



Students' Perceptions towards Blended Learning during Covid-19 Pandemic

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Abstract: This study aims to describe students' perceptions of the application of the Blended Learning model in learning mathematics during the COVID-19 pandemic at SMK Negeri 1 Sungai Apit. This research uses descriptive quantitative research methods. The subjects of this study were 40 students from SMK Negeri 1 Sungai Apit. The object of research is students' perceptions of Blended learning during Covid 19. The research data are analysed by finding the percentage and describing students' perceptions of blended learning. Based on the results of the study showed that as many as 47% of students felt enthusiastic and liked the direct learning process because the learning methods used by teachers varied despite having limited time, 45% of students always experienced problems in accessing the learning provided by the teacher, and 46% of students dared to learn. express opinions, both face-to-face learning and online learning. Based on this research, it can be concluded that more students like Limited Face-to-face Meetings (PTMT) than online learning.

Keywords: blended learning, online Learning, face-to-face, mathematics, perception.

Abstrak: Penelitian ini bertujuan untuk mendeskripsikan tentang persepsi siswa terhadap penerapan model Blended Learning dalam pembelajaran matematika selama pandemi COVID-19 di SMK Negeri 1 Sungai Apit. Penelitian ini menggunakan metode penelitian deskriptif kuantitatif. Subjek penelitian ini adalah 40 orang siswa yang berasal dari SMK Negeri 1 Sungai Apit. Objek penelitian adalah persepsi siswa terhadap Blended learning selama Covid 19. Data hasil penelitian di dianalisis dengan cara mencari persentase dan mendeskripsikan persepsi siswa terhadap blended learning. Berdasarkan hasil penelitian menunjukkan bahwa sebanyak 47% siswa merasa antusias dan menyukai proses pembelajaran secara langsung karena metode pembelajaran yang digunakan guru bervariasi meskipun memiliki waktu yang terbatas, 45% siswa selalu mengalami kendala dalam mengakses pembelajaran yang diberikan oleh guru, dan 46% siswa berani belajar mengemukakan pendapat, baik pembelajaran tatap muka maupun pembelajaran online. Berdasarkan penelitian ini, maka dapat disimpulkan bahwa lebih banyak siswa yang menyukai Pertemuan Tatap Muka Terbatas (PTMT) daripada pembelajaran online.

Kata kunci: blended learning, pembelajaran online, tatap muka, matematika, persepsi.

▪ INTRODUCTION

For approximately two years, various countries in the world are still facing the Corona Virus Disease pandemic or known as COVID-19. Indonesia is also inseparable from pandemic conditions that affect various aspects of human life, such as aspects of health, economy, to education Suripah & Susanti (2022). Since 2020, many restrictions have been imposed by the Indonesian government with the aim of breaking the chain of the spread of COVID-19. These activity restrictions are also applied in the field of education where teaching and learning activities cannot be carried out directly and are transferred online (Pokrovskaja, Leontyeva, Ababkova, & D'Ascenzo, 2021., Hebecci, Bertiz, & Alan, 2020).

This COVID-19 pandemic urges teachers and students to carry out distance education which has never been done simultaneously before Damayanthi (2020). One way to respond to this situation is to use an appropriate learning model for the pandemic, namely the blended learning model. The blended learning model is a learning model that has two methods, namely face-to-face and online. During the pandemic, blended learning-based learning is often used by schools (Roqobih & Ambarwati, 2020., Aznam, Perdana, Jumadi, Nurcahyo, & Wiyatmo, 2021).

The application of blended learning is considered very effective in the learning process because it provides new innovations that have not been obtained by students before. Blended learning aims to make learning activities more optimal and better, facilitating the characteristics and independence of students' learning (R. Wahyuni & Nurhayati, 2019). The blended learning model has many advantages, including improving the control process for students, reducing distractions that usually occur in class, as well as simplifying the task management process and improving student performance. A. S. Wahyuni (2022) even stated that the concept of blended learning is an ideal concept to be applied in learning in the midst of a pandemic. Although learning is done online, the learning time is used effectively and the interaction process between teachers and students is still there.

