Analysis of mathematics learning activities materials of operating skills of rapid number students in elementary school through online learning

Praditiya Alvin Viki[1*], Chumdari[1], St. Y. Slamet[1], Hardo Adriyanto[2]

[1] Universitas Sebelas Maret, Surakarta, Indonesia
[2] Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
✉ alvianviki13@gmail.com*

Abstract
This study aims to improve mathematics learning outcomes, especially in learning fractional arithmetic operations in fifth grade students of SD Muhammadiyah 01 Paron, Ngawi Regency. In this study, offline and online learning models or what is often called Blended Learning will be implemented using case study problems. This type of research is descriptive qualitative research, the research subjects are students of class Va and class Vb Muhammadiyah Elementary School 01 Paron, totaling 19 students in class Va and 20 students from class Vb, homeroom teachers of class Va and Vb and the principal of SD Muhammadiyah 01 Paron. The object of the research is the learning outcomes of fifth grade elementary school students, especially in mathematics subjects on the material of arithmetic operations on fractions using blended learning model learning. To test the validity of the instrument in this study using data triangulation. The research data were obtained from observations, interviews and learning outcomes tests. The data obtained were analyzed descriptively quantitatively and descriptively qualitatively. The results show that the average learning outcomes of mathematics using online learning models are still not effective because many students are constrained about mathematical concepts and students' understanding of fractional numbers is still low. With this, blended learning is a learning solution for elementary school students to improve learning outcomes and improve mathematical concepts. The average mathematics learning outcomes of students who are taught using a digital-based blended learning model are 70 while the average value of students who are taught using a conventional model is 57.5, it appears that the overall implementation of the learning process in the experimental class using a digital-based blended learning model is more supportive in mastering the material than in the classroom. control using conventional learning models.

INTRODUCTION
Technological advances in the 21st century have had a major influence on various fields of life, one of which is in the quality of education (Kosasi, 2020; Mokol et al., 2022; Oliveira & de SOUZA, 2022; Qureshi et al., 2021). The purpose of education is to continuously improve competence and quality training for better quality and to be able to compete (Assidiqi & Sumarni, 2020; Bahri, 2020). Education in general is growing with technological advances, in this case better, creative, innovative, and quality learning strategies can be applied to the education sector for quality and quality human resources competition (Puspitarini, 2022; Rinekso, 2021). Education is a conscious and planned effort, to create a consciously planned atmosphere in learning. Aims to develop the potential of students who experience physical, mental, emotional, and social disorders to become human beings who believe and are devoted

to God Almighty (Depdiknas, 2003). Noble character, healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen (Agussani, 2020). The learning program is structured in such a way as to suit the needs and character of the child. The education program includes 3M namely (Reading, Writing, Counting) as well as knowledge about nature and society to calculate.

One of the implementations of technology in the world of education is e-learning. E-leaning is one of the new breakthroughs in the world of education, innovation from technological developments and education combined into one as evidence of the progress of the times (Lestari et al., 2018). Learning by combining learning and the internet to keep up with the times in this digital era that uses the services of electronic devices such as computers and the internet (Perbawa et al., 2020). Revealed that the e-learning is given using a computer or mobile device that is able to support learning.

E-learning can be an alternative learning method under certain conditions, if face-to-face learning cannot be carried out with the help of internet-based learning or distance learning (Rahayu et al., 2019; Warsito et al., 2019). Online learning is a learning activity by utilizing the internet network, local area network as a method of interacting in learning such as delivering material (Mustofa et al., 2019; Pamungkas et al., 2020). Online learning can be done with computer, laptop or smartphone facilities that are connected to the internet network. With these facilities, teachers and students can learn together at the same time using platforms such as WhatsApp, Telegram, Zoom, Meets, Google Classroom (Fitriyani et al., 2020; Natalya & Halim, 2021; Sesmiarni, 2022).

However, online learning does not always have a good impact on students, many obstacles or problems occur during learning (Lubis & Dasopang, 2021). Students do not understand the material explained by the teacher, feel bored with the learning carried out and the social spirit of students is reduced because they do not directly meet the teacher and their colleagues. (Nafis et al., 2022; Nurhadi, 2020) with this, innovation in the world of education is very much needed, especially to reduce negative impacts on elementary school students, one of which is by applying the Blended Learning.

