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The Differences between Using Quizizz Interactive Quiz And LiveWorksheet in Math Problem Solving Ability

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ABSTRAK

Masalah pada penelitian ini yaitu minimnya kemampuan peserta didik dalam menyelesaikan masalah dan minimnya penggunaan kuis interaktif pada pembelajaran. Tujuan dari penelitian ini guna menganaisi perbedaan kemampuan peserta didik dalam menyelesaikan masalah matematika dengan menggunakan kuis interaktif Quizizz serta Liveworksheet. Penelitian ini memakai jenis penelitian kuantitatif memakai pendekatan Quasi Experiment. Pengumpulan data di penelitian ini memakai wawancara serta tes kemampuan pemecahan masalah berupa soal esai terbuka. Sampel penelitian ini adalah dua kelas yang terbagi menjadi kelas eksperimen yang akan menerapkan kuis interaktif Quizizz dan kelas eksperimen yang akan menerapkan kuis Liveworksheet interaktif. Analisis data penelitian ini dimulai dengan menggunakan uji validitas, uji reliabilitas, uji daya pembeda, uji tingkat kesukaran, uji normalitas, uji homogenitas, dan uji hipotesis pada soal Post-Test. Hasil penelitian menunjukkan Post-Test yang menggunakan kuis interaktif Liveworksheet rerata skor yang diperoleh lebih tinggi yaitu 22,8, sedangkan kelas yang menggunakan kuis interaktif Quizizz mempunyai rata-rata 19,4. Dapat diambil kesimpulan yakni kuis interaktif Liveworksheet lebih baik dibanding dengan yang menggunakan kuis interaktif Quizizz, karena mampu membuat siswa kian mudah menggunakannya saat memahami materi serta mengerjakan soal essay, selain itu peserta didik lebih semangat mengerjakan soal karena berlomba-lomba untuk mendapatkan skor tertinggi, dan peserta didik mampu mengembangkan pemecahan masalah matematika untuk meningkatkan cara berfikirnya.

ABSTRACT

The problem in this research is the lack of students' ability to solve problems and the lack of use of interactive quizzes in learning. The purpose of this study is to analyse differences in the ability of students to solve math problems with Quizizz interactive quizzes and Liveworksheets. This research uses a quantitative research type using a Quasi Experiment approach. The data collection in this study used interviews and a problem-solving ability test in the form of open essay questions. This study sample is two class devided into an experimental class that will apply the Quizizz interactive quiz and an experimental class that will apply the interactive Liveworksheet quiz. The data analysis of this research was started by using validity test, reliability test, discriminatory power test, difficulty level test, normality test, homogeneity test, and hypothesis testing on Post-Test questions. The results showed Post-Test data using the Liveworksheet interactive quiz, the average score obtained was 22.8, while the class using the Quizizz interactive quiz had an average of 19.4. It can be concluded that the Liveworksheet interactive quiz is better than the one using the Quizizz interactive quiz, because it can make it easier for students to use it when understanding the material and working on essay questions, besides that students are more enthusiastic about working on questions because they are competing to get the highest score, and students are able to develop mathematical problem solving to improve their way of thinking.

1. INTRODUCTION

Problem solving ability is a part of mathematical ability that must be developed by students, especially in elementary schools. The problem-solving ability in aspects of the curriculum of school math

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learning is to sharpen the way of thinking to draw conclusions, to explore problem solving, and to convey information through written, spoken, charts, diagrams, pictures, and maps (Marshel & Ratnawulan, 2020; Sari, 2020). Learners must have the ability to solve problems in mathematics to solve problem based problems. Problem solving skills are skills or abilities that are in students so that they can solve cases and can apply them in everyday life (Elita et al., 2019; Suryani et al., 2020). Problem solving skills are part of a very important math curriculum or may be said to be a major result of a learning process. When the protege finds the problem, there is a discrepancy with the original circumstances. A problem can lead learners to investigate, to explore patterns and think critically (Malik, 2018; Sari, 2020). The importance of problem solving in mathematics cannot be separated from problems from the teacher. Teachers carry out their functions as role models, promoters and motivators for students. Thus, the teacher makes it easier for students to solve mathematical problems (Antara, 2019; Hidayat & Sariningsih, 2018). Teacher teaching in the classroom is very important, because through teaching it can determine whether students can solve existing problems. Every problem given there will always be a way to solve the problem (Rostika & Junita, 2017). Therefore mathematics is a subject that can develop self-potential and a person's perspective on a problem he faces. Mathematics has a big role as a brain training tool so that you can think logically, analytically, and systematically so that you can bring a person, citizen, or nation to success (Dewi, 2018; Pramitasari et al., 2019).

