

**An Analysis of High School Students' Understanding Ability of Mathematical
Concepts in Online Learning During the Pandemic**

Messa Dwi Rahmania¹, Heni Pujiastuti²

^{1,2} Mathematics Education Program, Faculty of Teacher Training and Education, Sultan
Ageng Tirtayasa University

Email: messadwirahmania98@gmail.com¹, henipujiastuti@untirta.ac.id²

Abstrak

Penelitian yang dilakukan memiliki tujuan ialah untuk mengetahui tingkat kemampuan pemahaman konsep matematis peserta didik pada jenjang Sekolah Menengah Atas yang melaksanakan pembelajaran daring secara penuh selama pandemi. Jenis penelitian yang digunakan yakni memakai metode penelitian deskriptif dengan pendekatan kualitatif. Subjek yang dipakai sebagai sampel ialah sebanyak 3 peserta didik. Teknik pengambilan sampel yang dipakai ialah teknik *purposive sampling*. Guna menggapai tujuan penelitian, instrumen yang disusun adalah instrumen tes yang berhubungan terkait dengan permasalahan pemahaman konsep Matematika yang selanjutnya disajikan kepada subjek yang sedang melakukan pembelajaran daring secara penuh saat pandemi. Berdasarkan hasil penelitian yang sudah dilaksanakan, diketahui bahwasannya tingkat kemampuan pemahaman konsep matematis siswa pada jenjang Sekolah Menengah Atas yang sedang melakukan pembelajaran daring secara penuh selama pandemi digolongkan baik dan tidak terdeteksi adanya penurunan, hal ini dibuktikan dengan hasil jawaban yang dikerjakan oleh ketiga subjek tersebut pada instrumen tes yang telah disajikan.

Kata kunci: Analisis Kemampuan, Pemahaman Konsep, Pembelajaran Daring

Abstract

The purpose of this research is to determine the level of students' understanding ability of mathematical concepts at the high school level who carry out full online learning during the pandemic. The type of research used is the descriptive research method with a qualitative approach. The subjects used as samples were 3 students. The sampling technique used is the purposive sampling technique. In order to achieve the research objectives, the instruments prepared were test instruments related to the problem of understanding mathematical concepts which were then presented to subjects who were doing full online learning during the pandemic. Based on the results of research that has been carried out, it is known that the level of ability to understand mathematical concepts of students at the high school level who are doing full online learning during the pandemic is classified as good, and no decline has been detected, this is evidenced by the results of the answers carried out by the 3 subjects in test instruments that have been presented.

Keywords: Analysis of Ability, Concept Understanding, Online Learning

INTRODUCTION

Based on Law of The Republic of Indonesia Number 20 of 2003, Education means a conscious and planned effort to develop the potential of students so that students have spiritual abilities, self-control, personality, intelligence, noble character, and skills needed for themselves, society, nation, and country. Education is a systematic individual activity in order to create an active state of teaching and learning process that aims to grow students' self-skills (Basa & Hudaidah, 2021). Education can be obtained by students in 2 ways, namely formal education and non-formal education. Following the education program created by the government is a way that can be done to be able to obtain a formal education. Meanwhile, non-formal education can be followed by attending course institutions, training, community learning activities, and study groups. Through education, the next generation of the nation can advance and develop a country with its accomplishments and achievements. Education is also one of the important things that should be considered.

In 2022, the case of the Covid-19 pandemic did not subside, and also in 2022, there is the emergence of a new variant of the virus, namely Omicron. The United Nations (UN) explained that education is one of the areas that were affected by the pandemic (Hasanah, Sri Lestari, Rahman, & Danil, 2020). One of the impacts of the Covid-19 pandemic and the Omicron variant virus on the education sector is the change in the learning system. In order to emphasize the decrease in patient numbers and reduce mobility, the government made a new policy regarding the learning system, where the implementation of learning activities that were originally offline, turned into online.

