

STUDENTS' DIFFICULTIES IN ONLINE MATH LEARNING DURING PANDEMIC COVID 19

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Abstract

Students' Mathematical Resilience when learning mathematics online during the Covid 19 pandemic must be identified. The goal is to ensure online learning does not harm students' mathematics learning outcomes. Various studies on students' mathematical resilience in offline mathematics learning have identified that mathematical resilience affects students' mathematical performance. This study investigated the resilience of students perceived by students, as well as those observed by teachers during online mathematics learning during the Covid 19 pandemic. Research data were obtained from 22 students who studied math online. Using an open questionnaire and interviews, the data were analyzed. It was revealed that students had difficulties in understanding math material and completing tasks given by the teacher. It was also revealed that teachers had difficulty assessing students' mathematics learning outcomes objectively and transparently. Students also find it difficult to get support in online mathematics learning from teachers and families. Students find it difficult to adapt, low interest and motivation during online mathematics learning, even the teacher's limitations in controlling students' online learning strategies.

Kata kunci: Indonesian students' Learning Difficulties, Online Math Learning, Pandemic Covid 19.

Abstrak

Ketahanan Matematika Siswa saat belajar matematika secara online di masa pandemi Covid 19 harus diketahui. Tujuannya agar pembelajaran online tidak merugikan hasil belajar matematika siswa. Berbagai penelitian tentang resiliensi matematis siswa dalam pembelajaran matematika offline telah mengidentifikasi bahwa resiliensi matematis berpengaruh terhadap performa matematika siswa. Penelitian ini menyelidiki resiliensi siswa yang dirasakan oleh siswa, serta yang diamati oleh guru selama pembelajaran matematika online selama pandemi covid 19. Data penelitian diperoleh dari 22 siswa yang belajar matematika secara online. Menggunakan kuesioner terbuka dan wawancara, data dianalisis. Terungkap bahwa siswa mengalami kesulitan dalam memahami materi matematika dan menyelesaikan tugas yang diberikan oleh guru. Diungkapkan pula bahwa guru kesulitan menilai hasil belajar matematika siswa secara objektif dan transparan. Siswa juga kesulitan mendapatkan dukungan dalam pembelajaran matematika online dari guru dan keluarga. Siswa sulit beradaptasi, minat dan motivasi rendah selama pembelajaran matematika online, bahkan keterbatasan guru dalam mengontrol strategi pembelajaran online siswa..

Keywords: Kesulitan Belajar Siswa Indonesia, Belajar Matematika Online, Pandemi Covid-19



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INTRODUCTION

One of the main tasks and learning objectives is solving problems (Retnawati et al., 2017). Therefore, each individual must learn everything that can improve self-competence. The prototype curriculum currently being implemented in Indonesia, for example, numeracy competence is a basic competency that must be possessed by all students. Numerical ability is a basic competency that every individual must possess. Therefore, mathematics is still taught at every level of education and every specialization (Febriyanti et al., 2021; Hasanah et al., 2016; Mufarizuddin, 2018) so that students have numeracy knowledge and skills. Mathematics is given to students to have logical, analytical, systematic, critical, and creative thinking competencies and work in groups when solving various math problems (Kholil, 2016; Septiati, 2018; Sumarmo et al., 2016). Unfortunately, mathematics always gets negative perception from students.

This negative perception then has an impact on the process and results of students' mathematics learning. Mathematics is considered a complicated, difficult, and confusing subject, causing many students to try to avoid mathematics. Many studies have found the fact that from various subjects at school, mathematics is considered the most difficult subject (Febriyanti et al., 2021; Mohd Rusdin et al., 2019; van Steenbrugge et al., 2010; Wijaya et al., 2019). Students who have difficulty in learning mathematics and get bored quickly are students who have negative perceptions (Harahap & Syarifah, 2015) Students who have learning difficulties will find it difficult to carry out learning activities effectively and will have an impact on low learning achievement

(Hasibuan, 2018; Waluyo & Nuraini, 2021). This phenomenon, of course, causes anxiety so that students find it difficult to learn and understand mathematics.

Students' learning difficulties in mathematics come from various factors. These difficulties can come from within the students (internal factors) and outside the students (external factors) (Kusumaningrum & Lestari, 2019; van Steenbrugge et al., 2010). Individual internal factors are related to the intelligence factor of students understanding the lesson (cognition) and student learning motivation. External factors come from the student's environment, for example: family environment, learning place, learning facilities and infrastructure and so on. Including outbreaks causing changes in the learning process in a sudden and lasting time, can be a source of student learning difficulties. Because of this, the Covid 19 pandemic which causes sudden and long-lasting changes in the way students learn has an impact on students' difficulties in learning mathematics.

