the previous explanation, numeracy literacy is a person's ability to understand a statement through the activity of reciting numbers and

symbols or mathematical language found in everyday life, as well as expressing it verbally and in writing (Herawan, 2022). Consequently, the numeracy literacy movement is not only a slogan but is a real and structured activity to prepare individuals who can compete freely with other countries (Dantes, 2021).

The Organization for Economic Cooperation and Development (OCED) announced that the PISA (Program for International Student Assessment) score for Indonesia in the field of Literacy was ranked 72 out of 77 countries. Mathematics was ranked 72 out of 78 countries and science was ranked 70 out of 78 countries. This makes Indonesia number 74 (OCED, 2019). Based on the report, Indonesia's achievements tend to decline when compared to the PISA report in 2015 (Ndiung & Jediut, 2020). Indonesia is also in a low position even and unlike the small country Vietnam (Pangesti, 2018).

The interview activities for third grade students of SD IT Harum and also 3<sup>rd</sup> teachers showed that students were not yet aware of the importance of numeracy literacy skills used in academics and to support daily activities. Along with these observations, the researcher also conducted an interview process with one of the teachers at SDIT Harum, namely Mrs. Nurul as class III C teacher, Ibnu Batutah. In carrying out the learning, Mrs. Nurul as homeroom teacher of Class III C Ibnu Batutah SDIT Harum has used several online media in online and offline learning. Media that have been used include concrete media and digital media such as Youtube, Google Classroom, WhatsApp Group and Google Form.

Accordingly, it can be said that these numeracy literacy skills must have special attention. As seen in the research conducted by (Dantes, 2021), he said that students' lack of understanding of numeracy literacy skills is one of the impacts of the decline in the literacy index of the Indonesian people. The research conducted by (Fitriana & Koiri Ridlwan, 2018), said that in the learning process both mathematics and non-mathematics must acquire and integrate numeracy literacy skills related to everyday life.

In studying mathematics, students are expected to be able to apply mathematics as an inference tool in objective, systematic, logical, and critical thinking (Kowiyah, 2016). Moreover, when studying mathematics in elementary schools, teachers must be able to teach optimally till the learning provided is meaningful for students (Adawiyah & Kowiyah, 2021). Along with this, numeracy literacy skills provide students with the provision to think critically, logically, creatively, analytically, and systematically. It can be said that the more complex an achievement that must be fulfilled by students from learning, the learning media has an important role (Widiastuti et al., 2018).

When using learning media, it is not merely a complementary component, but learning media is a component that provides motivation to students which will have an impact on the achievement of learning (Winarni et al., 2021). Hence, learning is not monotonous and boring. The use of varied media is important for a teacher (Mulyawati & Kowiyah, 2022). The impact of using interesting media in learning provides something special for students as a result students have experiences that will become memories in the long term (Saputra et al., 2019). Then, whatever the purpose of the learning carried out

will be achieved if a teacher can design learning in the classroom as attractive as possible (Hawa & Yosef, 2019).

In applying numeracy literacy skills to game-based evaluation activities, one of them using game media, namely Quizizz, can motivate students to carry out evaluation activities related to numeracy literacy in an interesting and entertaining way (Pratama et al., 2020; Zulfadewina et al., 2020). Quizizz is an application that can be used for learning media as well as an evaluation tool for game-based learning processes and is equipped with image and music features (Audia et al., 2021; Nuryati et al., 2022). Starting from the background that has been conveyed and the research conducted by (Ardiansyah, 2022) in the use of the Quizizz application in mathematics learning which only focuses on interest and understanding of mathematical concepts and several other studies related to learning mathematics and learning media, the researchers are moved to examine new problems with the title "Effectiveness of Using Quizizz Application Media in Numerical Literacy Skills for Grade III Elementary School Students". The purpose of this study was to determine the effectiveness of using game-based application media, namely Quizizz, in material numeracy literacy skills. With the formulation of the research problem, namely (1) How is the effectiveness of using Quizizz application media with numeracy literacy skills seen by students' tests? (2) Is the use of the Quizizz application media suitable for use in material numeracy literacy skills?

## **METHODE**

Mixed Method (Combination Method) is the method used in this study. Mixed method is a coalition of qualitative and quantitative methods in a study (Putri, 2020). In other words, the combination method combines two strengths at once in a study where the qualitative method provides a deeper understanding of the problem in a research while the quantitative focuses on the existence of data in a study (Dawadi et al., 2021). This study used a combination method, and one of the two methods is considered superior to the other methods. The superior method in this research is quantitative method and qualitative method as a complement and additional data sequentially or called Explanatory Sequential Designs.