Blended learning is a learning system that combines synchronous learning strategies and asynchronous learning strategies in order to create a learning experience to achieve optimally determined learning outcomes (Chaeruman, 2018; Darma & Karma, 2020). Puspitarini (2022) and Warsito et al., (2019) states that blended learning has the following characteristics: Combining the two best strategies, namely synchronous in the classroom and asynchronous outside the classroom, the weaknesses of traditional learning can be integrated into online learning, aiming to achieve optimum learning effectiveness. (Ningsih et al., 2017) mentions that the blended learning is an innovation from the learning model, which teachers can apply to elementary school students. To provide a new learning innovation that is fun and more effective, efficient, and innovative so that students also have a passion for learning.

The blended learning has the aim of facilitating learning by providing various learning media by taking into account the characteristics of students in learning (Puspitarini, 2022). This learning can also encourage participants to make the best use of face-to-face in developing knowledge. However, what happens is that the use of blended learning is different from face-to-face activities in the classroom, blended learning offers better learning, either separately or in groups and at the same or different times. Learning materials can be visualized in a more interesting and dynamic form. By using various learning variations, it can increase students' enthusiasm for learning.

Obstacle faced in learning mathematics is the low understanding of students towards the concepts being studied (Maharani, 2022). This is a result of the lack of knowledge and

understanding of students on the basic concepts of the material to be studied. The lack of student understanding is marked by the mistakes made by students in solving math problems. Errors made by students are generally found during exams, tests, or assignments given by the teacher (Gusti et al., 2022; Rinekso, 2019). Assert that for mathematics which has concepts that are hierarchically arranged with interrelated constructions, the concept cannot be explained perfectly without being given a pre-conditional the previous concept. In line with that, (Ramlah et al., 2016) stated that mathematical concepts are arranged hierarchically, structured, logically and systematically starting from the simplest concepts to the most complex concepts. In addition, (Arnidha, 2018; Kusumaningrum & Pujiastuti, 2021) mentions that being able to understand mathematical concepts is very necessary for learning mathematics in elementary schools.

The world is currently shocked by the outbreak of the Covid-19 virus disease. The Covid-19 virus is spreading rapidly in various regions and between countries. Most countries in the world decided to (Agustina et al., 2021; Chairani, 2020). One of the countries that decided to lock was Indonesia. Activities in various fields are carried out remotely, namely from home online. One of the fields that apply the online method is the field of education. Learning activities are carried out online from their respective homes (Musu et al., 2021). Online learning is in accordance with Circular Letter Number 4 of 2020 from the Minister of Education and Culture of the Republic of Indonesia regarding the Implementation of Policies in the Emergency Period for the Spread of Covid-19 which explains that the learning process is carried out at home through online or distance learning. Online learning is distance learning using an internet-based interactive model and learning management system (LMS). Online learning activities are carried out from home to replace face-to-face learning activities. Every student can take part in online learning via android or laptop.

METHODS

This research was conducted at Paron Ngawi Muhammadiyah Elementary School, Paron District, Ngawi Regency. This research uses descriptive qualitative research. The subjects of this study were the V grade teachers of SD Muhammadiyah Paron and V grade students, as well as the principal. The research strategy used in this research is a case study. The strategy chosen by this researcher is used as a reference in conducting observations, gathering information and in presenting the analysis of research results. Data collection in this study was conducted by interviewing teachers and students, and principals. To get valid data, the researcher gave questions about mathematics material and filled out questionnaires on student responses, teachers and school principals regarding the blended learning model. The validity of this research is to use triangulation of data sources and time, namely by conducting interviews with the principal, class teachers and students and documentation on each lesson carried out using both blended learning and online learning. While time triangulation is used to determine when the data collection is carried out in the research.

The data is then analyzed using an interactive analysis model, consisting of data collection, data reduction, data presentation, and drawing conclusions. Component analysis is carried out continuously in one cycle until valid data is obtained. The technique used in this study is a measurement technique in the form of a test for understanding mathematical concepts about understanding fractions. This test is in the form of essay questions to determine students' understanding of the solution. Analysis of the results of this test is used to measure students' conceptual understanding in accordance with predetermined indicators. The data listed on the test result sheet is an assessment of students' answers to the posttest in the experimental class compared to the control class.