Online learning is a challenge in the world of education, so that learning continues even though it is not face-to-face. Therefore, through online learning, learning interactions can take place between students and teachers (Sadikin & Hamidah, 2020). The online learning process currently uses google classroom and zoom/meet to receive an explanation of the subject matter from the teacher, then students do an evaluation of learning in books, then take photos and send them to the teacher via WhatsApp (Fitrah & Ruslan, 2020). Learning evaluation is the last process of learning to measure and find out learning outcomes, as well as the level of understanding of students' concepts about the material (Kartika, 2019; Widiyanti, 2021). So far, teachers use conventional evaluations, namely paper-based tests. Feedback can not be done directly, but waiting from the teacher. Students will feel bored with homework from the teacher, so that students are less motivated and reduce their learning outcomes, especially in mathematics lessons which are considered difficult lessons. Even though students are less diligent in studying and practicing. From the results of interviews with third grade teachers at SDN Kalideres 14 Petang, there are difficulties in online learning in the mathematics learning process. Students' interest in learning depends on the material being taught, if the material being taught is easy to understand then students have a higher desire to learn, while with material that is difficult to understand, the enthusiasm for learning will be smaller. The weakness of students in learning mathematics is calculating story problems. In addition, teachers have not used online-based interactive quizzes.

With the problems above, the way to overcome them is to use online evaluations in the form of Quizizz interactive quizzes and Liveworksheets. Quizizz is a site that can be used anywhere in the form of homework (home work), which can also be used as an interactive quiz game (Asria et al., 2021; Noor, 2020). Quizizz provides various features that interest students, for example avatars, memes, and themes. Quizizz is an online website that helps students review knowledge and progress in education (L. S. L. Purba, 2020; Yana et al., 2020). This quizz can be used as an alternative educational assessment for students, and can also be monitored for item analysis. Quizizz interactive quizzes can motivate students to learn. Meanwhile, Liveworksheet is a website for designing interactive online materials and quizzes. Liveworksheets can show material in the form of videos, mp3, photos, and other interesting symbols that can add interest to students. Teachers can create active quizzes on liveworksheets. Students can work on various forms of problems such as multiple options, in the form of decline, open problems, tick sections, combining through lines, drag marks problems, and other forms of teacher creativity (Fitriani et al., 2021). Liveworksheet is one of the online applications that can turn conventional evaluations into interactive online evaluations, because students can work on questions in online evaluations and send them directly to the teacher, so that teachers can monitor the progress of students' learning creativity (Djannah et al., 2021; Roskaputri et al., 2021). This can help teachers to shorten the time in the evaluation process, can increase the enthusiasm of students' learning, and can be beneficial for the environment because it saves paper.

There are several relevant research results that have been carried out by previous research related to this research, namely research conducted by previous researcher regarding differences in student mathematics learning outcomes through online-based assessment media using the Quizizz application and Google Form in matrix material (Wulandari & Suwardana, 2020). The results of this study indicate that there is a comparison of students' mathematics learning outcomes using the evaluation media for the Quizizz application and Google Form. This is because using the Quizizz application evaluation media is more interesting than using Google Form. This research has not discussed the mathematical problem solving ability, especially by using the Liveworksheet application. Then the research conducted by other previous