From the results of interviews related to numeracy literacy skills for students and teachers of SD IT Harum, so the research was conducted at SD IT Harum Koja, North Jakarta in the even semester of the 2021/2022 academic year. The research process used interactive game-based learning media, namely Quizizz. The research population was all students in class III SD IT Harum as many as 83 students and divided into 3 study groups. Because the population is quite large, the researchers applied a random sampling technique to take samples in this study, namely students who were in class III C Ibnu Batutah SD IT Harum as many as 25 students.

Data is the most important component in a study and to draw conclusions to obtain results from the research conducted (Pamungkas & Kowiyah, 2021). Therefore, in collecting data and information about the object or each process that were studied in this study, among others: a) Fraction test questions

assisted by game-based application media, namely Quizizz in the closing activity where each student's answers became data in the research conducted, b) The form of e-questionnaire for student responses to the use of Quizizz game-based application media in the closing activity assisted by the google form, c) The interview guide sheet was carried out to strengthen the data and on the e-questionnaire sheet.

Researchers analyzed data related to the effectiveness of using game-based application media, namely Quizizz, in closing activities that were integrated with numeracy literacy skills. Data analysis techniques on the results of each student's acquisition were grouped according to the score that reached the minimum completeness category, where the KKM for class III is 75. It can be seen that students who got the results of working on questions through the Quizizz application media were more than equal to 75 are included in the group. "Completed" while students who obtained the results of working on questions through the Quizizz application media were less than 75 included in the "Incomplete" group.

Obtaining data on the results of the questions that students worked on through the Quizizz media, the researchers calculated the percentage of the number of students belonging to the complete group by using the following formula (Putri, 2020):

$$\frac{\text{number of students completed}}{\text{total number of students}} \times 100\% \quad (1)$$

Meanwhile, in order to find out the percentage of students who are not completed, you can use the following formula (Putri, 2020):

$$\text{Incomplete Student percentage} = 100\% - \text{Percentage of Completed Students} \quad (2)$$

Furthermore, to obtain the percentage of the group of students who completed, and students did not complete the results of the evaluation of the fraction material related to numeracy literacy using Game Based Quizizz application media.

## **FINDINGS AND DISCUSSION**

### ***Data analysis of test results done by students through Paper and Quizizz based on the first indicator of Numerical Literacy***

Based on the first indicator of numeracy literacy, students applied various types of numbers and symbols related to mathematics and related to the context of everyday life. The following is the data on the results of tests carried out by students using papers related to numeracy literacy skills for grade III C Ibnu Batutah SD IT Harum students. The data obtained are shown in Table 1.

Table. 1 First Indicator of Using Paper

<i>Paper</i>	<b>Item 1</b>	<b>Item 2</b>	<b>Item 3</b>
Mean	13.60	11.40	11.00
N	25	25	25
Std. Deviation	3.069	3.958	3.227

Based on Table 1, the average results of the test scores for numeracy literacy skills using papers related to the first indicator at point 1 are 13.60; at point 2 are 11.40; at point 3 are 11.00. Furthermore, the following data on the results of tests carried out by students through Quizizz in the same indicators can be seen in Table 2.

Table 2. First Indicator of Using *Quizizz*

<i>Quizizz</i>	Item 1	Item 2	Item 3
Mean	13.80	13.80	11.80
N	25	25	25
Std. Deviation	2.179	2.986	2.843

Furthermore, it can be seen in table 2 that the average result of the numeracy literacy skill test scores using Quizizz on first indicator in item 1 is 13.80, item 2 is 13.80, and item 3 is 11.80. Based on the two tables above, in the first numeracy literacy indicator with test items 1, 2 and 3 on fractional material, the average value obtained by students has increased. The test results of students who implemented the Quizizz application media were higher than the average value obtained by students when only using paper. It can be described by the many features found in the Quizizz application such as live quizzes, accompaniment music and others, that can be have an impact on making students more enthusiastic in applying various types of numbers and symbols relates to mathematics and related to the context of everyday life.

***Data analysis of test results done by students through Paper and Quizizz based on the second indicator of Numerical Literacy***

The second indicator in numeracy literacy is examining information in the form of images, diagrams, graphs, and tables. The following is the data on the results of tests carried out by students using papers related to numeracy literacy skills for grade III C Ibnu Batutah SD IT Harum students. The data obtained are as shown in Table 3.