Based on the opinions of several experts above, it can be seen that the blended learning model has several advantages. From these advantages, the blended learning model can be applied in the mathematics learning process. This is because students' motivation to learn mathematics has decreased during the online learning process (Kamaluddin, 2017). In addition, many students think that the concept of abstract mathematics learning material is increasingly difficult to understand when learning is carried out online (Rizaldi, Nurhayati, & Fatimah, 2021). Therefore, teachers must be creative in providing alternative learning methods using blended learning methods, both online and face-to-face. For example the use of websites Suripah & Susanti (2022)., Ali, (2020) as well as facilitating learning with interactive media such as the use of geogebra software (Celen, 2020., Tamam & Dasari, 2021).

However, based on the results of researcher interviews with several class XI students of SMKN 1 Sungai Apit, information was obtained that students had difficulty participating in online math learning activities. Some of the difficulties include: (1) students cannot understand the explanation of the material given by the teacher because the time is so short, (2) students feel bored with online math learning activities, (3) not all students have facilities such as cellphones and laptops. for online mathematics learning activities, (4) lack of interaction between teachers and students during online learning activities, (5) students are often late in submitting assignments to the teacher.

Furthermore, from the results of the researcher's interview with the mathematics teacher at SMKN 1 Sungai Apit, information was obtained that during the pandemic learning mathematics was conducted in limited face-to-face (TMT) and online. Limited Face-to-face Learning (TMT) is carried out in accordance with applicable health protocols and learning time only lasts 45 minutes and the condition of students in class is only 50%, while online learning activities are carried out with a predetermined time limit. One of the obstacles faced is that learning cannot be carried out optimally. The use of models and learning methods in sufficient time is available. According to the

teacher, the application of the blended learning model has an impact on student learning outcomes as seen from the results of test scores.

One of the factors that determine the success of applying blended learning in learning mathematics is student perception. According to Leavitt & Zarkasi (1992) perception is a person's assessment or interpretation of a person's perspective on something that is captured by his senses. Perception is the process of receiving a stimulus in the form of a quality object, the relationship between symptoms and events so that the stimulus is realized and understood (Nazarwaty, 2017). Meanwhile, according to Sunendar (2020), Estriegana, Medina-Merodio, & Barchino (2019), student perceptions are students' assumptions and abilities to measure objects that occur in students' memories.

Every student has a different perception. Based on the results of Hima (2017), it is known that students have a positive perception of the application of blended learning. This is because from the results of the study it was concluded that with the application of blended learning students' learning motivation increased. However, from the research of Jaya & Akhirudin (2021) it is known that students have a negative perception of the application of blended learning. This is due to the limited learning facilities owned by students and teachers, as well as the teacher's lack of understanding about the use of technology.

The application of blended learning in a pandemic is considered an effective strategy. However, a sudden change in learning conditions will lead to student perceptions during the learning process. Therefore, this study aims to describe students' perceptions of the application of the blended learning model in learning mathematics during the COVID-19 pandemic at SMK Negeri 1 Sungai Apit.

▪ **METHOD**

This study uses quantitative research methods with a descriptive approach. This study aims to describe students' perceptions of the blended learning model during the Covid-19 pandemic in a quantitative descriptive manner. Students' perceptions are described by calculating students' perception questionnaires on the blended learning model. The student's perception of the blended learning model is determined by converting the student perception questionnaire data into quantitative data. The research subjects were 40 students of class XI who were taken by considering the subject selection criteria (Razak, 2017).

The process of collecting data was carried out by the survey method. The instrument in this study was a non-test instrument in the form of a student response questionnaire. Questionnaire used in this study was adapted from Anderha & Maskar (2020), R. Wahyuni & Nurhayati (2019) and Al Aslamiyah, Setyosari, & Praherdhiono (2019) and was developed by researchers. Before the questionnaires were distributed, the researchers validated with experts, namely UIR mathematics education lecturers. The researcher made revisions according to expert input and suggestions so as to produce a valid questionnaire, which consisted of 33 statements, namely 22 positive statements and 11 negative statements. With three indicators, namely the Limited Face-to-face Learning indicator, the Online Learning indicator and the Independence indicator in Blended Learning.

Based on the validity results, from 33 statement items, after testing there were 3 invalid statement items, so that 30 valid statement items were used for research

instruments. Furthermore, the results of the reliability test can be known by the Cronbach Alpha formula. Based on the results of the reliability test, it can be seen that the value of Cronbach's alpha is 0.712, which means that the instrument tested is reliable. According to Umbara & Rahmawati (2018) if the alpha value is more than 0.70 it means high reliability, meaning that all statement items are reliable and internally consistent because they have strong reliability. The Likert scale category used in the questionnaire, for positive statement items, namely always (4), often (3), sometimes (2), never (1). The indicators and their statement items can be seen in Table 1.