Online learning is a teaching and learning method that is carried out virtually (Purwanto et al., 2020). There are 2 types of online learning processes, namely synchronous and asynchronous learning. Synchronous learning is carried out by holding virtual face-to-face classes by utilizing supporting applications such as Zoom and Google meet. While asynchronous learning is carried out by reading material, holding discussions, and doing assignments on the LMS (*Learning Management System*). This online learning becomes a challenge that is not easy for both teachers and students. Students feel significant differences in the implementation of learning, and teachers also find it difficult to harmonize online learning activities with the usual offline learning habits. Online learning, causes changes in the learning process, such as changes in strategies, media, and learning evaluation (Raihanah, 2022). This change requires preparation so that the teaching and learning process in online learning runs smoothly. This condition encourages every educator to make

adjustments and innovations regarding the use and development of technology to support the continuity of learning activities in each subject (Syariful Anam & Elya Umi Hanik, 2020).

One of the basic and important subjects to be understood and mastered by students is Mathematics (Oktasya, Turmuzi, & Setiawan, 2022). Conditions like this currently make teachers have to try to innovate, so that Mathematics learning can be conveyed properly to all students. Mathematics learning is a process of providing learning experiences within the scope of the Mathematics field which is deliberately designed for students, with the aim of creating a learning atmosphere so that students can actively participate and play a role during the learning process (Faradilla, Relawati, & Ratnaningsih, 2021). At various levels of education, Mathematics is a compulsory science that must be understood and mastered by students (Marfiah & Pujiastuti, 2020).

With the implementation of online learning in this current pandemic situation making the delivery of topics taught by teachers as educators, especially in Mathematics subjects, is not guaranteed that the implementation goes properly. One of the subjects in the Mathematics lesson delivered by the teacher is the Inverse Function and the Composition Function. Based on the data, students experienced errors in solving problems, especially in the subject of Inverse Functions and Composition Functions. One of the contributing factors is that students do not fully understand the concepts of Inverse Functions and Compositional Functions. The concern about the delivery of the subject, especially on the subject of Inverse Function and Composition Function taught by this teacher, makes this research important to be carried out in order to determine the level of accomplishment of students in understanding the topics taught in online learning. Understanding is a process that includes the ability to describe, interpret, give examples, provide explanations, and convey ideas creatively. Meanwhile, the concept has a meaning namely everything that is depicted in the mind and poured through a statement. Understanding mathematical concepts is an individual skill in the scope of Mathematics which is shown by understanding the mathematical concepts they learn itself (Nila, 2008). The ability to understand mathematical concepts is a basic mastery that should be mastered by all students so that students are able to construct meaning (Umam & Zulkarnaen, 2022). Understanding mathematical concepts is a foundation that all students should have, because the stronger the foundation, the easier it will be to go to the next stage (Alfina & Sutirna, 2022). Students are considered to have the ability to understand

mathematical concepts when they are able to define tactics to solve mathematical problems by applying simple calculations, determining symbols to express certain concepts, and converting shapes to other forms (Mawaddah & Maryanti, 2016). Thus, students who can understand concepts, explain relationships between concepts, and implement algorithms flexibly, efficiently, and correctly in solving a problem are students who have good understanding of mathematical concepts (Aledya, 2019).

The low ability of students at the high school level in solving mathematics problems with an emphasis on understanding concepts is a problem in learning at the high school level (Khairani, Maimunah, & Roza, 2021).

Table 1
Parameters of Concept Understanding
Based on BSN (National Standardization Agency of Indonesia) 2006

Parameter	Description
First	Restate a concept
Second	Classify an object based on properties that match the concept
Third	Provide examples and non-examples of a concept
Fourth	State the concept in various configurations of mathematical representation
Fifth	Optimizing necessary and sufficient conditions
Sixth	Determining certain operations
Seventh	Implementing the algorithm into problem solving

(Zevika et al., 2012)

According to research by Rahmah, M.Imamuddin, & Rahmat (2020), the mathematical understanding ability of students at the high school level is the lowest at the fourth parameter, namely expressing concepts in various configurations of mathematical representations. Meanwhile, based on research by Sibarani, Gusmania, & Hanggara, (2020) shows that the ability to understand mathematical concepts of students at the high school level, especially in the subject of Trigonometry, is classified as good in the fourth and fifth parameters.