Preparation Stage
The steps taken in the preparation stage include: (1) conducting pre-research at SD Muhammadiyah Paron; (2) formulating the problem of pre-research results; (3) provide solutions, namely using a blended learning; (4) reviewing the literature on blended learning; (5) making learning tools in the form of lesson plans (RPP); (6) making a research instrument to test the understanding of students' learning concepts; (7) validate learning tools and research instruments; (8) revise learning tools and research instruments based on validation results from experts; (9) conducted a trial of research instruments in the form of learning outcomes tests for V grade students of SD Muhammadiyah Paron; (10) analyze the data from the test results to determine the reliability of the questions.

Implementation Stage
The steps taken at the implementation stage include active learning with a blended learning in the experimental class and online learning in the control class. Next is to give a concept understanding test after being given treatment.

Final Stage
The steps taken in the final stage include: (1) analysing research data; (2) collect additional data to support data analysis through literature review; (3) compiling a research report by describing the results of data analysis and drawing conclusions from the research that has been done.

RESULTS AND DISCUSSION

From the results of data analysis which includes data reduction, data presentation, and verification or checking of data, it is found that the types of errors made by students in solving problems in arithmetic operations on fractions are as follows. Conceptual errors in solving arithmetic operations problems on fractions related to the addition of fractions with integers are that many students make mistakes in changing the form of integers into a/b form. In addition, there are students who directly add fractions with different denominators without equating the denominators first. This can be seen from the results of student work on the questions.

Based on the results of student interviews, it was found that some students already knew the concept of converting mixed fractions into ordinary fractions. However, students are wrong in multiplying and adding integers. Some of the other students did not know the concept of converting mixed fractions into ordinary fractions. Students only write down what is on their mind or copy the work of their friends. The same thing also happens when students solve problems related to subtraction of fractions. The most common misconceptions students make in solving fraction subtraction problems are converting mixed fractions into ordinary fractions or in changing integers in the form of a/b. as indicated in the student work.

Teacher Performance
a) The performance of the experimental class teacher
In general, the teacher in planning learning has done well. At the first meeting, the teacher's performance of 60% was included in the "enough" criteria. The second meeting the percentage of teacher performance of 72% included in the "good" criteria between teachers and students, there was interaction so that the teacher could balance the activities of students during learning. The third meeting, the percentage of teacher performance by 84% which is included in the "good" criteria. Fourth meeting, teacher performance percentage

by 96% which is included in the "very good" criteria. The teacher always evaluates the shortcomings and students have started to get used to learning and students are very enthusiastic to follow the learning process.

b) The performance of the control class teacher

At the first meeting, the teacher's performance was 52% which was included in the "less" criteria where at the first meeting in the learning process the teacher was not used to teaching in this class so that the interaction between teachers and students did not go well. The second meeting, the percentage of teacher performance shows that the percentage is 62%. This can be seen that there is an increase in the percentage of teacher performance compared to the first meeting. The second meeting, the percentage of teacher performance included in the "sufficient" criteria between teachers and students has begun to adapt in the teaching and learning process. The third meeting, the percentage of teacher performance based on the results of the study was 76%. The fourth meeting, the percentage of teacher performance is 80% which is included in the "good" criteria. This shows that the teacher's performance reaches the criteria of "good". The teacher always evaluates the shortcomings in each meeting and the students seem to be getting used to the learning that is taking place. The performance of this teaching teacher will affect student learning activities in the learning process.