researcher related to the Development of Textbooks assisted by Google Slides and Quizizz increasing problem-solving skills in relations and functions in class VIII of SMP Negeri 1 Kubu (Sulistiyowati et al., 2021). This research focuses on problem solving skills not focusing on fractions by using Liveworksheet. There is a significant comparison of students' solving skill scores between the beginning and the end of learning with Google Slides and Quizizz textbooks. So that this research has not discussed the ability of students to solve problems, especially on the subject of fractions and use Liveworksheets. In addition, the research conducted by Kowiyah regarding the analysis of the representation ability of elementary school mathematics students from a gender perspective (Kowiyah & Mulyawati, 2018) focuses on the representation of mathematical problem solving in visual reality which is higher than the descriptive form. So that this research has not discussed the students' ability in solving mathematical problems on fraction description problems using interactive quizzes, but rather on gender-based problem solving. Based on this explanation, the purpose of this study was to analyse the differences in mathematical problem solving abilities using Quizizz interactive quizzes and Liveworksheets in third grade students at SDN Kalideres 14 Petang.

2. METHOD

This study uses a quantitative method in the Quasi Experimental approach (Mustafa et al., 2020). Quantitative research is scientific research that is systematically related to parts and facts and the quality of the relationship. This design has a control class, but cannot fully control the external variables that affect the experiment. The experimental design used in this study is a simple experimental design. There are two experimental groups in this study, the first group is the experimental group who is working on questions with the Quizizz interactive quiz at III A and the second group is the experimental group who is working on the questions with the Liveworksheet interactive quiz at III B at SDN Kalideres 14 Petang on fractions. This study sample is a class III A of 30 students as an experimental class that will apply the Quizizz interactive quiz application in problem solving capabilities and class III B as much as 30 students as an experimental class that will apply the interactive Liveworksheet quiz application in problem solving capabilities. Sampling for this study is the use of a tedium sampling technique. A saturated sample would be a sample if it were added in number, and it would not add to supply and so would not affect the value of the information that had been obtained. The saturated sampling technique isa sampling technique where populations are relatively small or research that wants to create generalization with very small faults (Sugiyono, 2018). With the sampling taken using the saturated sampling technique it made it easier for researchers and helped to do the statistical calculations in determining the relation of the two variables to be examined.

This study uses a material expert validation sheet instrument and a Learning Implementation Plan (RPP). The instrument is in the form of a problem-solving ability test, containing understanding the problem, preparing a settlement plan, implementing the plan, and conducting an evaluation. Students in carrying out problem solving will gain knowledge and problem solving skills. From this, problem solving indicators are needed as a reference to take into account the ability of students to solve problems. The indicators applied by Polya to solve the problem as show in Table 1.

Table 1. Indicators of Problem Solving Stages

Problem Solving	Problem Solving Stage Indicators
Understanding the Problem	Pay attention to relevant data by ignoring irrelevant data. Determine how to represent the problem.
Developing a Completion Plan	Students can find other things such as formulas / equations that are not known from the problem. Students are able to develop a procedural plan in solving problems.
Executing the Plan	Solve problems using the plans that have been made. Check each completion line before writing the next line. If the plan is not successful after writing a few lines, make another plan and implement it.
Re-evaluating	Students are able to check the answers again that have been done according to the right steps or method. Students are sure that the answers they get are correct.

The data analysis of this research was started by using validity test, reliability test, discriminatory power test, difficulty level test, normality test, homogeneity test, and hypothesis testing on Post-Test questions.

3. RESULT AND DISCUSSION

Result

According to the experimental results of the problem-solving instrument, it is found that the correlation coefficient is calculated for each item of the question. In order to determine whether the question is valid, the Product Moment correlation coefficient is compared with the r_{table}, the result of validity test is show in Table 2.

Table 1. Results of Validity Test

Description	Item of Questions	Total
Valid	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	10

Base on **Table 2** The instrument is reliable enough to be used in data collection because the instrument is good. The reliability of the questions was tested using Alpha Cronbach, so r_{count} = 0.790 while r_{table} = 0.361. Because $r_{count} > r_{table}$, it can be concluded that the instrument is reliable and suitable to be used as a research instrument. The results of the discriminatory test obtained by classifying the most capable and least able students which are presented in **Table 3**.