From the results of several studies above, there are differences in the results for the ability to understand mathematical concepts of students at the high school level. Therefore,

researchers are interested in conducting research related to the ability to understand mathematical concepts of students at the high school level who are carrying out online learning, which is viewed from several parameters of understanding mathematical concepts, so that the efforts made can produce findings regarding the extent to which students understand mathematical concepts at the high school level during online learning activities, and whether online learning is good or not to be applied.

RESEARCH METHOD

Type of Research

The method used is a descriptive research method with a qualitative approach. The qualitative descriptive research conducted, has the aim of knowing how well students understand mathematical concepts in the online learning system during the Pandemic.

Time and Location of Research

This research was carried out starting from the provision of test instruments related to understanding the concept of Mathematics in one of the subjects of Mathematics at class X High School, where the collection was carried out on March 25, 2022. Meanwhile, the provision of test instruments in this study was carried out with the help of an application of cross-platform messages, namely Whatsapp at the subject's respective homes, due to efforts to break the spread of the Covid-19 and Omicron chains through restrictions on mobility. The subject residing in Griya Bumi Asri Teriti, Sepatan District, Tangerang Regency, Banten.

Research Subjects

The subjects of this research were high school students in class X, who carried out online learning in their respective homes. Due to the Covid-19 and Omicron pandemics, the subject of this study took 3 students from different schools in Tangerang City. The sampling technique in this study was using purposive sampling with the criteria that the researcher took were high school students that conducting online learning activities in their respective homes.

Procedure

Based on current conditions, this study aims to determine the level of understanding of students' mathematical concepts at the high school level based on the online learning system applied. Subjects totaling 3 people from different schools were given a test instrument in the form of Inverse Function and Composition Function questions with a total of 5 essay questions. Then, the results of solving the problem were analyzed using the rubric for assessing the level of understanding of mathematical concepts. Furthermore, it is concluded based on the parameter understanding of the concept of BSN (National Standardization Agency of Indonesia). After the conclusion is obtained, a description of the level of understanding of the Mathematical concept of high school students will be obtained in online learning during the pandemic.

Data Sources, Instruments, and Data Collection Techniques

Data collection efforts were carried out through test instruments related to the ability to understand Mathematical concepts in the form of essay questions related to Inverse Functions and Composition Functions. The reason for taking those subject is because those subject has been studied by the three research subjects before. Another reason is that students experience errors in solving problems, especially in the subject of Inverse Functions and Composition Functions where one of the contributing factors is that students do not fully understand the concepts of Inverse Functions and Composition Functions. Furthermore, the data is taken from the results of the test instruments that have been done, then analyzed and concluded. After knowing the conclusion, an output is the form of a description of the level of understanding ability of high school students' mathematical concepts that have been tested.

Data Analysis Techniques

This study used a test instrument related to the ability to understand mathematical concepts at the high school level. The score obtained comes from the acquisition of the results of the completion of the test instrument related to the ability to understand mathematical concepts based on the assessment rubric as follows:

Table 2
Rubric for Assessment of the Level of Understanding of Mathematical Concepts