Table 1. Research questionnaire instruments

Indicator	Sub indicators
Limited Face-to-face Learning	Time Allocation
	Learning methods
	Student Participation
	Communication Difficulty
Online Learning	Learning Media Accessibility
	Use of Learning Media
	Use of Online Learning Methods
	Assignment
Independent Learning in Blended Learning	Discipline
	Confidence

This study uses quantitative data analysis consisting of validity and reliability tests with the Alpha Cronbach technique with the help of SPSS version 16 software. To compare student perceptions of the application of the blended learning learning model during the covid-19 pandemic, each indicator is calculated. Data processing was carried out with the help of Microsoft Excel to calculate the percentage of each indicator by grouping the perception questionnaire according to Table 2 below.

Table 2. Criteria for perception questionnaire score

Intervals (%)	Criteria
81-100	very good
68-80	Well
41-60	Enough
21-40	not enough
0-20	Not much

(Al Aslamiyah et al., 2019)

Data collection begins with distributing questionnaires to get students' perceptions of blended learning. From the data, data coding is carried out, then the appropriate data filtering is carried out, and data analysis is carried out. Data analysis in the form of student perceptions of the blended learning model during the covid-19 pandemic was carried out using SPSS and Microsoft Excel.

▪ **RESULT AND DISSCUSSION**

The research activity was carried out at SMK Negeri 1 Sungai Apit with the aim of knowing students' perceptions of the application of the blended learning model in

learning mathematics. Based on the results of the data obtained, then an analysis was carried out for each indicator of students' perceptions of blended learning during the Covid 19 pandemic. The descriptions of the data results and detailed discussions for each indicator are described as follows.

Limited Face-to-face Learning (PTMT)

Based on The results of the percentage of students' perceptions of the use of the blended learning learning model on the limited face-to-face learning (PTMT) indicators are presented in Figure 1 below.

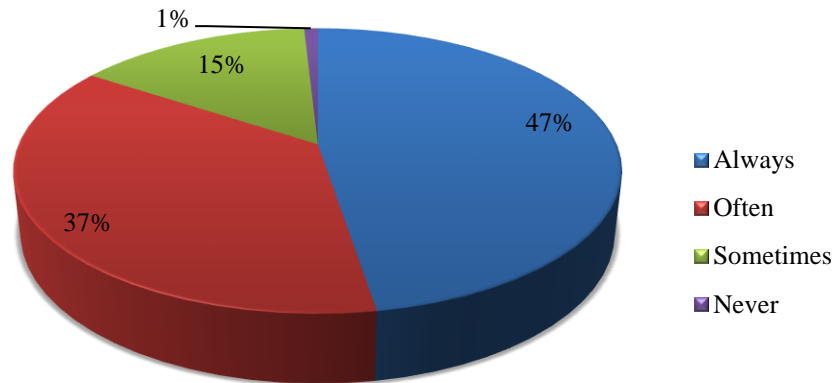


Figure 1. Percentage of student perception of ptmt

From Figure 1 it can be seen that 47% of students always feel enthusiastic and like the direct learning process because the learning methods used by teachers vary even though the time they have is limited. Meanwhile, there are 1% of students who feel tense and do not understand learning when the face-to-face learning process is limited. Other respondents, as much as 37% stated that they were often less active in class during learning and sometimes felt enthusiastic in participating in limited learning activities. This is in line with the results of previous studies that there is a relationship between activeness and enthusiasm for learning that support each other (Frenzel, Becker-Kurz, Pekrun, Goetz, & Lüdtke, 2018., Lazarides, Gaspard, & Dicke, 2019).

In general, public perceptions, especially from students, state that face-to-face learning is the most effective strategy to be applied in the learning process (Darsono, Fitri, Rahardjo, Imanuela, & Lasambouw, 2020). In addition, the habit of teacher-centered learning that has been carried out for a long time is one of the things that is difficult to change. This is in accordance with research conducted by Weldy (2018) which states that the face-to-face learning method remains the main choice of students.