Table 1. Results of Observation of Teacher Performance in Experimental Class

No	Aspects Observed	Score			
		1	2	3	4
1	Introduction				
	Making lesson plans	4	4	4	4
	Determination of time allocation	3	4	4	5
	Prepare learning media	2	4	5	4
2	Core Activities				
	Open learning	3	4	3	5
	Delivering material	2	3	4	5
	Learning with digital-based blended learning	3	3	4	5
	Teachers motivate students	3	4	4	4
	Guiding and monitoring students in th teaching and learning process	3	3	3	5
3	Closing				
	Evaluation	3	3	4	5
	Closing the lesson	4	4	3	5
	Total score	30	36	42	48
	Maximum score	50	50	50	50
	Presentation	60%	72%	84%	96%
	Criteria	Quite	Good	Good	Very good

Table 2. Observations of Teacher Performance in the Control Class

No	Aspects Observed	Score			
		1	2	3	4
1	Introduction				
	• Making lesson plans	3	3	4	5
	• Determination of time allocation	2	3	4	4
	• Prepare learning media	2	2	4	4
2	Core Activities				
	• Open learning	2	3	3	4
	• Delivering material	2	3	4	5
	• Learning with digital-based blended learning	3	3	4	4
	• Teachers motivate students	3	4	5	4
	• Guiding and monitoring students in the teaching and learning process	3	3	3	3
3	Closing				
	• Evaluation	3	3	4	3
	• Closing the lesson	3	4	3	4
	Total score	26	31	38	40
	Maximum score	50	50	50	50
	Presentation	52%	62%	76%	80%
	Criteria	Not	Enough	Good	Good

Student Learning Activities

a) Results of observations of class student learning activities experiment.

At the first meeting the results of the activity students by 40% with the criteria of "enough" students are not familiar with the model and media used by the teacher in delivering the material. However, this can be overcome by increasing observations at meetings: second meeting 47.4% third meeting by 60% and fourth meeting 70%, this means that students are getting used to the model and the media used by the teacher so that learning goes well and is fun. It shows students getting used to the models and media used by the teacher so that learning goes well and is fun. Students have new experiences in learning because in previous learning students were only taught with conventional models, this can affect students' interest in understanding the content the material that the teacher teaches is on the material of flat figures and broken numbers.

b) Results of observations of class student learning activities control.

The conventional model is a model learning that is usually done by every teacher without using models and media certain learning. The teacher explains the material orally while students listen carefully to the teacher's explanation. It's not like that to provide new experiences to students, so that students do not give a positive response in following the lesson. Student learning activities in the control class at the beginning of the meeting until the fourth meeting in the "active" criteria, there was an increase in scores at each meeting but only slightly. This means that applying learning using conventional models has less effect on student activity.

Table 3. Student Learning Outcomes Experiment Class

No	Aspects of Student Activities Learning	Score 1st meeting			
		1	2	3	4
1.	Student attention	2	2	3	4
2.	Students quickly condition the situation in learning activities	2	3	4	4
3.	Students easily adapt to learning that is used	2	3	3	4
4.	Student activity in the learning process	3	2	4	4
5.	Responding and answering questions	2	3	3	4
6.	Doing assignments	2	3	4	4
7.	Summarizing	3	3	3	4
	Total Score	16	19	24	28
	Maximum score	40	40	40	40
	Presentation	40%	47,4%	60%	70%
	Criteria	Sufficie-nt	Active	Active	Very active

Table 4. Student Learning Outcomes in Control Class

No	Aspects of Student Activities Learning	Score 1st meeting			
		1	2	3	4
1.	Student attention	2	2	2	3
2.	Students quickly condition the situation in learning activities	2	2	3	4
3.	Students easily adapt to learning that is used	2	3	2	3
4.	Student activity in the learning process	3	2	2	3
5.	Responding and answering questions	2	3	2	4
6.	Doing assignments	2	3	2	3
7	Summaring	1	2	3	3
	Total Score	14	17	16	23
	Maximum Score	40	40	40	40
	Presentation	35%	42,5%	40%	57,5%
	Criteria	Sufficie	Active	Fairly active	Active

The Results of The Experimental Class Student Questionnaire Responses and Control Class.

Students in the experimental class who gave a "very interested" response using a blended *learning* model *web* were 70% and students who stated "interested" as much as 20%. The results of the questionnaire response analysis students in the control class who apply learning using conventional models such as in Table 5. students who stated "interested" in using the conventional model as many as 55% and students who stated "very interested" as many as 25%, stating "quite interested" 15% and those stating "less interested" 5%. So, learning with a blended *learning* model *digital* gets more positive response from students than the use of conventional models.