Table 2. Discriminatory Test Results

No	Criteria	Item of Questions
1	Poor	-
2	Fair	1, 5, 8, 9, 10
3	Good	2, 3, 4, 6, 7
4	Very Good	-

Based on the Table 3, it is obtained that questions 1, 5, 8, 9, 10 have sufficient benchmarks in the discriminatory test, while questions 2, 3, 4, 6, 7 have good benchmarks in the discriminatory test in solving problems. To know the degree of difficulty, the writers use the results of the degree of difficulty test which are presented in Table 4.

Table 3. Difficulty Degree Test Results

No	Criteria	Item of Questions
1	Easy	2
2	Moderate	1
3	Difficult	3, 4, 5, 6, 7, 8, 9, 10

Bas eon **Table 4**, the degree of difficulty test, it is found that question 2 has an easy benchmark in the degree of difficulty test. Then, in question 1, the benchmark is in the level of difficulty test while questions 3, 4, 5, 6, 7, 8, 9, 10 have difficult benchmarks in the degree of difficulty test. The student's normality test was carried out through the Lilliefors test. From the calculation data that has been done, in the experimental group I obtained L_{count} = 0.061, and in the experimental group II obtained L_{count} = 0.059 with L_{table} = 0.161. The result of normality test is show in **Table 5**.

Table 4. Normality Test of Problem Solving Skill

Group	L_{count}	L_{table}	Index	Interpretation
Experiment I	0,061	0,161	$L_c < L_t$	H_0 accepted (data normal)
Experiment II	0,059	0,161	$L_c < L_t$	

Based on the **Table 5**, it shows that L_{count} is smaller than L_{table} ($L_c < L_t$) at α significant level = 0.05 for n = 30 students, so it can be concluded that the results of the problem solving ability between the two samples are normally distributed. The homogeneity test for solving mathematical problems from both groups used Fisher's formula. In the homogeneity test, the value of F_{table} is 1.861 and the price of F_{count} is 1.227, df numerator = 29, df denominator = 29, significant header = 0.05. Because $F_{count} < F_{table}$ i.e. 1.227 < 1.861, and accept H_0, so the sample data has homogeneous variations. After the prerequisite test is done, the results are obtained, and the hypothesis is tested. The results of the hypothesis test were obtained at the significance level of 0.05; t_{count} = 3.7582 and t_{table} = 2.0032; $t_{count} > t_{table}$ until H_1 was accepted. Then, there was a comparison between Quizizz interactive quizzes and Liveworksheet on students' mathematical problem solving.

From the results of the requirements analysis test, it can be seen that the Post-Test is normally distributed and homogeneous, so the t-test can be used to test the hypothesis. The results of the t-test in this study obtained t_{count} as much as 3.7582 at α significant level = 0.05 and degrees of freedom (df) = 2.0032. Because the value of $t_{count} > t_{table}$ is 3.7582 > 2.003, so it can be achieved that H_0 is rejected which means that there are differences in the ability of students to solve math problems using Quizizz interactive quizzes and Liveworksheets. Based on the research results, it is proven that the use of Liveworksheet interactive quizzes is better than Quizizz interactive quizzes. The evidence is presented in **Table 6.**

Table 5. Recap of Post-Test Result

Criteria	Post-Test Result	
	Experiment I	Experiment II
Highest Score	25	28
Lowest Score	12	13
Total	582	685
Average	19,4	22,8

Base on **Table 6** show in the Post-Test results, there are differences. The maximum Post-Test score obtained from the experimental group I is 25 and the experimental group II is 28. The minimum Post-Test score for the experimental group I is 12 and the experimental group II is 13. The average Post-Test score is of experimental group I is 19.4, and experimental group II is 22.8.