According to Nengrum, Pettasolong, & Nuriman (2021). In the Limited Meeting (PTMT) there are advantages and disadvantages. The advantages include: (1) learning is more effective and students are enthusiastic, (2) the provision of learning materials can be done thoroughly. While the shortcomings of the PTMT process are: (1) not all students can follow the PTMT because the number of students wholimited, (2) inadequate learning facilities. Based on the results of the Budgetary (2019) research, it is known that there is no significant difference in student learning outcomes with the

PTMT method or online learning, this is because the learning outcomes obtained by students depend on their learning styles. However, in general the management of learning by teachers must also adjust and facilitate the needs of students (Carmody, Duffy, Brown, & Del Fabbro, 2020)., Coman, Țîru, Meseșan-Schmitz, Stanciu, & Bularca, 2020).

Online learning

The results of the percentage of student responses to online learning using the blended learning learning model can be seen in Figure 2 following.

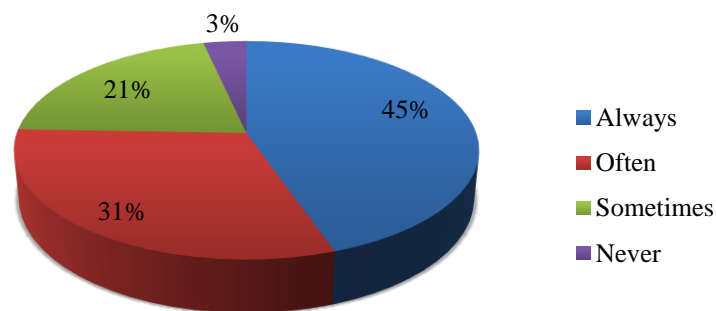


Figure 2. Percentage of student perception of online learning

From Figure 2 it can be seen that 45% of students always experience problems in accessing the learning provided by the teacher. Students often experience internet network problems which always hinder students from downloading the material provided by the teacher, but according to students the method given by the teacher during the online learning process is appropriate. This can be seen from the 3% of students who stated that they had never had difficulty in using the learning media used by the teacher in online learning.

In simple terms, it can be said that although the learning process is carried out online, students' perceptions will be the same as when the learning process is carried out face-to-face or blended learning. This means that the effectiveness of the online learning process that has been feared so far seems to be overcome by prioritizing good process standards. Especially now that there are many learning media that help students, including the Learning Management System (LMS) (Fitriani, 2020), video tutorials (Wulandari & Nugroho, 2020), learning software such as Geogebra, Algebrator, and others Novilanti & Suripah, 2021., Aholongan & Suripah, 2021., Umbara & Rahmawati, 2018).

In online learning there are several factors that influence the success of learning including (1) learning resources, in this case the learning content must be designed to be attractive and meet the competency standards that have been set; (2) learning strategies, teaching methods that are useful for improving communication and understanding of teachers and students towards learning materials; (3) learning support, students need support and motivation from the teacher so that they can support academic interaction;

(4) administration, although learning is done online, the administrative process must be carried out properly so that curriculum achievement can be carried out properly (Irawati & Santaria, 2020). In addition, Farhan, Razmak, Demers, & Laflamme (2019) added that one of the factors that determine success in learning is the teacher's ability to manage learning.

Independent Learning in Mixed Learning

The results of the percentage of students' perceptions of learning independence in blended learning can be seen in Figure 3. From Figure 3 it can be seen that as many as 46% of students dare to learn to express their opinions, both face-to-face learning and online learning. But sometimes as many as 19% of students feel less confident during the learning process. This result is also reinforced by the initial interview data that during online learning, some students are not ready to face the various obstacles they have. Limited time is one of the factors in the implementation of learning. Students are limited to exploring the learning process that takes place virtually. This is clarified by the results of the study Silalahi & Hutauruk, (2020)., Ferri, Grifoni, & Guzzo (2020), that online learning is a separate obstacle for people who are accustomed to face-to-face meetings.