Table 3. Second Indicator Using Paper

Paper	Item 4	Item 5
Mean	10.80	11.80
N	25	25
Std. Deviation	4.252	3.786

Based on Table 3, the average result of the test scores for numeracy literacy skills using a paper related to the first indicator in point 4 is 10.80, and in item 5 is 11.80. Furthermore, the following data on the results of tests carried out by students through Quizizz in the same indicators can be seen in Table 4.

Table 3. Second Indicator of Using *Quizizz*

<i>Quizizz</i>	Item 4	Item 5
Mean	13.80	13.40
N	25	25
Std. Deviation	2.614	2.380

Furthermore, it can be seen in table 4 that the average result of the numeracy literacy skill test scores using Quizizz on second indicator in item 4 is 13.80 and item 5 is 13.40. Based on the two tables above, in the second numeracy literacy indicator with test items 4 and 5 on fractional material, the average value obtained by students has increased. The test results of students who implemented the Quizizz application media were higher than the average value obtained by students when only using paper. The explanation related to the use of Quizizz application media includes students' ability to examine information in the form of pictures, diagrams, especially in learning mathematics, which is very helpful.

***Data analysis of test results carried out by students through Paper and Quizizz based on the third indicator of Numerical Literacy***

The third indicator in numeracy literacy skills is to describe the results of previous study activities in order to predict and make decisions. The following is the data on the results of tests carried out by students using papers related to numeracy literacy skills for grade III C Ibnu Batutah SD IT Harum students. The data obtained are as shown in Table 5.

Table 5 Third Indicator Using Paper

<b>Paper</b>	<b>Item 6</b>	
Mean	N	Std. Deviation
12.00	25	7.071

Based on Table 5, the average result of the test scores for numeracy literacy skills using a paper related to the third indicator in point 6 is 12.00. Furthermore, the following data on the results of tests carried out by students through Quizizz in the same indicators can be seen in Table 6.

Table 6 Third Indicator Using Quizizz

<b>Quizizz</b>	<b>Item 6</b>	
Mean	N	Std. Deviation
15.20	25	6.532

Furthermore, it can be seen in table 6 that the average result of the numeracy literacy skill test score using Quizizz on the third indicator in point 6 is 15.20. And based on the two tables above, in the second numeracy literacy indicator with test item 6 on fractional material, the average value obtained by students has increased. The test results obtained by students by implementing the Quizizz application media are higher than the average value obtained by students when only using paper. It can be said that the use of Quizizz application media can affect students' ability to describe the results of study activities in order to predict and make decisions. Researchers conducted a descriptive analysis, obtained data as shown in Table 7.

Table 7. Descriptive Analysis

	<b>N</b>	<b>Min.</b>	<b>Max.</b>	<b>Mean</b>	<b>Std. Dev</b>
<b>Paper</b>	25	40	100	68.80	19.218
<b>Quizizz</b>	25	60	100	81.80	9.882
<b>N</b>	25				

Based on Table 7, descriptively the average score obtained by students by implementing the Quizizz application media was higher on all indicators, namely 81.80 with a percentage 80% of students belonging to the complete group and 20% of students belonging to the incomplete group, compared to the average value obtained by students who only use paper, which is 68.80 with a percentage of 40% of students belonging to the complete group and 60% of students belonging to the incomplete group. The requirements for drawing conclusions in the study are normality test, homogeneity test, and t-test (Al Mawaddah et al., 2021). Based on student test data related to numeracy literacy skills in fractional material, the results of the *Kolmogorov-Smirnov* test are obtained as shown in Table 8.

Table 8. One-Sample Kolmogorov-Smirnov Test

Unstandardized Residual		
N		25
Normal Parameters <sup>a,b</sup>	Mean	.000
	Std. Deviation	7.43
Most Extreme Differences	Absolute	.088
	Positive	.088
	Negative	-.088
Test Statistic		.088
Asymp. Sig. (2-tailed)		.200 <sup>c,d</sup>

Based on Table 8, it can be concluded that the normality test in the calculation of the data is fulfilled. This can be indicated by a significant value of  $0.200 > 0.05$ . Thus, it can be concluded that the data came from research subjects who were normally distributed. Then to ensure further, the *Levene* test was carried out in Table 9.