Discussion

The ability of students to solve math problems with Liveworksheet interactive quizzes is better than those using Quizizz interactive quizzes. Liveworksheets are very effective in getting students to focus on doing questions, and they are active and happy in doing them because questions can be made varied. The application of Liveworksheet media can be used in all subjects to attract students to work on questions (Khikmiyah, 2021; Roskaputri et al., 2021; Sele, 2022). Liveworksheet is one of the learning media as well as interactive quizzes that can be a place for a teacher's creativity in sharing material or practice questions (Prastika & Masniladevi, 2021). Teachers really need to increase their creativity in making media in order to attract students to participate in the teaching and learning process to create optimal and fun learning outcomes.

This is also supported by the opinion that the main purpose of this Liveworksheet is not just an evaluation tool, but it can be used to measure the assessment of attitudes, knowledge, and skills in the form of interactive multimedia in learning (Rahayu et al., 2021; Rhosyida, 2021). Because of most activities can automatically generate student scores based on students' correct answers and certain criteria. The system certainly minimizes subjectivity in evaluation. In addition, students can immediately see the status of their score as well as seeing the progress of their score in the workbook. Parents can also easily track their child's progress in learning outcomes. In addition, the purpose of implementing the Liveworksheet is also to develop the ability of students to solve problems according to their abilities, especially for online learning (Khikmiyah, 2021; Prastika & Masniladevi, 2021). This Liveworksheet is useful in increasing teacher creativity, especially for presenting interesting evaluation materials for students. Moreover, it can increase student interest in learning because it looks attractive and interactive.

Furthermore, students can improve various abilities to complete or perform a certain task, so these abilities are obtained through practice (Lubis, 2018). Mathematics is an effort or series of activities in learning, so students can develop their mindset and solve problems in everyday life (T. N. Purba et al., 2022). The ability to solve mathematical problems is very important for everyone. It is not only because most of human life will be faced with problems that need to be solved, but also the most important problem solving is mathematical and can help someone to improve their analytical skills and help them to solve problems in other various situations (Dwyer et al., 2014; Hidayatullah et al., 2021; Rostika & Junita, 2017). Mathematical problem solving ability is a student's skill to think actively and analytically in solving mathematical cases based on the observations obtained, so students can improve their knowledge, skills and behavior. In learning using interactive quizzes, it is suitable for developing students' abilities in solving mathematical problems because this learning requires students to proactively prepare themselves before studying in class.

Research that can strengthen the results of this study states that the application of interactive quizzes can increase the activity and ability of students in solving problems in mathematics (Purnama Sari et al., 2018). The similarity between other and this study is that it discusses the ability of students to solve problems in mathematics by using interactive quizzes. In this study, the comparison of students' abilities in solving problems using Quizizz interactive quizzes and Liveworksheets has not been discussed. Because

this study only focuses on the subject of trigonometry without discussing the subject of fractions. However, it only compares the ability of students to solve problems using interactive and conventional quizzes, not on Quizizz interactive quizzes and Liveworksheets. Other findings also show that Liveworksheet interactive quizzes are very effective for learning (Khikmiyah, 2021). In this study, it only analyse the ability of students to solve problems only with Liveworksheets, and did not use Quizizz as a comparison tool because the previous research examined a web live worksheet based on Problem Based Learning in mathematics learning. Besides, it only focuses on the subject of social arithmetic, not on the subject of fractions. This study updates regarding the Liveworksheet and Quizizz applications which are very helpful for teachers in facilitating online evaluation of the subject of fractions. Meanwhile, they can improve students' ability to solve math problems because students are required to have readiness before participating in learning in the classroom

4. CONCLUSION

From the results of the research, it can be concluded that there is a difference between the ability to solve math problems in class III A using the Quizizz interactive quiz and Class III B using the Liveworksheet interactive quiz at SDN Kalideres 14 Petang. Liveworksheet interactive quizzes is better than those using Quizizz interactive quizzes because they are able to make it easier for students to use them when understanding the material and working on essays. Moreover, students are more enthusiastic about working on questions because they are competing to get the highest score, and students are able to develop mathematical problem solving to improve their way of thinking. The advice that researchers give based on the research obtained, which is: In math study, educators can familiarize learners with the ability to solve math problems. It can be done over and over again so that the student's mathematical problem solving ability can be fully achieved. In learning activities, educators can adopt interactive quizizz and liveworksheet quizz quizz and liveworksheet to learners to improve problem-solving capabilities, in addition to substituting conventional evaluations into compelling online evaluations. Learners can develop the mathematical problem-solving ability to improve how they think.