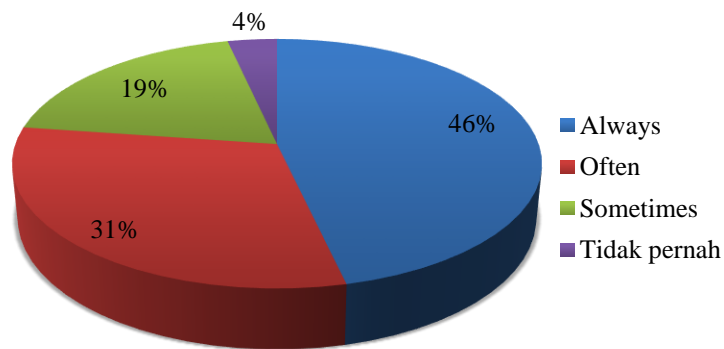


Figure 3. Percentage of students' perceptions of independent learning

According to Fitriasaki, Tanzimah, & Sari (2018) blended learning is learning that combines face-to-face and virtual learning. Based on the results of research by Al Aslamiyah et al., (2019), it is known that the blended learning strategy is able to increase student learning independence by 77.6%. In addition, Sutisna (2016)., Harahap, Nasution, & Manurung (2019) research results also conclude that the blended learning model is effective in increasing student learning independence. Some of these opinions support the results of research by researchers that blended learning requires students' independence to learn indirectly or directly. From some of these expert studies, it can be seen that applying blended learning in the learning process will have the potential to increase student learning independence.

▪ CONCLUSION

Based on the research conducted, through the results of testing and data analysis, researchers can conclude that the perception of students of SMK Negeri 1 Sungai Apit on the BL learning model. Blended learning is obtained that in the limited face-to-face learning process has very good criteria to be applied. Meanwhile, online learning and student learning independence in blended learning have good criteria.

The application of blended learning is proven that this blended learning model is good to apply during the Covid-19 pandemic. This can be seen from the emergence of blended learning indicators for Limited Face-to-face Learning, Online Learning and Independent Learning after blended learning is carried out. Students look enthusiastic, attentive, serious in learning, and active in discussing and looking for additional material via the internet. However, there are also shortcomings in this study, namely: (1) The media used are diverse, so it is difficult to implement if the facilities and infrastructure are not supported; (2) Uneven facilities owned by students, such as cellphones/computers and internet access; (3) Lack of knowledge of teacher and student learning resources.

▪ REFERENCES

- Aholongan, A., & Suripah, S. (2021). Student Ability in Using Algebrator Software: Case Study During Online Learning. *Al Khawarizmi: Jurnal Pendidikan Dan Pembelajaran Matematika*, 5(1), 24–34.
- Al Aslamiyah, T., Setyosari, P., & Praherdhiono, H. (2019). Blended Learning Dan Kemandirian Belajar Mahasiswa Teknologi Pendidikan [Blended Learning and Independent Learning of Educational Technology Students]. *Jurnal Kajian Teknologi Pendidikan*, 2(2), 109–114.
- Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. *Higher Education Studies*, 10(3), 16–25.
- Anderha, R. R., & Maskar, S. (2020). Analisis Kemampuan Komunikasi Matematis Siswa Pada Pembelajaran Daring Materi Eksponensial [Analysis of Students' Mathematical Communication Ability in Online Learning Exponential Material]. *Jurnal Ilmiah Matematika Realistik*, 1(2), 1–7.
- Aznam, N., Perdana, R., Jumadi, J., Nurcahyo, H., & Wiyatmo, Y. (2021). The implementation of Blended Learning and Peer Tutor Strategies in Pandemic Era: A systematic review. 6th International Seminar on Science Education (ISSE 2020), 906–914. Atlantis Press.
- Carmody, C., Duffy, S., Brown, L., & Del Fabbro, L. (2020). Preparing for Work-Integrated Learning during COVID-19: How a New Virtual Orientation Tool Facilitated Access for All. *International Journal of Work-Integrated Learning*, 21(5), 545–557.
- Celen, Y. (2020). Student Opinions on the Use of Geogebra Software in Mathematics Teaching. *Turkish Online Journal of Educational Technology-TOJET*, 19(4), 84–88.