Table 9. Test of Homogeneity of Variances

Levene Statistic			df1	df2	Sig.
<i>Paper_Quizizz</i>	Based on Mean	.799	4	19	.541

Based on Table 9, it can be concluded that the homogeneity test is fulfilled. This can be seen at a significant value of  $0.541 > 0.05$ . Thus, it can be concluded that the two tests for each student are homogeneously distributed. The next calculation is carried out to draw the final conclusion whether or not there is an effect in the use of the Quizizz application media on the numeracy literacy skills of fractional material, namely the *Anova* test as a t-test. Then, the data is obtained as shown in Table 10.

Table 10. Paired Sampel Test

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2)
					Lower	Upper			
Pair1	<i>Paper_Quizizz</i>	-13.00000	14.71960	2.94392	-19.07595	-6.92405	-4.416	24	.000

Based on Table 10, the calculation of the paired sample t-test using SPSS version 25, it can be said that if the value of sig (2-tailed) < (0.05) then  $H_0$  is rejected and  $H_1$  is accepted. It can be seen in Table 6, the significance value is less than 0.05, namely  $0.000 < 0.05$ . Thus, it can be concluded that the use of Quizizz application media can affect students' ability to apply various types of numbers and symbols related to mathematics and related to the context of daily life in the fraction material of class III C Ibnu Batutah SD IT Harum elementary school students.

#### ***Data analysis of student responses to the use of Quizizz media through GoogleForm***

In this section, the process of filling out an e-questionnaire through Google Form by all grade III C students of SD IT Ibnu Batutah Harum. The e-questionnaire used is in the form of open-ended questions in order to classify the respondents being studied and reviewed by the way the respondents answered the e-questionnaire using their own sentences. In this section, the process of filling out an e-questionnaire through Google Form by all grade III C students of Ibnu Batutah SD IT Harum. The e-questionnaire used is in the form of open-ended questions, in order to classify the respondents being studied, then reviewed by the way the respondents answered the e-questionnaire using their own sentences.

1. Can using Quizizz media help you in solving problems related to numeracy?

All students answered, "yes very helpful". Because for students Quizizz is an interesting application media and Quizizz is easy to use, so that during the evaluation process it is more interactive. One student's answer "Quizizz is very helpful when working on story problems like this"

2. How do you feel when you use Quizizz media in doing questions related to numeracy lottery?

All students stated, "more enthusiastic, happy, and helpful". Because students through the Quizizz application can learn and play at the same time. The answer of one student "The feeling is very happy, even though the question is long but with interesting pictures and background music it is not boring and can be more enthusiastic"

3. When using Quizizz media in doing questions, do you feel more enthusiastic?

All students answered "yes, feel more excited". For students using the Quizizz application, there are lots of animated images, background music, and a live quiz feature, so it gives students more enthusiasm when working on fractions. The answer of one student "Of course very excited, because they can see the direct score and compete with other friends".

#### ***Data analysis of student responses to the use of Quizizz media through interviews***

In the interview process, it was carried out after the students carried out evaluation activities by working on questions and after the researchers took the e-questionnaire data through the Google Form. Furthermore, the researchers took samples to be interviewed randomly as many as 5 students. The following are the results of the interview process:

1. Can using Quizizz media help you in doing the questions?

The five students who were interviewed said "it is certainly very helpful". One of the students said "Quizizz is very easy to use so that when working on fractions you don't feel difficult and bored".

2. When using Quizizz media in doing questions, do you feel more enthusiastic?

The five students who were interviewed said "yes, they are more enthusiastic". One of the interviewed students said "I am more enthusiastic when I do questions through Quizizz than just using paper because in Quizizz I can compete with my friends, and in Quizizz there are also lots of pictures and plus music"

3. How do you feel when you use Quizizz media in doing questions?

The five students who were interviewed said that they were "more enthusiastic and very happy". One of the students interviewed said "when working on questions and playing games, you don't feel bored but feel happier and more enthusiastic".

### ***Discussion***

The evaluation process by working on questions sometimes makes students bored if they only use media that do not vary, so it is important for a teacher to use a variety of evaluation media which is expected to achieve the goals of the learning process (Pratama et al., 2020). By using the Quizizz media, where in this media there are elements of games that become entertainment for students at the end of the learning process (Al Haddar & Adam Juliano, 2021). It can be seen that all students are very enthusiastic in answering questions related to numeracy literacy on fractional material and considering answers. The overall results of this study indicate that the use of Quizizz game-based application media in working on numeracy literacy questions on fractional material has been effective. In its use, Quizizz media has met the minimum completeness criteria, student responses, and student behavior (Pratama et al., 2020).