5. REFERENCES

Antara, P. A. (2019). Implementasi Pengembangan Karakter Anak Usia Dini dengan Pendekatan Holistik. *JIV-Jurnal Ilmiah Visi*, *14*(1), 17–26. https://doi.org/10.21009/jiv.1401.2.

Asria, L., Sari, D. R., Ngaini, S. A., Muyasaroh, U., & Rahmawati, F. (2021). Analisis Antusiasme Siswa Dalam Evaluasi Belajar Menggunakan Platform Quizizz. *Alifmatika: Jurnal Pendidikan Dan Pembelajaran Matematika*, *3*(1), 1–17. https://doi.org/10.35316/alifmatika.2021.v3i1.1-17.

Dewi, K. M. S. (2018). Kontribusi Disiplin Belajar dan Motivasi Berprestasi Terhadap Hasil Belajar Matematika. *Jurnal Penelitian Dan Pengembangan Pendidikan*, *2*(2), 152. https://doi.org/10.23887/jppp.v2i2.15397.

Djannah, M., Zulherman, & Nurafni. (2021). Kahoot Application for Elementary School Students: Implementations of Learning Process from Distance during Pandemic period of COVID 19. *Journal of Physics: Conference Series*, *1783*(1). https://doi.org/10.1088/1742-6596/1783/1/012121.

Dwyer, C. P., Hogan, M. J., & Stewart, I. (2014). An integrated critical thinking framework for the 21st century. *Thinking Skills and Creativity*, *12*(1), 43–52. https://doi.org/10.1016/j.tsc.2013.12.004.

Elita, G., Habibi, M., Putra, A., & Ulandari, N. (2019). Pengaruh Pembelajaran Problem Based Learning dengan Pendekatan Metakognisi terhadap Kemampuan Pemecahan Masalah Matematis. *Mosharafa: Jurnal Pendidikan Matematika*, *8*(3), 447–458. https://doi.org/https://doi.org/10.31980/mosharafa.v9i3.517.

Fitrah, M., & Ruslan, R. (2020). Eksplorasi Sistem Pelaksanaan Evaluasi Pembelajaran di Sekolah pada Masa Pandemi Covid-19 di Bima. *Jurnal Basicedu*, *5*(1), 178–187. https://doi.org/10.31004/basicedu.v5i1.639.

Fitriani, N., Hidayah, I. S., & Nurfauziah, P. (2021). Live Worksheet Realistic Mathematics Education Berbantuan Geogebra: Meningkatkan Abstraksi Matematis Siswa SMP pada Materi Segiempat. *JNPM (Jurnal Nasional Pendidikan Matematika)*, *5*(1), 37–50. https://doi.org/10.33603/jnpm.v5i1.4526.

Hidayat, W., & Sariningsih, R. (2018). Kemampuan Pemecahan Masalah Matematis Dan Adversity Quotient Siswa SMP Melalui Pembelajaran Open Ended. *Tubercle and Lung Disease*, *2*, 109. https://doi.org/10.33603/jnpm.v2i1.1027.

Hidayatullah, Z., Wilujeng, I., Nurhasanah, N., Gusemanto, T. G., & Makhrus, M. (2021). Synthesis of the 21st Century Skills (4C) Based Physics Education Research In Indonesia. *JIPF (Jurnal Ilmu Pendidikan*