Category Level of Understanding	Criteria Answer	Points
Does not show any conceptual understanding of Mathematics questions	<ul style="list-style-type: none"> ● Not working on test instruments 	0
The concepts used in Mathematics problems are limited, the majority answers contain incorrect calculations	<ul style="list-style-type: none"> ● Answers that do not match ● implementation of the algorithm is not complete ● Improper algorithm implementation 	1
The concepts used in the Mathematics problem are not complete, some answers contain incorrect calculations The	<ul style="list-style-type: none"> ● Inappropriate answer ● The majority of calculations are carried out incorrectly ● Implementing algorithm is almost complete ● algorithm is almost right 	2
The application of mathematical terms and notation, the application of the algorithm is complete, the calculation is wrong	<ul style="list-style-type: none"> ● The answer is not correct but there is only a slight calculation error ● Implementing the complete algorithm ● use of the majority concept is correct 	3
The concepts used in Mathematics problems are complete, the application of mathematical terms and notation is correct, the use of the algorithm is complete and correct.	<ul style="list-style-type: none"> ● The answer is appropriate ● The Complete algorithm implementation ● The implementation of the algorithm is in accordance with the concept 	4

(Ernawati, 2016)

Furthermore, the data were analyzed after getting the results based on the students' answers to the test instruments regarding the understanding of Mathematics concepts at the

high school level that had been given. After that, the results are interpreted as in the table below:

Table 3
Interpretation of the Score of Ability to Understand Mathematical Concepts

No	Score	Description
1	Score ≥ 85	Very good
2	$70 \leq \text{score} < 85$	Good
3	$55 \leq \text{score} < 70$	Enough
4	$40 \leq \text{score} < 55$	Low
5	Score < 40	Very Low

RESEARCH RESULTS AND DISCUSSION

Research Results

The table below is the data obtained based on the results of the work related to the test instruments carried out by students at the high school level regarding the ability to understand mathematical concepts with a total of five essay questions.

Table 4
Mathematical Concept Understanding Ability

Students' Initial	Score	Review
MFA	80	Good
MNB	80	Good
ADU	75	Good

Based on the data above, it can be seen that the results of the completion of the test instrument conducted by the three subjects received good reviews with each score, MFA received a score 80, MNB got a score of 80, and ADU got a score of 75. Although the three subjects received the same review, there were differences in the work of the three students' test instruments. For students with the initials MFA, the work steps are complete and systematic, but there are some errors when writing the completion such as notation errors and number writing errors, and the lack of writing units at the end of the answers. For students with the initials MNB, the work steps are complete and systematic, but there are some mistakes when writing the completion such as notation errors and number writing errors, and the lack of writing units at the end of the answers. For students with the initials

ADU, the work steps are complete and systematic, but there is 1 wrong answer and there is a factoring error. The following are the details of the results of the work carried out by the three subjects:

a. The results of working on the test instrument by students with the initials MFA

The image below is the result of completing the tests of students with the initials MFA based on the test instruments that have been presented.