Based on the results of research that uses Quizizz application media in learning activities, especially in evaluation activities, there are similarities, (Al Mawaddah et al., 2021; Therapy, 2012) which states that with game-based application media, especially Quizizz which has many advantages in evaluating students. Learning Activities. One of them is that students are very entertained after doing the learning process, so students do not feel bored and the goals of the learning process are achieved (Ardiansyah, 2022). The difference from previous studies with research conducted is that they have not used the Quizizz application as an evaluation medium related to numeracy literacy skills in fractional material. This can be proven in this study; the increased cognitive achievement of students seen from the results of the numeracy literacy test of the fractional material, they were working on with the help of Quizizz media and students liked the evaluation process in closing activities using Quizizz media which could be seen through the process of filling out the e-questionnaire and Interview.

So that it can be seen together that there is an influence in the use of the Quizizz application on numeracy literacy skills with fraction material for third grade students of SD IT Harum. Although this research has limitations that only involve number of students in one school, as input material that can

be submitted in the form of data collection related to numeracy literacy skills which is expected to involve more students in several school institutions and use more specific and varied media.

## CONCLUSION

The results in this study regarding the use of the Quizizz application media in evaluation activities related to numeracy literacy skills in the fraction material of class III C students of Ibnu Batutah SD IT Harum are very effective. This can be seen in the results of data analysis and discussion. That the average result of the test scores for numeracy literacy skills on the fractional material increased. Then, by using the Quizizz application media, the closing activities for class III C Ibnu Batutah SD IT Harum students related to numeracy literacy in fractional material went very smoothly, and the students were very enthusiastic. Likewise, the suggestions that researchers can convey as research material that can be carried out by further researchers are in terms of collecting data related to numeracy literacy skills which are expected to involve more students in several school institutions and use more specific and varied media.

## REFERENCES

- Adawiyah, A. R., & Kowiyah. (2021). Analisis Kebutuhan Pengembangan Permainan Kartu Domino sebagai Media Pembelajaran Operasi Hitung Perkalian Siswa Kelas IV SD. *Ideas: Jurnal Pendidikan, Sosial, Dan Budaya*, 7(3), 115. <https://doi.org/10.32884/ideas.v7i3.435>
- Al Haddar, G., & Adam Juliano, M. (2021). Analisis Media Pembelajaran Quizizz dalam Pembelajaran Daring pada Siswa Tingkat Sekolah Dasar. *Edukatif: Jurnal Ilmu Pendidikan*, 3(5), 2240–2246.
- Al Mawaddah, A. W., Hidayat, M. T., Amin, S., & Hartatik, S. (2021). Pengaruh Penggunaan Media Pembelajaran Quizizz terhadap Hasil Belajar Siswa pada Mata Pelajaran Matematika melalui Daring di Sekolah Dasar. *Jurnal Basicedu*, 5(5), 3109–3116.
- Ardiansyah, M. (2022). Efektivitas Penggunaan Platform Quizizz Dalam Meningkatkan Minat Dan Pemahaman Konsep Matematika. *SAP (Susunan Artikel Pendidikan)*, 6(3), 417–423.
- Audia, C., Yatri, I., Aslam, Mawani, S., & Zulherman. (2021). Development of Smart Card Media for Elementary Students. *Journal of Physics: Conference Series*, 1783(1). <https://doi.org/10.1088/1742-6596/1783/1/012114>
- Dantes, N. (2021). Peningkatan Literasi Sekolah Dan Literasi Numerasi Melalui Model Blanded Learning Pada Siswa Kelas V SD Kota Singaraja. *WIDYALAYA: Jurnal Ilmu Pendidikan*, 1(3), 269–283. <http://jurnal.ekadanta.org/index.php/Widyalya/article/view/121>
- Dawadi, S., Shrestha, S., & Giri, R. A. (2021). Mixed-Methods Research: A Discussion on its Types, Challenges, and Criticisms. *Journal of Practical Studies in Education*, 2(2), 25–36. <https://doi.org/10.46809/jpse.v2i2.20>
- Ekowati, D. W., & Astuti, Y. P. (2019). Literasi Numerasi di SD Muhammadiyah. *ELSE (Elementary School Education)*, 3(4), 93–103.