The Covid-19 pandemic has forced the education sector to make major changes by changing the offline math learning process into online learning. This is the government's effort to reduce the spread of the coronavirus in Indonesia. Many studies reveal that it is difficult to carry out full offline learning while the COVID-19 pandemic is not over (Dhawan, 2020; Mailizar et al., 2020; Prayudha, 2020; Yohannes et al., 2021). Unfortunately, the online learning process faces many difficulties. For example, students do not actually get an explanation of the material online directly (in time). Instead, the dominant material information process is carried out through WhatsApp messages, while

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offline students come to school to take assignments and collect assignments. There were study explained that students were not enthusiastic about learning mathematics online, so they had difficulty learning mathematics (Bonar et al., 2021; Maharani et al., 2020). Based on some of the things that have been described, through an exploratory method this research aims to explain the difficulties faced by Medan city students when taking online mathematics lessons during the Covid 19 Pandemic.

RESEARCH METHOD

This research used exploratory method. The participants in this study were 22 high school students in the city of Medan, Indonesia. Data were collected through an online questionnaire which was then followed by in-depth interviews. The data obtained through a questionnaire were then analyzed using the frequency and percentage tabulation approach. The results of the analysis are then presented in a diagram and interpreted narratively. Data collection methods used in this study was questionnaires and interviews.

The following are the steps of the research carried out:

First: Data Collection

Students were given an online questionnaire with mixed items. The student questionnaire contains the following information: demographic data, types of online learning media, types of online learning platforms, maximum time to participate in online learning, and student perceptions during online mathematics learning. The questionnaire has been validated in advance by the Lecturer as an expert and the Teacher as a Practitioner. Furthermore, the data was collected by

conducting interviews with students to reveal in-depth information about the difficulties faced by students when learning mathematics online. Interviews were also conducted to confirm the results of the student questionnaire.

Second: Data Analyze

The data were analyzed by reducing and presenting the data. The data obtained through a questionnaire were then analyzed using a tabulation approach of frequency and percentage.

Third: Concluding

The results of the analysis are then presented in a diagram and interpreted narratively. The learning difficulties data also were analyzed by categorizing based on relating aspects from students' responses. The data that has been reduced into themes and sub-themes are then concluded the interrelationships between the sub-themes in order to obtain specific information about the data.

RESULT AND DISCUSSION

This study aims to identify the difficulties of students learning mathematics online during the Covid 19 Pandemic. Looking at the results of further research, an open questionnaire was conducted on 20 high school students. Table 1 shows the distribution of students who were participants in this study.

Tabel 1. Profile Of Partisipant

	Profile	Number
Gender	Male	7
	Female	13
Class	X (10)	7
	XI (11)	11
	XII (12)	2
Major	Science	11
	Social	8
	Language	0
	Art & Culture	1

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The result of this study shows that the three most frequently used platforms for teaching mathematics are WhatsApp, Youtube, and Edmodo. Based on the result of this study,

WhatsApp is the most widely used and frequently used platform for online math learning. The comparison of each platforms for teaching mathematics can be seen in Figure 1.

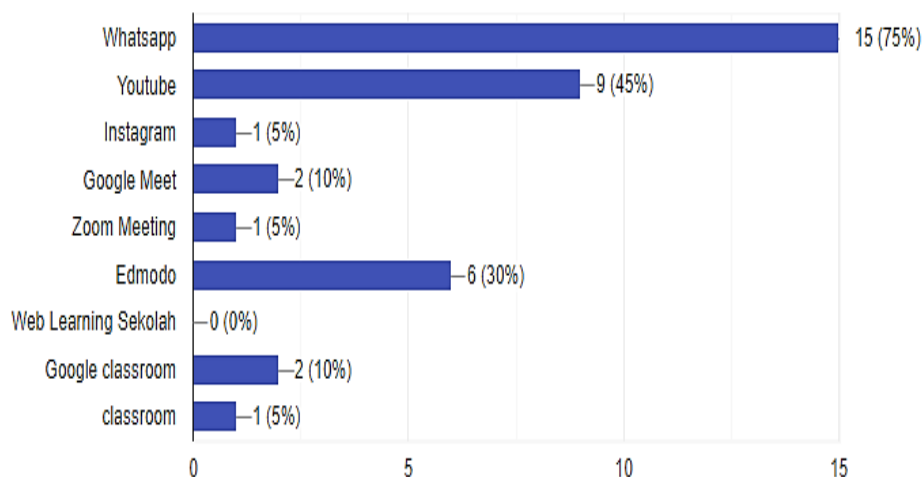


Figure 1. Online Math Learning Platform Used

Figure 1 show that 75% students using whatsapp for learning mathematics online. The second most used platform is Youtube (45%) and it is followed by Edmodo (30%) in third place. In this study, students are allowed to choose more than one online math learning platform used. It means that in carrying out online math learning, teachers and students use a combination of platforms. Other platforms such as Instagram, Zoom Meeting, Google Classroom, Google Meet have fewer users. No one even uses a learning website as a learning platform.