Fisika), *6*(1), 88. https://doi.org/10.26737/jipf.v6i1.1889.
Kartika, T. (2019). Manajemen Pembelajaran Tahfidz Al-Qur'an Berbasis Metode Talaqqi. *Jurnal Isema : Islamic Educational Management*, *4*(2), 245–256. https://doi.org/10.15575/isema.v4i2.5988.
Khikmiyah, F. (2021). Implementasi Web Live Worksheet Berbasis Problem Based Learning dalam Pembelajaran Matematika. *Pedagogy: Jurnal Pendidikan Matematika*, *6*(1), 1–12. https://doi.org/10.30605/pedagogy.v6i1.1193.
Kowiyah, & Mulyawati, I. (2018). An Analysis of Primary School Students' representational Ability in Mathematics Based on Gender Perspective. *Journal of Physics: Conference Series*, *948*(1). https://doi.org/10.1088/1742-6596/948/1/012016.
Lubis, E. (2018). Efektivitas Penggunaan Model Pembelajaran Talking Stick Terhadap Kemampuan Pemecahan Masalah Matematis Siswa di Kelas VIII MTs YPKS Padangsidimpuan. *Jurnal MathEdu*, *1*(3), 32–39. http://journal.ipts.ac.id/index.php/MathEdu/article/view/571.
Malik, R. S. (2018). Educational Challenges in 21st Century and Sutainable Development. *Journal of Sustainable Development Education and Research*, *2*(1), 9–20. https://doi.org/10.17509/jsder.v2i1.12266.
Marshel, J., & Ratnawulan. (2020). Analysis of Students Worksheet (LKPD) integrated science with the theme of the motion in life using integrated connected type 21st century learning. *Journal of Physics: Conference Series*, *1481*(1). https://doi.org/10.1088/1742-6596/1481/1/012046.
Mustafa, P. S., Gusdiyanto, H., Victoria, A., & Masgumelar, N. kukuh. (2020). *Metodelogi Penelitian Kuantitatif, Kualitatif, dan Tindakan Kelas dalam Pendidikan Olahraga*. Fakultas Ilmu Keolahragaan Universitas Negeri Malang.
Noor, S. (2020). Penggunaan Quizizz dalam Penilaian Pembelajaran pada Materi Ruang Lingkup Biologi untuk Meningkatkan Hasil Belajar Siswa Kelas X.6 SMA 7 Banjarmasin. *Jurnal Pendidikan Hayati*, *6(1)*, 1–7. https://doi.org/https://doi.org/10.33654/jph.v1i1.927.
Pramitasari, K., Usodo, B., Subanti, S., Magister, P., Matematika, P., Sebelas, U., & Surakarta, M. (2019). Proses Pembelajaran Matematika Untuk Siswa Slow Learner Di Kelas Inklusi Smp Negeri 7 Klaten Kelas Viii. *Jurnal Elektronik Pendidikan Matematika*, *3*(7), 777–786. https://jurnal.fkip.uns.ac.id/index.php/s2math/article/view/6494.
Prastika, Y., & Masniladevi. (2021). Pengembangan E-LKPD Interaktif Segi Banyak Beraturan dan Tidak Beraturan Berbasis Liveworksheets Terhadap Hasil Belajar Peserta Didik Kelas IV Sekolah Dasar. *Journal of Basic Education Studies*, *4*(1), 4–14. https://www.ejurnalunsam.id/index.php/jbes/article/view/3817.
Purba, L. S. L. (2020). The Effectiveness of the Quizizz Interactive Quiz Media as an Online Learning Evaluation of Physics Chemistry 1 to Improve Student Learning Outcomes. *Journal of Physics: Conference Series*, *1567*(2), 16–20. https://doi.org/10.1088/1742-6596/1567/2/022039.
Purba, T. N., Pangaribuan, F., & Hutauruk, A. J. (2022). Pengembangan LKS Pembelajaran Matematika Realistik Berbasis Etnomatematika dengan Konteks Gonrang Sipitu Pitu Simalungun pada Materi Geometri Bangun Ruang Tabung. *Jurnal Basicedu*, *6*(3), 4686–4700. https://doi.org/https://doi.org/10.31004/basicedu.v6i3.2873.
Purnama Sari, D., Wahyu Yunian Putra, R., & Syazali, M. (2018). Pengaruh Metode Kuis Interaktif Terhadap Kemampuan Pemecahan Masalah Matematis Mata Kuliah Trigonometri. *Jurnal Pendidikan Matematika*, *12*(2), 63–72. https://core.ac.uk/download/pdf/267822151.pdf.
Rahayu, N. D., Zulherman, & Yatri, I. (2021). Animated Video Media Based on Adobe After Effects (AEF) Application: An Empirical Study for Elementary School Students. *Journal of Physics: Conference Series*, *1783*(1), 012116. https://doi.org/10.1088/1742-6596/1783/1/012116.
Rhosyida, N. (2021). Mengoptimalkan Penilaian dengan Liveworksheet pada Flipped Classroom di SD. *Taman Cendekia*, *05*(01), 568–578. https://doi.org/10.30738/tc.v5i1.9749.
Roskaputri, F., Mardiyana, M., & Fitriana, L. (2021). Pengembangan E-Modul Matematika Menggunakan Liveworksheets Sebagai Bahan Pembelajaran Mandiri pada Masa Pandemi Covid-19. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *10*(4), 2029–2039. https://doi.org/10.24127/ajpm.v10i4.4331.
Rostika, D., & Junita, H. (2017). Peningkatan Kemampuan Pemecahan Masalah Siswa SD dalam Pembelajaran Matematika dengan Model Diskursus Multy Representation (DMR). *EduHumaniora : Jurnal Pendidikan Dasar*, *9*(1), 35–46. https://doi.org/10.17509/eh.v9i1.6176.
Sadikin, A., & Hamidah, A. (2020). Pembelajaran Daring di Tengah Wabah Covid-19. *Biodik*, *6*(2), 109–119. https://doi.org/10.22437/bio.v6i2.9759.
Sari, K. W. S. (2020). *Pengembangan Modul Materi Segiempat Berbasis Kemampuan Pemecahan Masalah pada Peserta Didik Kelas VII SMP Negeri Secang Tahun Ajaran 2019/2020*. Universitas Sanata Dharma.