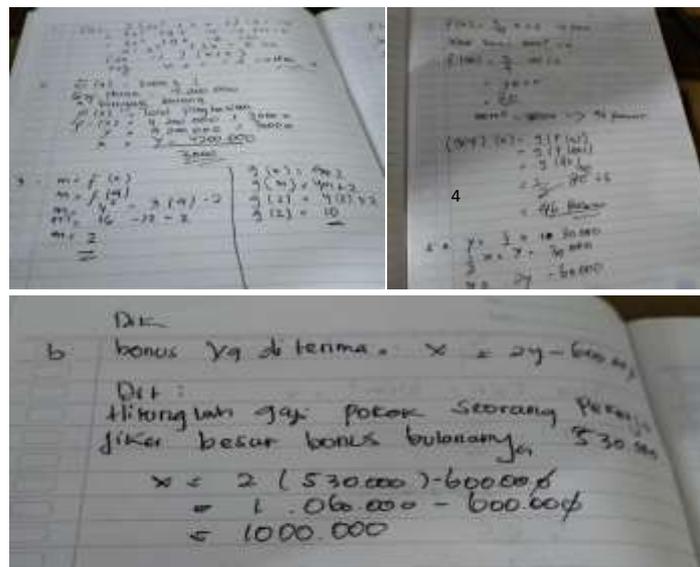


Figure 1
Results of Working on Test Instruments by MFA

Based on the completion of the test instrument by students with the initials MFA, it shows a good understanding of the concept, it can be known based on the results of the correct MFA's answers to all the questions that have been presented. However, there are some mistakes at the time of writing and a lack of writing units at the end of the answer. The results of the data analysis and its relation to the rubric for assessing the level of understanding of mathematical concepts, the points obtained are 3, with the category of understanding levels being the application of mathematical terms and notations, the application of a complete algorithm, the calculation there is a slight error with the answer criteria, the answer is not appropriate but there are a few calculation errors, implementation of complete algorithms, use of the majority concept is correct. Furthermore, the score

obtained in terms of the interpretation of the ability to understand mathematical concepts is 80, with an interpretation that is good.

b. The results of working on the test instrument by students with the initials MNB

The picture below is the result of completing the tests of students with the initials MNB based on the test instruments that have been presented.

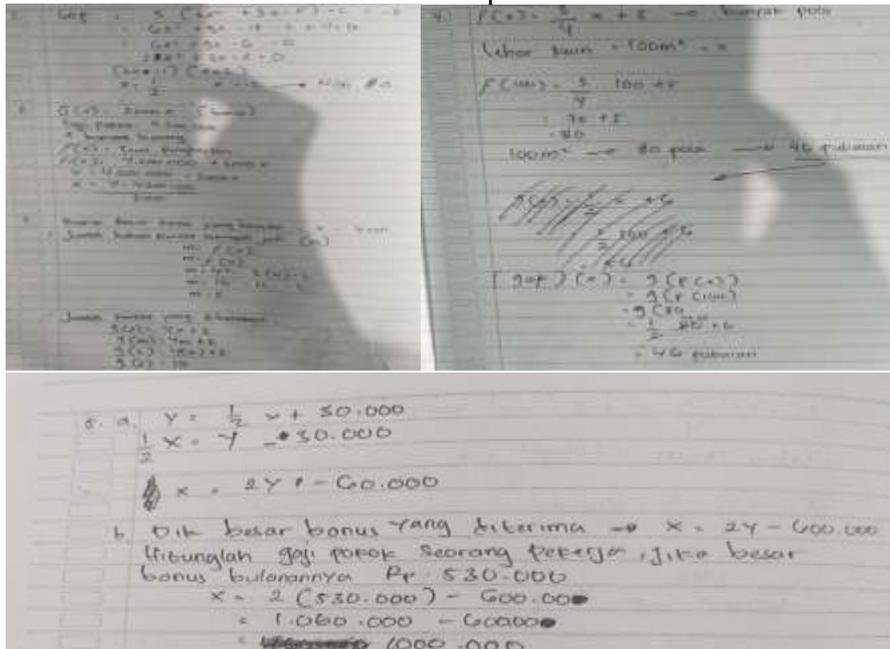


Figure 2
Results of Working on Test Instruments by MNB

From the completion of the test instrument by students with the initials MNB, it shows a good understanding of the concept, it can be seen based on the results of the correct MNB's answers to all the questions that have been presented. However, there are some mistakes at the time of writing and a lack of writing units at the end of the answer. The results of the data analysis and its relation to the rubric for assessing the level of understanding of mathematical concepts, the points obtained are 3, with the category level of understanding being the application of mathematical terms and notation, the application of a complete algorithm, the calculation there is a slight error with the answer criteria, namely, the answer is not appropriate but there are only a few calculation errors, complete algorithm implementation, correct use of majority concept. Furthermore, the score obtained in terms

of the interpretation of the ability to understand mathematical concepts is 80, with an interpretation that is good.

c. The results of working on the test instrument by students with the initials ADU

The picture below is the result of completing the tests of students with the initials ADU based on the test instruments that have been presented.