The preference for using the online math learning media platform is based on practicality and the amount of internet required when using the platform. WhatsApp and YouTube are more practical and flexible when used. Teachers and students can easily and quickly access it. Even parents can easily use it to help students. While

Edmodo is used because it has been known by teachers and students in distance learning systems, as well as schools that implement digital-based learning. The interaction and student experience in online learning can be seen in the Table 1.

Table 1 show that the interaction of respondents with online learning platforms is not very good. The majority of respondents still did not have experience in online math learning before Pandemic Covid 19. Data also shows that participants don't know about the online math learning tools. There is no maximum interaction in learning mathematics between teachers and students, and mathematical formulas and abstractions by teachers cannot be accepted. Learning mathematic online, students only get a little explanation from the teacher. The majority of students only get submissions of material files and assignments.

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Tabel 1. Interaction among Students' and Online Math Learning

No	Statement	Response (%)		
		Yes	Maybe	No
1	I'm used to using online math learning platforms before the covid 19 pandemic	9,1	36,4	54,5
2	I am familiar with all the tools on the online math learning platform that I use	27,3	18,2	50
3	Do you feel comfortable using the digital platform in online math learning?	18,2	59,1	40,9
4	The presentation of mathematics such as formulas, diagrams, pictures, is clearer and easier to understand when online math learning	9,1	27,3	63,6
5	Two-way interaction is more optimal by using an online math learning platform	18,2	0	81,8

This condition occurs because the time spent learning mathematics online is very little compared to learning offline. During online math learning, the majority of learning only

lasts a maximum of 30 minutes, faster than when studying offline. Some even only get sample questions, then they are asked to work on the questions (see Figure 2.)

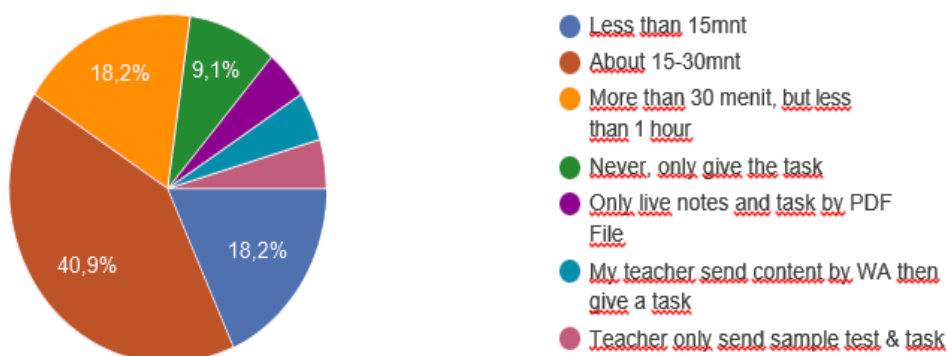


Figure 2. Students' - Teacher During Online Math Learning

Figure 2 shows that 40.9% of students only use 15-30 minutes of time to get an explanation of the material from the teacher. As many as 18.2% only took less than 15 minutes, even 9.1% only got a written sample of the question and then was given an assignment.

The results of this study on the aspects of teacher-student interactions are also shown from the students' answers which are shown in Table 2.

The data shows that 45.5% of students get the same interaction

opportunities as when studying offline. But the data also shows that 40.5% do not get the same interaction as when learning mathematics offline. Although 45.5% had the opportunity to discuss outside of online study time, 40.9% stated that they did not get the opportunity to discuss outside of study time. However, the teacher gave more time to complete the task when learning mathematics online than when learning mathematics offline.

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Table 2. Students’ – Teacher Interaction in Online Math Learning During Pandemic Covid 19

No	Statement	Response (%)		
		Yes	Maybe	No
1	Opportunity to discuss is same between online and offline math learning	45,5	14	40,5
2	Have no opportunity to discuss outside of online time	45,5	13,6	40,9
3	Have more time to complete assignments while online than offline learning	72,7	9,1	18,2

The limited interaction between students and teachers can also be seen from students' responses to questions

about the time spent learning mathematics online (See Figure 3.)