Sele, A. (2022). Survei Kepuasan Siswa Mengerjakan Tugas dengan Aplikasi Live Worksheet pada Pembelajaran Daring. *Ideguru: Jurnal Karya Ilmiah Guru*, *7*(1), 53–60. https://doi.org/10.51169/ideguru.v7i1.311.

Sugiyono. (2018). *Metode Penelitian Kuantitatif*. Alfabeta.

Sulistiyowati, Y. E., Susiaty, U. D., & Oktaviana, D. (2021). Pengembangan Buku Ajar Elektronik Interaktif (BAEI) Berbantuan Google Slide dan Quizizz dalam Meningkatkan Kemampuan Pemecahan Masalah pada Materi Relasi dan Fungsi di Kelas VIII SMP Negeri 1 Kubu. *JUWARA: Jurnal Wawasan Dan Aksara*, *1*(2), 143–155. http://jurnal.smpharapanananda.sch.id/index.php/juwara/article/view/26.

Suryani, M., Jufri, L. H., & Putri, T. A. (2020). Analisis Kemampuan Pemecahan Masalah Siswa Berdasarkan Kemampuan Awal Matematika. *Mosharafa: Jurnal Pendidikan Matematika*, *9*(1), 119–130. https://doi.org/10.31980/mosharafa.v9i1.605.

Widiyanti, A. (2021). Pengembangan Bahan Ajar E-LKPD Menggunakan Live Worksheet Pada Materi Bangun Datar Kelas IV Sekolah Dasar. *Eprints UMM*, 20.

Wulandari, D., & Suwardana, O. (2020). Perbedaan Hasil Belajar Matematika Siswa melalui Media Penilaian Berbasis Online Menggunakan Aplikasi Quizizz dan Google Form pada Materi Matriks. *Jurnal Stkip Kusuma Negara*, 114–126. http://jurnal.stkipkusumanegara.ac.id/index.php/semnara2020/article/view/478.

Yana, A. U., Antasari, L., & Kurniawan, B. R. (2020). Analisis Pemahaman Konsep Gelombang Mekanik Melalui Aplikasi Online Quizizz. *Jurnal Pendidikan Sains Indonesia*, *7*(2), 143–152. https://doi.org/10.24815/jpsi.v7i2.14284.