- Coman, C., Țîru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective. *Sustainability*, 12(24), 10367.
- Damayanthi, A. (2020). Efektivitas Pembelajaran Daring di Masa Pandemi Covid - 19 pada Perguruan Tinggi Keagamaan Katolik [Effectiveness of Online Learning in the Covid-19 Pandemic Period at Catholic Religious Universities]. *Edutech*, 19(3), 241–262.
- Darsono, H., Fitri, A. N., Rahardjo, B., Imanuela, M. Z., & Lasambouw, C. M. (2020). Efektivitas Pembelajaran Jarak Jauh saat Pandemi Covid-19 (Kajian di Politeknik Negeri Bandung)[Effectiveness of Distance Learning during the Covid-19 Pandemic (Study at Bandung State Polytechnic)]. *Prosiding Industrial Research Workshop and National Seminar*, 11(1), 1235–1240.
- Estriegana, R., Medina-Merodio, J.-A., & Barchino, R. (2019). Student acceptance of virtual laboratory and practical work: An extension of the technology acceptance model. *Computers & Education*, 135, 1–14.
- Farhan, W., Razmak, J., Demers, S., & Laflamme, S. (2019). E-learning systems versus instructional communication tools: Developing and testing a new e-learning user interface from the perspectives of teachers and students. *Technology in Society*, 59, 101192.
- Ferri, F., Grifoni, P., & Guzzo, T. (2020). Online learning and emergency remote teaching: Opportunities and challenges in emergency situations. *Societies*, 10(4), 86.
- Fitriani, Y. (2020). Analisa pemanfaatan learning management system (LMS) sebagai media pembelajaran online selama pandemi covid-19[Analysis of the Utilization of Learning Management Systems (LMS) as Online Learning Media During the Covid-19] Pandemic. *Journal of Information System, Informatics and Computing*, 4(2), 1–8.
- Fitriasari, P., Tanzimah, T., & Sari, N. (2018). Kemandirian belajar mahasiswa melalui blended learning pada mata kuliah metode numerik[Independent Learning of Students Through Blended Learning in the Numerical Method Course]. *Jurnal Elemen*, 4(1), 1–8.
- Frenzel, A. C., Becker-Kurz, B., Pekrun, R., Goetz, T., & Lüdtke, O. (2018). Emotion transmission in the classroom revisited: a reciprocal effects model of teacher and student enjoyment. *Journal of Educational Psychology*, 110(5), 628.
- Harahap, F., Nasution, N. E. A., & Manurung, B. (2019). The Effect of Blended Learning on Student's Learning Achievement and Science Process Skills in Plant Tissue Culture Course. *International Journal of Instruction*, 12(1), 521–538.
- Hebebcı, M. T., Bertiz, Y., & Alan, S. (2020). Investigation of views of students and teachers on distance education practices during the Coronavirus (COVID-19)

- Pandemic. *International Journal of Technology in Education and Science*, 4(4), 267–282.
- Hima, L. R. (2017). Pengaruh pembelajaran bauran (blended learning) terhadap motivasi siswa pada materi relasi dan fungsi [The Effect of Blended Learning on Student Motivation on Relations and Function Materials]. *JIPMat*, 2(1).
- Irawati, R., & Santaria, R. (2020). Persepsi siswa SMAN 1 Palopo terhadap pelaksanaan pembelajaran daring mata pelajaran kimia [Students' Perceptions of SMAN 1 Palopo on the Implementation of Online Learning for Chemistry Subjects]. *Jurnal Studi Guru Dan Pembelajaran*, 3(2), 264–270.
- Jaya, H. W., & Akhirudin, A. (2021). Dampak Kebijakan Pembelajaran Blended Learning pada Mahasiswa Universitas Pamulang dalam Masa Pandemi Covid-19 [The Impact of Blended Learning Policy on Pamulang University Students During the Covid-19 Pandemic]. *Wiyatamandala*, 1(2), 233–247.
- Kamaluddin, M. (2017). Pengaruh Motivasi Belajar Terhadap Prestasi Belajar Matematika dan Strategi untuk Meningkatkan [The Effect of Learning Motivation on Mathematics Learning Achievement and Strategies to Improve It]. *Seminar Matematika Dan Pendidikan Matematika*, 455–460.
- Lazarides, R., Gaspard, H., & Dicke, A.-L. (2019). Dynamics of classroom motivation: Teacher enthusiasm and the development of math interest and teacher support. *Learning and Instruction*, 60, 126–137.
- Leavitt, H. J., & Zarkasi, M. (1992). Psikologi manajemen: sebuah pengantar bagi individu, dan kelompok di dalam organisasi [Management Psychology: An Introduction to Individuals, and Groups in Organizations]. Penerbit Erlangga.
- Nazarwaty, N. (2017). Implementasi Model Pembelajaran Sejarah Think Pair Share Pada Peserta Didik Kelas Xi Ipa 2 Man 1 Banjarmasin [Implementation of the Think Pair Share History Learning Model for Class XI IPA 2 MAN 1 Banjarmasin Students]. *Jurnal Socius*, 6(1).
- Nengrum, T. A., Pettasolong, N., & Nuriman, M. (2021). Kelebihan dan Kekurangan Pembelajaran Luring dan Daring dalam Pencapaian Kompetensi Dasar Kurikulum Bahasa Arab di Madrasah Ibtidaiyah 2 Kabupaten Gorontalo [Advantages and Disadvantages of Offline and Online Learning in Achieving Basic Competencies of Ara]. *Jurnal Pendidikan*, 30(1), 1–12.
- Novilanti, F. R. E., & Suripah, S. (2021). Alternatif Pembelajaran Geometri Berbantuan Software GeoGebra di Masa Pandemi Covid-19 [Alternative Geometry Learning Assisted by GeoGebra Software during the Covid-19 Pandemic]. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 5(1), 357–367.
- Pokrovskaja, N. N., Leontyeva, V. L., Ababkova, M. Y., & D'Ascenzo, F. (2021). Regulation of digital behavior models for knowledge transfer: Organizational concerns of remote learning. *Education Sciences*, 11(10), 592.