Posttest Scores

After the *posttest was held,* there was a difference between the experimental class and the control class significant value gain. In the experimental class obtained an average of 70 while the average control class is 57.5. This strongly illustrates that the blended learning model can increase motivatiopn and better student learning outcomes in the future.

19

Table 5. Percentage of Student Responses on Web-Based BLM Learning and Conventional Model Learning

Criteria	Experiment Class		Control Class	
	Number of Responden	Precentage	Number of Respondents	Precentage
Very Interested	13	70	5	25
Interested	4	20	10	55
Quite Interested	2	10	3	15
Less Interested	0	0	2	5

Table. 6 Comparison of the control class and the experimental class
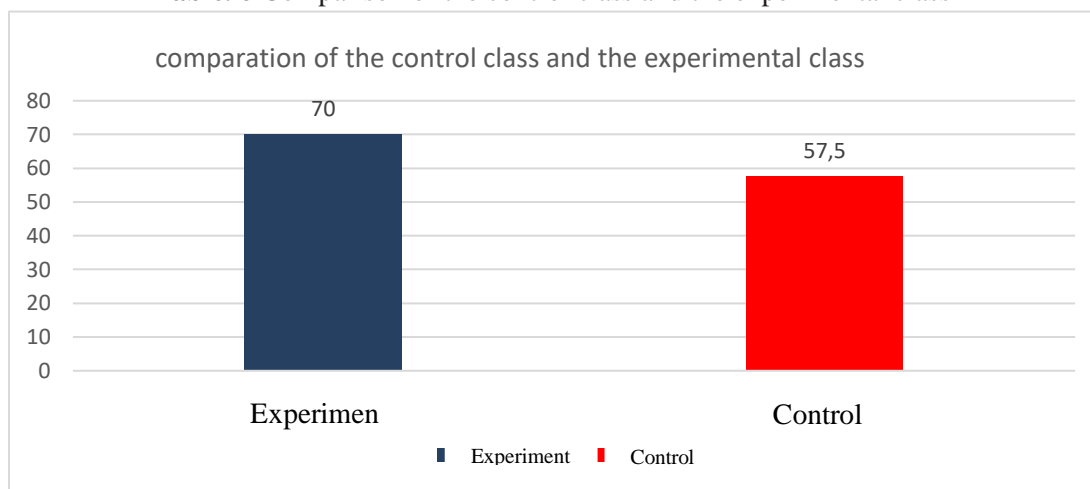
Students' mistakes in understanding the concept of fraction multiplication operations are when working on multiplication problems in fractional numbers, in completing multiplication operations on fractional numbers by first doing the process of equating the denominator by using the KPK after that's students only perform multiplication operations on the fractional numerator and do not perform multiplication operations on the fractional number. The denominator of the fraction (Warsito et al., 2019). When asked about their understanding of the sample questions and explanations given by the teacher in class, some students said they understood. However, when the form of the question is changed, students do not understand and cannot work on the problem. The student's error in understanding the concept of the fraction division operation is that the student first equates the denominator of the two fractions and then divides or adds the numerator, while the denominator remains. In addition to the explanation above, students' mistakes in performing multiplication and division operations of fractions are that students make mistakes in converting integers into a/b form or errors in converting mixed fractions into ordinary fractions.

So, it can be concluded that in general the conceptual errors made by students in solving arithmetic operations on fractions are errors in converting integers into a/b form and errors in converting mixed fractions into ordinary fractions. Conceptual errors made by students in solving story problems are caused because students do not understand the concept of translating mathematical sentences that are known in story problems so that students have difficulty in answering questions. Conceptual errors made by students in answering story questions are that students are wrong in translating questions into mathematical sentences and

students are wrong in translating operating words in story problems. Students translate the operating word "times" into "plus" or "less".

Based on the results of the analysis of interviews with students, students solve story problems according to their understanding and are still confused in determining what operations will be used in solving story problems. The principal errors made by students related to arithmetic operations on fractions mostly occurred in item questions. In solving arithmetic operations problems on fractions, the error made by students is wrong in the process of equating the denominator of a fraction. The principles error experienced by students is that students understand the concept of adding and subtracting two fractional numbers that can be done if the denominators are the same, but in the process of equating the denominators the students have not been able to equalize the denominators perfectly. As happened to the student, the student was correct in the operation of adding fractions first, the student equated the denominator of the two fractions, but the student was wrong in determining the numerator of the two fractions.