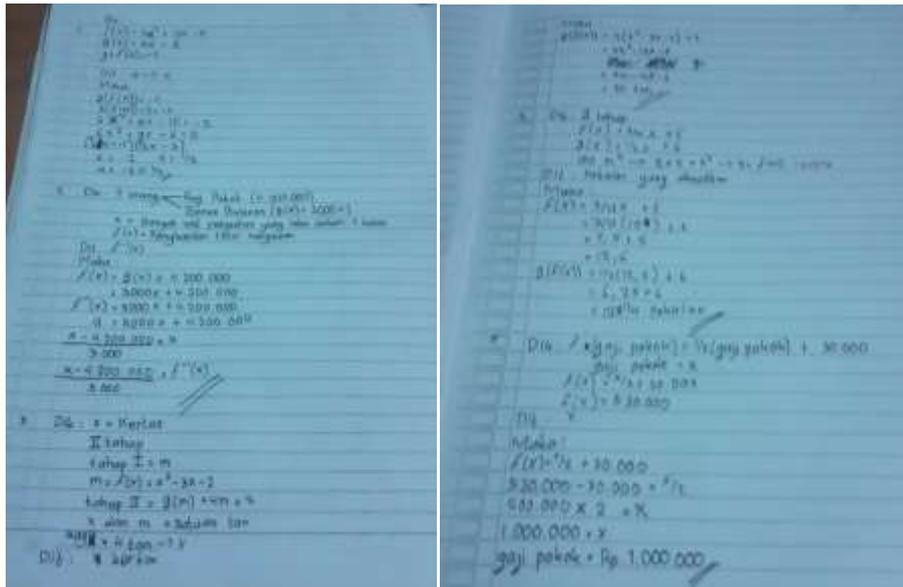


Figure 3
Results of ADU's Test Instrument Work

The completion of the test instrument by students with the initials ADU, it shows that a good understanding of the concept can be seen based on the results of the ADU's correct answers on 4 questions with complete and systematic working steps. However, there is 1 wrong answer and there is a factoring error. The results of the data analysis and its relation to the rubric for assessing the level of understanding of mathematical concepts, the points obtained are 3, with the category level of understanding being the application of mathematical terms and notation, the application of a complete algorithm, the calculation there is a slight error with the answer criteria, the answer is not appropriate but there are only few calculation errors, complete algorithm implementation, correct use of majority concept. Furthermore, the score obtained in terms of the interpretation of the ability to understand mathematical concepts is 75, with an interpretation that is good.

DISCUSSION

Based on the data collection that has been obtained from working on the test instrument in table 4, it shows that the acquisition of students' scores after taking the test can be interpreted well. From the three students as research subjects, high school students with the initials MFA and MNB completed all the questions contained in the test instrument using almost complete and correct mathematical concepts and complete algorithms, where MFA and MNB wrote the work steps by rewriting information that is known in the problem and then works on the problem with systematic and precise steps that are in accordance with the concepts of Inverse Functions and Composition Functions, so that MFA and MNB can be categorized as good in understanding mathematical concepts. This is in accordance with the idea that Zahra & Erianjoni, (2022) states, that conceptual understanding is the competence of students in understanding concepts based on procedures or algorithms with flexibility, exactness, and accuracy. Meanwhile, based on previous research conducted by (Nila, 2008) which states that a good understanding of mathematical concepts in students is proven that students are able to understand the concepts and application of the algorithms used are flexible, precise, and accurate in solving problems. However, based on test number 2, judging by the answers of MFA and MNB, there is an error in writing the inverse notation, where they still use $x = \frac{y-4.200.000}{3000}$ which should be $f^{-1}(x) = \frac{x-4.200.000}{3000}$ or $f^{-1}(x) = \frac{x}{3000} - 1400$. Then, in question number 3, judging by MFA's and MNB's answers, there is no unit in tons in the final answer. In addition, in question number 5, there are errors in writing numbers for MFA's and MNB's. In MFA's there is an error in writing a number, where 60,000 is written as 600.00. Meanwhile, in MNB's there are writing errors of 60,000 written with 600,000. Judging from the student's answer with the initials ADU which can be seen in Figure 3, he was able to solve 4 questions using almost complete and almost correct mathematical concepts and the use of almost complete algorithms. However, in number 1, there is an error in factoring and at number 4 there is an error in workmanship where the area of the fabric can be directly substituted without needing to be rooted.