- Fitriana, E., & Koiri Ridlwan, M. (2018). Pembelajaran transformatif berbasis literasi dan numerasi di sekolah dasar. *TRIHAYU: Jurnal Pendidikan Ke-SD-An*, 8(1), 1284–1291. <https://doi.org/10.30738/TRIHAYU.V8I1.11137>
- Hawa, S., & Yosef, Y. (2019). Aplikasi Metode Scamper Dalam Pengembangan Desain Pembelajaran Matematika Di Sekolah Dasar. *Jurnal Pendidikan Matematika*, 13(2), 143–152. <https://doi.org/10.22342/jpm.13.2.6749.143-152>
- Herawan, E. (2022). Literasi Numerasi Di Era Digital Bagi Pendidik. *Seminar Nasional Pendidikan Sultan Agung*, 23–32.
- Kowiyah. (2016). Peningkatan Kemampuan Berpikir Kritis dalam Pemecahan Masalah Matematis Menggunakan Pendekatan Open Ended. *Jurnal Inovasi Pendidikan Dasar*, 5(1), 67–74. <http://jipd.uhamka.ac.id/index.php/jipd/article/view/48>
- Mulyawati, I., & Kowiyah. (2022). Pembelajaran Matematika dan IPA Guru SD Melalui Media Pembelajaran Visual. *Jurnal SOLMA*, 2(1), 97–108. <https://doi.org/10.51878/secondary.v2i1.878>
- Ndiung, S., & Jediut, M. (2020). Pengembangan instrumen tes hasil belajar matematika peserta didik sekolah dasar berorientasi pada berpikir tingkat tinggi. *Premiere Educandum : Jurnal Pendidikan Dasar Dan Pembelajaran*, 10(1), 94. <https://doi.org/10.25273/pe.v10i1.6274>
- Nuryati, Subadi, T., Muhibbin, A., Murtiyasa, B., & Sumardi. (2022). Pembelajaran Statistik Matematika Berbantuan Website Google Sites (Quizizz) di Sekolah Dasar. *Jurnal Basicedu*, 6(2), 524–532.
- OCED. (2019). *PISA 2018 Insights and Interpretations*. [https://www.oecd.org/pisa/PISA 2018 Insights and Interpretations FINAL PDF.pdf](https://www.oecd.org/pisa/PISA%2018%20Insights%20and%20Interpretations%20FINAL%20PDF.pdf)
- Pamungkas, G. P., & Kowiyah. (2021). *The Influence of Open Ended Learning Mathematical Problem Solving Ability Model on Mathematical Problem Solving Ability*. 5(3), 395–402.
- Pangesti, F. T. P. (2018). Menumbuhkembangkan Literasi Numerasi Pada Pembelajaran Matematika Dengan Soal Hots. *Indonesian Digital Journal of Mathematics and Education*, 5(9), 566–575. <http://idealmathedu.p4tkmatematika.org>
- Pratama, L. D., Lestari, W., & Astutik, I. (2020). Efektifitas Penggunaan Media Edutainment Di Tengah Pandemi Covid-19. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 9(2), 413–423. <https://doi.org/10.24127/ajpm.v9i2.2783>
- Putri, M. (2020). Efektivitas Penggunaan Aplikasi Wordwall Dalam Pembelajaran Daring (Online) Matematika Pada Materi Bilangan Cacah. *UIN Syarif Hidayatullah Jakarta*, 1(1), 145–165.
- Saputra, R., Thalia, S., & Gustiningsi, T. (2019). Pengembangan Media Pembelajaran Berbasis Komputer Dengan Adobe Flash Pro Cs6 Pada Materi Luas Bangun Datar. *Jurnal Pendidikan Matematika*, 14(1), 67–80. <https://doi.org/10.22342/jpm.14.1.6794.67-80>
- Therapy, E. (2012). *The Effectiveness Of The Use Of Quizizz-Based Gamification On Students' Learning Interest In 4th Grade Mathematics*. 434(2014), 138–142. <https://doi.org/10.1016/j.agrformet.2007.11.012>

- Widiastuti, Y., Ilma, R., & Putri, I. (2018). Kemampuan Berpikir Kreatif Siswa Pada Pembelajaran Operasi Pecahan Menggunakan Pendekatan Open-Ended. *Jurnal Pendidikan Matematika*, 12(2), 13–22.
- Winarni, S., Kumalasari, A., Marlina, M., & Rohati, R. (2021). Efektivitas Video Pembelajaran Matematika Untuk Mendukung Kemampuan Literasi Numerasi Dan Digital Siswa. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 10(2), 574. <https://doi.org/10.24127/ajpm.v10i2.3345>
- Zulfadewina, Sucipto, A., Iba, K., & Zulherman. (2020). Development of Adobe Flash CS6 Multimedia-Based Learning Media on Science Subjects Animal Breeding Materials. *Jurnal Basicedu*, 4(4), 1308–1314.