According to the results of interviews with students who were selected as research subjects, it was found that some students were wrong in dividing and multiplying integers. In addition, students do not know how to equate the denominator of fractions in completing arithmetic operations on fractions and only cheat on their friends' work. Based on the description, it can be concluded that students experience errors in applying the principles to arithmetic operations on fractions due to students' inaccuracy in solving questions. This error occurs in students who make errors in procedural solving math problems. This procedural error is the most common error made by students after conceptual errors.

Discussion

Blended learning model is a learning model that utilizes computer technology, especially the internet-based blended learning model *digital* as a learning resource was carried out in class Va as an experimental class. The teaching and learning process using a blended *learning* model as a learning resource is more suitable to be applied in the teaching of mathematics on the subject of geometric figures and fractions. This is because learning is not centered on the teacher so that student creativity can develop, besides that it will also create an effective teaching and learning process, so that it can increase student interest and learning outcomes. The use of technology-based media allows learning to be carried out more varied so that it is not boring.

Judging from the observations of teacher performance, in general it is included in the "good" criteria reaching 76%. This means that the teaching process carried out by the teacher is in accordance with the lesson plan. The application of learning with a blended *learning* model *digital* as a learning resource has a reciprocal relationship between students and teachers in the teaching and learning process. The teacher's performance in teaching affects student learning activities in the learning process. Observation of student activities in participating in learning can be seen that in the experimental class students actively participate in the learning process-based blended learning model *web* as a learning resource will encourage students' motivation and curiosity about the material being studied.

After participating in the lesson, 70% of the experimental class students stated that they responded "very interested" in participating in learning with a blended learning model digital as a learning resource and the post-test results in this class had an average score of 76.78. Learning in this experimental class can foster student interest in learning, eliminate student boredom in following the learning process, and can help students understand what is being learned so that student learning outcomes can increase.

The implementation of conventional model learning is carried out in class Vb as a control class. Conventional model learning is not suitable to be applied to the material of building space and fractional numbers. This is because the material for broken numbers and building blocks is not only rote but also requires learning media in studying the material. This material is also directly related to the symptoms experienced in everyday life. The conventional model applied to the control class does not foster student activity. Students are active in learning when they receive a warning from the teacher. In the implementation of student behavior that tends to deviate. Students become indifferent to mathematics lessons, bored with the material being taught so that they have the desire to make noise in class to seek attention. After being treated with a conventional model as many as 20 students responded that they were "quite interested" in this learning, it can be concluded that there are differences in learning outcomes between students who use blended learning model web as a learning resource and conventional learning in class Vb SD Muhammadiyah Paron Ngawi Regency for the 2020/2021 academic year. The average mathematics learning outcomes of students who are taught using blended learning model are digital 70 while the average value of students who are taught using a conventional model is 57.5, it appears that the overall implementation of the learning process in the experimental class using blended learning model is more supportive in mastering the material than in the classroom. control using conventional learning models.

CONCLUSIONS

Based on the discussion of the results of the study, the following conclusions can be drawn: (1) The cause of this error is that students make mistakes in the algorithm of questions and in performing operations, students skip the steps for solving problems, and students cannot determine the procedures or steps in completing the items. questions so that students cannot find the final result. As a result, students cannot solve the questions given. The most procedural errors made by students. According to the results of interviews with students who were selected as research subjects, it was found that some students did not know the steps for solving problems and only cheated on their friends' work. This is especially done by students when solving story problems. In solving story problems, students skip several steps of completion and some students only write the final answer or conclusion, (2) the implementation of learning that uses *blended learning* models as a learning resource is better than learning using conventional models of fractional numbers in V grade elementary school students Muhammadiyah 1 Paron, Ngawi Regency, for the 2020/2021 academic year (3) there are differences in learning outcomes of mathematics with fractional numbers between learning using *blended learning* -based *digital* and conventional learning models. The advice given is that teachers need to attend training on how to apply ICT-based learning media in mathematics subjects in particular, so that teachers can develop and use *blended learning* models *digital* in learning and for schools to provide infrastructure facilities to support smooth learning by completing tools in the multimedia room as well as in every classroom.