From the subjects' answers, students with the initials MFA, MNB, and ADU, in general, the high school students already understand the concept of Mathematics well based on the test instruments given, and students are good at parameters 1, 5, and 7, namely restating a concepts, optimizing the necessary and sufficient conditions for a concept, and implementing algorithms in problem solving as evidenced by problem solving for the problems given on the test instrument where this can answer concerns whether there is a

decrease or not related to the ability to understand students' mathematical concepts at the high school level on the online learning system that is applied.

CONCLUSION

Based on the results of the research that has been carried out, it was found that the ability to understand Mathematics concepts of students at the high school level in online learning during the Pandemic did not decrease and was indicated to be good. This is proven from the results of research that has been carried out, students are good at parameters 1, 5, and 7, namely restating a concept, optimizing the necessary and sufficient conditions for a concept, and implementing algorithms into problem-solving in which the student is able to answer most of the problems are given correctly the use of an almost complete algorithm. Thus, the management of online learning carried out by teachers is monitored effectively to be carried out in a pandemic situation.

This research can be developed or continued by comparing the ability to understand mathematical concepts of students at the high school level who carry out full online learning with students at the high school level who have implemented Hybrid learning (learning by combining face to face and online).

REFERENCES

- Aledya, Vivi. (2019). Kemampuan Pemahaman Konsep Matematika Pada Siswa. https://www.researchgate.net/publication/333293321_Kemampuan_Pemahaman_Konsep_Matematika_Pada_Siswa. Diakses dari laman web tanggal 14 April 2022.
- Alfina, S., & Sutirna, S. (2022). Kemampuan Pemahaman Matematis Siswa MTS Pada Materi Aljabar. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, 5(2), 405-416.
- Anam, S., & Hanik, E. U. (2020). Problematika Kebijakan Pendidikan di Tengah Pandemi dan Dampaknya Terhadap Proses Pembelajaran di Sekolah Dasar. *Qiro'ah: Jurnal Pendidikan Agama Islam*, 10(2), 73-81.
- Argawi, A. S., & Pujiastuti, H. (2021). Analisis Kemampuan Pemahaman Konsep Matematis Siswa Sekolah Dasar Pada Masa Pandemi Covid-19. *Al Khawarizmi: Jurnal Pendidikan dan Pembelajaran Matematika*, 5(1), 64-75.
- Basa, Z. A., & Hudaidah, H. (2021). Perkembangan Pembelajaran Daring terhadap Minat Belajar Matematika Siswa SMP pada Masa Pandemi Covid-19. *Edukatif: Jurnal*
- 82 / *Messa Dwi Rahmania & Heni Pujiastuti: An Analysis of Hight School ...*
Al Khawarizmi, Vol. 6, No. 1, Juni 2022

Ilmu Pendidikan, 3(3), 943–950.