- Razak, F. (2017). Hubungan kemampuan awal terhadap kemampuan berpikir kritis matematika pada siswa kelas VII SMP Pesantren IMMIM Putri Minasatene [The Relationship between Initial Ability and Critical Thinking Mathematics Ability in Class VII Students of the Islamic Boardin. *Mosharafa: Jurnal Pendidikan Matematika*, 6(1), 117–128.
- Rizaldi, D., Nurhayati, E., & Fatimah, Z. (2021). The effectiveness of project-based learning with the blended learning system to improve 21st century skills during the COVID-19 pandemic. *Jurnal Scientia*, 9(2, Februar), 46–52.
- Roqobih, F. D., & Ambarwati, R. (2020). Implementation of Blended Learning using Schoology on The Topic of Invertebrate to Improve Student Learning Outcomes. *Jurnal Inovasi Pembelajaran Biologi*, 1(1), 24–34.
- Silalahi, T. F., & Hutauruk, A. F. (2020). The application of cooperative learning model during online learning in the pandemic period. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, 3(3), 1683–1691.
- Sunendar, A. (2020). Student perception of mathematics learning based on the theory of intelligence and the association with mathematical disposition of class xi students intermediate vocational school. *Jurnal Theorems*, 4(2), 185–194.
- Suripah, S., & Susanti, W. D. (2022). Alternative Learning During A Pandemic: Use Of The Website As A Mathematics Learning Media For Student Motivation. *Infinity Journal*, 11(1), 17–32.
- Sutisna, A. (2016). Pengembangan model pembelajaran blended learning pada pendidikan kesetaraan program paket c dalam meningkatkan kemandirian belajar [Development of Blended Learning Learning Model in Equality Education Package C Program in Improving Learning Independence]. *JTP-Jurnal Teknologi Pendidikan*, 18(3), 156–168.
- Tamam, B., & Dasari, D. (2021). The use of Geogebra software in teaching mathematics. *Journal of Physics: Conference Series*, 1882(1), 12042. IOP Publishing.
- Umbara, U., & Rahmawati, I. (2018). Pembelajaran matematika berbantuan software algebrator untuk meningkatkan kemampuan pemahaman matematis siswa [Algebrator Software Assisted Learning Mathematics to Improve Students' Mathematical Understanding Ability]. *Jurnal Elemen*, 4(1), 9–19.
- Wahyuni, A. S. (2022). Analisis Respon Siswa Kelas XII SMA Negeri 9 Makassar terhadap Penerapan Blended Learning dalam Pembelajaran Tatap Muka Terbatas pada Materi Pewarisan Sifat pada Makhluk Hidup [Analysis of Responses of Class XII Students of SMA Negeri 9 Makassar to the Ap. *Biogenerasi*, 7(1), 23–29.
- Wahyuni, R., & Nurhayati, N. (2019). Kemandirian belajar mahasiswa melalui blended learning pada mata kuliah matematika ekonomi. *Jurnal Ilmiah Pendidikan Matematika Al Qalasadi*, 3(2), 76–81.

- Weldy, T. G. (2018). Traditional, blended, or online: Business student preferences and experience with different course formats. *E-Journal of Business Education and Scholarship of Teaching*, 12(2), 55–62.
- Wulandari, E., & Nugroho, W. (2020). Sikap Siswa terhadap Video Pembelajaran Jarak Jauh Materi Statistika pada Media Sosial Youtube [Students' Attitude to Distance Learning Videos on Statistical Materials on Youtube Social Media Students' Attitude to Statistical Material Videos Used in Distan. *Edumatica: Jurnal Pendidikan Matematika*, 10(2), 1–9.