AUTHOR CONTRIBUTIONS STATEMENT

PAV and CC played a major role in this research. In this study, it was designed, conceptualized, and carried out by the two researchers. Both researchers have a very important role in carrying out this research. Meanwhile, SY and HA has a role in the implementation of this research.

REFERENCES

Agussani. (2020). *Program Pendidikan Keaksaraan Berbasis Kecakapan Hidup*. Universitas Pendidikan Indonesia: Departemen Pendidikan Masyarakat Fakultas Ilmu Pendidikan.

Agustina, E., Ernawati, E., Irvita, M., & Putri, C. P. (2021). Dampak masa pandemi covid-19 dalam perspektif kesetaraan gender. *UNUSIA CONFERENCE*, *1*(1), 89-100.

Arnidha, Y. (2018). Analisis pemahaman konsep matematika siswa Sekolah Dasar dalam penyelesaian bangun datar. *JPGMI (Jurnal Pendidikan Guru Madrasah Ibtidaiyah Al-Multazam)*, *3*(1), 53.

Assidiqi, M. H., & Sumarni, W. (2020). Pemanfaatan platform digital di masa pandemi covid-19. *Prosiding Seminar Nasional Pascasarjana (PROSNAMPAS)*, *3*(1).

Bahri, S. (2020). Pengembangan teknologi dalam pendidikan pascapandemi covid-19. *Prosiding Seminar Nasional Pascasarjana (PROSNAMPAS)*, *3*(1).

Chaeruman, U. A. (2017). PEDATI model desain sistem pembelajaran blended. *Direktorat Pembelajaran Kementrian Riset, Teknologi Dan Pendidikan Tinggi*.

Chairani, I. (2020). Dampak pandemi covid-19 dalam perspektif gender di Indonesia. *Jurnal Kependudukan Indonesia*, 39.

Darma, I. K., & Karma, I. G. M. (2020). Blended learning, inovasi strategi pembelajaran matematika di era revolusi industri 4.0 bagi pendidikan tinggi. *PRISMA, Prosiding Seminar Nasional Matematika*, *3*, 13.

Darma, I. K., & Karma, I. G. M. (2022). Inovasi pembelajaran matematika bagi pendidikan vokasional dengan blended learning masa pandemi covid- 19. *PRISMA, Prosiding Seminar Nasional Matematika*, *5*, 15-19.

Depdiknas. (2003). *Undang-undang RI No. 20 Tahun 2003. Tentang Sistem Pendidikan Nasional*.

Fitriyani, Y., Fauzi, I., & Sari, M. Z. (2020). Motivasi belajar mahasiswa pada pembelajaran daring selama pandemik covid-19. *Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran*, *6*(2), 165–175.

Gusti Satria, T., Maya Sari, D., Rosalina, E., & Rijal, A. (2022). Analisis kesalahan siswa dalam menyelesaikan soal pecahan pada siswa kelas V SD Negeri 43 Lubuklinggau. *Jurnal Paris Langkis*, *2*(2), 23–32.

Kosasi, S. (2020). Education transformation in the era of digital disruption 4.0. *JUDIMAS*, *1*(1), 1-13.

Kusumaningrum, S. A., & Pujiastuti, H. (2021). Analisis pemahaman konsep matematis materi bangun datar pada siswa kelas III di SDN Kota Serang. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, *10*(5), 1142-1151.

Lestari, R. R., Mulyono, & Minarni, A. (2018). An effort to improve mathematical problem-solving ability of middle secondary school students through autograph-assisted mathematics realistic education approach. *American Journal of Educational Research*, *6*(10), 1338-1343.

Lubis, A. H., & Dasopang, M. D. (2021). Online learning during the covid-19 pandemic: How is it implemented in elementary schools?. *Premiere Educandum: Jurnal Pendidikan Dasar Dan Pembelajaran*, *11*(1), Article 1.

Maharani, N. A. D. (2022). The effectiveness game-based learning approach in improving problem-solving skills and learning motivation. *Journal of Diversity in Learning*, *2*(2), 15.