- Ernawati, S. (2016). Analisis Kemampuan Pemahaman Konsep Matematika Siswa MTS Negeri Parung Kelas VII dalam Materi Segitiga dan Segi Empat. Skripsi. Universitas Islam Negeri (UIN) Syarif Hidayatullah: Jakarta.
- Fadilla, A. N., Relawati, A. S., & Ratnaningsih, N. (2021). Problematika Pembelajaran Daring Pada Pembelajaran Matematika Di Masa Pandemi Covid-19. *Jurnal Jendela Pendidikan*, 1(02), 48-60.
- Hasanah, A., Sri Lestari, A., Rahman, A. Y., & Danil, Y. I. (2020). Analisis Aktivitas Belajar Daring Mahasiswa Pada Pandemi Covid-19. *Karya Tulis Ilmiah (KTI) Masa Work From Home (WFH) Covid-19 UIN Sunan Gunung Djati Bandung Tahun 2020*, 4–8.
- Indonesia, P. R. (2006). Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional.
- Khairani, B. P., Maimunah, M., & Roza, Y. (2021). Analisis Kemampuan Pemahaman Konsep Matematis Siswa Kelas XI SMA/MA Pada Materi Barisan Dan Deret. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 5(2), 1578-1587.
- Marfiah, D. Y., & Pujiastuti, H. (2020). Analisis Pengaruh Kecerdasan Intrapersonal Terhadap Kemampuan Komunikasi Matematis Siswa Pada Materi Bentuk Aljabar. *Al Khawarizmi: Jurnal Pendidikan dan Pembelajaran Matematika*, 4(1), 1-15.
- Mawaddah, S., & Maryanti, R. (2016). Kemampuan Pemahaman Konsep Matematis Siswa SMP dalam Pembelajaran Menggunakan Model Penemuan Terbimbing (Discovery Learning). *EDU-MAT: Jurnal Pendidikan Matematika*, 4(1), 76–85.
- Nila, K. (2008). Pemahaman konsep matematik dalam pembelajaran Matematika. *Prosiding Seminar Nasional Matematika Dan Pendidikan Matematika, Jurusan Pendidikan Matematika Fakultas Matematika Dan Ilmu Pengetahuan Alam Universitas Negeri Yogyakarta*.
- Oktasya, I., Turmuzi, M., & Setiawan, H. (2022). Analisis Kemampuan Pemecahan Masalah Soal Cerita Matematika Siswa Kelas V SDN 01 Tempos. *Jurnal Ilmiah Profesi Pendidikan*, 7(2), 351-353.
- Purwanto, A., Asbari, M., Choi, C. H., Pramono, R., Purwanto, A., Putri, R. S., ... Wijayanti, L. M. (2020). Studi Eksploratif Dampak Pandemi Covid-19 Terhadap Proses Pembelajaran Online di Sekolah Dasar. *EduPsyCouns: Journal of Education, Psychology and Counseling*, 2(1), 1–12.

- Rahmah, N., M.Imamuddin, & Rahmat, T. (2020). *Menggunakan Model Pembelajaran Kooperatif Tipe Think Talk Write Di Kelas XI MIPA SMA N 5 Bukittinggi Tahun Pelajaran 2019 / 2020*. 4(1), 81–94.
- Raihanah, S. (2022). Strategi Pembelajaran Sejarah Abad 21. *Journal of Social Sciences and Technology for Community Service*, 3(1), 43-48.
- Sibarani, J. D., Gusmania, Y., & Hanggara, Y. (2020). Analisis Kemampuan Pemahaman Konsep Matematis Siswa Dalam Materi Trigonometri Kelas X IPS 2 SMAN 17 Batam. *Cahaya Pendidikan*, 6(2), 128–138.
- Umam, M. A., & Zulkarnaen, R. (2022). Analisis Kemampuan Pemahaman Konsep Matematis Siswa Dalam Materi Sistem Persamaan Linear Dua Variabel. *Jurnal Education FKIP UNMA*, 8(1), 303-312.
- Zahra, F. A., & Erianjoni, E. (2022). Pengembangan LKPD Menggunakan Model Discovery Learning untuk Meningkatkan Pemahaman Konsep Siswa Mata Pelajaran Sosiologi Kelas X SMAN 1 Suliki. *Naradidik: Journal of Education and Pedagogy*, 1(1), 84-92.
- Zevika, M., Yarman, & Yerizon. (2012). Meningkatkan Kemampuan Pemahaman Konsep Siswa Kelas VIII SMP Negeri 2 Padang Panjang Melalui Pembelajaran Kooperatif Tipe *Think Pair Share* Disertai Peta Pikiran. *Jurnal Pendidikan Matematika*, 1(1), 45–50.