Mokol, N. A., Putri, F. J. K., Wulandari, M. T., Waluyo, R. A., & Suni, M. H. (2022). pengaruh perkembangan teknologi dalam pembelajaran abad 21 pendidikan kewarganegaraan di Indonesia. *SNHRP*, 1082–1088.

Mustofa, M. I., Chodzirin, M., Sayekti, L., & Fauzan, R. (2019). Formulasi model perkuliahan daring sebagai upaya menekan disparitas kualitas perguruan tinggi. *Walisongo Journal of Information Technology*, *1*(2), 151.

Musu, W., Simpen, W., & Samsie, I. (2021). Identifikasi pola pembelajaran daring dimasa pandemi covid-19 menggunakan teknik data mining. *Jurnal Pekommas*, *6*(3), Article 3.

Nafis, F. N. R., D.a, L. R., Azizah, L. N., & Rasyid, A. N. (2022). Efektivitas model pembelajaran blended learning terhadap hasil belajar siswa pada mata pelajaran IPA sebagai solusi awal pembelajaran tatap muka. *VEKTOR: Jurnal Pendidikan IPA*, *3*(1), Article 1.

Natalya, L., & Halim, S. V. (2021). Covid-19 pandemic: Its impact on learning motivation (The fluctuation during three different phases). *Jurnal Pendidikan Dan Pengajaran*, *54*(3), Article 3. https://doi.org/10.23887/jpp.v54i3.37535

Ningsih, Y. L., Misdalina, M., & Marhamah, M. (2017). Peningkatan hasil belajar dan kemandirian belajar metode statistika melalui pembelajaran blended learning. *Al-Jabar: Jurnal Pendidikan Matematika*, *8*(2), 155.

Nurhadi, N. (2020). Blended learning dan aplikasinya di era new normal pandemi covid 19. *AGRIEKSTENSIA: Jurnal Penelitian Terapan Bidang Pertanian*, *19*(2), 120–128.

Oliveira, K. K. de S., & de SOUZA, R. A. C. (2022). Digital transformation towards education 4.0. *Informatics in Education*, *21*(2), 283–309.

Pamungkas, G. W., Nasir, A., Romadhoni, L., & Lailina, N. (2020). Formulasi pengembangan model pembelajaran daring sebagai upaya peningkatan kualitas pendidikan. *Prosiding Nasional Pendidikan: LPPM IKIP PGRI Bojonegoro*, *1*(1), 47-58.

Perbawa, I. G. B., Adiarta, A., & Ratnaya, I. G. (2020). Pengembangan media pembelajaran menggunakan smarthphone berbasis android untuk pembelajaran teknologi jaringan berbasis luas (WAN). *Jurnal Pendidikan Teknik Elektro Undiksha*, *9*(3), 11.

Puspitarini, D. (2022). Blended learning sebagai model pembelajaran abad 21. *Ideguru: Jurnal Karya Ilmiah Guru*, *7*(1), 1-6.

Qureshi, M. I., Khan, N., Raza, H., Imran, A., & Ismail, F. (2021). Digital technologies in education 4.0. does it enhance the effectiveness of learning? A systematic literature review. *International Journal of Interactive Mobile Technologies (IJIM)*, *15*(04), 31-43.

Rahayu, G., Arga, H., Altaftazani, D., & Bernard, M. (2019). Effect of VBA learning media to improve student's decission making skill of elementary school. *Proceedings of the 2019 Ahmad Dahlan International Conference Series on Education & Learning, Social Science & Humanities (ADICS-ELSSH 2019)*. 11.

Ramlah, R., Bennu, S., & Paloloang, B. (2016). Analisis kesalahan siswa dalam menyelesaikan soal penjumlahan dan pengurangan pecahan di kelas VII SMPN model terpadu madani. *JIPMat*, *1*(2), 182-194.

Rinekso, A. (2021). The representation of 21st century skills in an Indonesian EFL textbook. *Journal on Language and Language Teaching*, *24*(1), 191–211.

Sesmiarni, Z. (2019). The effective moral education on early childhood as an effort against immoral culture. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *3*(2), 561-569.

Warsito, Nuraini, Y., & Muhtadi, D. (2019). The design learning of fraction with realistic mathematics education in elementary school. *Journal of Physics: Conference Series*, *1180*(1), 012110.