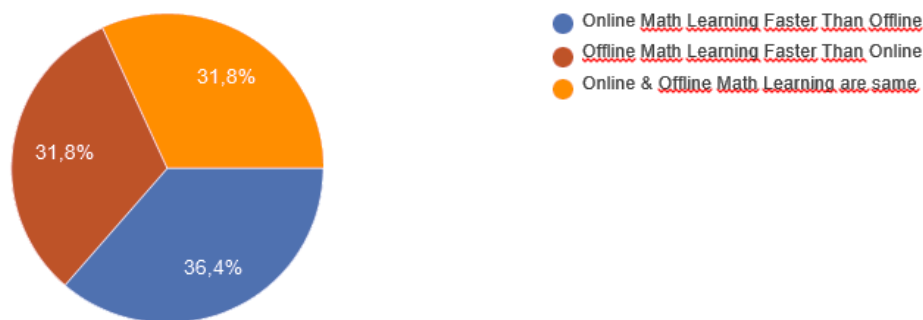


Figure 3. Time Used Between Online and Offline Math Learning

Table 3. Student Environment Support During Online Math Learning

No	Statement	Response		
		Yes	Maybe	No
1	I am Burdened with homework while studying math online	45,5	27,3	27,2
2	I am facilitated by the internet network to study at home	45,5	31,8	22,7
3	I am facilitated to buy other math learning resources such as books, internet quota, online math tutors.	8,1	13,7	82,7
3	There is someone I can ask about math at home	22,7	9,2	68,1
4	I always have friends to discuss maths matter	31,3	32,5	36,2

Figure 3 showed Students answered that learning mathematics online was faster than learning mathematics offline. That is, math material is delivered faster than when learning math offline. Although it did

not show a significant difference, the data showed that the time spent learning mathematics online was faster than learning mathematics offline. There were 36.4% of students who answered that learning mathematics online was

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faster than learning mathematics offline (31.8%). The rest stated that the time spent studying online and offline at school was the same.

Furthermore, the data from this study shows how supportive the environment is during online math learning from home which can be seen in Table 3. The data from the exploration of the support environment for students while learning mathematics online shows that 45.5% of students are still burdened with homework during online learning. There were 27.2% of students who did not get the homework load, while 27.3% gave a "probably" response. The results of the interviews showed that students were still given homework such as selling, helping with

cooking, taking care of their younger siblings while learning mathematics online.

During online mathematics learning, the majority of students get the support of network facilities from home. This shows that from the aspect of facilities students have received support to do online math learning from home. But students still have difficulty learning mathematics online because there is no one to discuss at home related to mathematical material that is not understood. This data is supported by student responses to the question, whether they get private tutor support from parents to accompany online learning as shown in Figure 4.

My parents invited a private tutor to teach me math during online school

22 responses

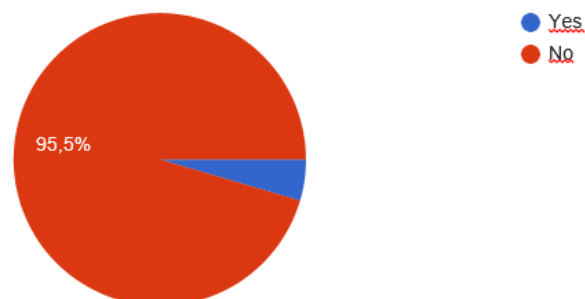


Figure 4. Private Math Tutor Support During Online Math

Figure 4 show that 95,5% students do not get support in the form of private tutoring in mathematics at home. Just 0,5% student get private tutoring. With the conditions experienced by students while learning mathematics online, students prefer learning mathematics offline than online, as shown in Figure 5 Berdasarkan kondisiThe end of the data generated in the research related to student choices that show in Figure 5.

Figure 5 showed that 86.4% of students feel they understand

mathematics better when offline than online math learning. That's the reason the student prefer learning mathematics offline than online.

Due to the COVID-19 pandemic, which requires students to learn mathematics online from home, it is no longer possible for teachers and students to meet in the classroom. Especially for students, learning mathematics online during a pandemic requires students to face the learning process with various obstacles such as connections,

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assignment methods, delivery methods, and inadequate time management (Noviyanti et al, 2020). The mathematics that requires interaction in explaining abstractions and mathematical models directly must be explained online. Although online learning is a learning model that provides many benefits, the unpreparedness of students and their

support makes it difficult for students to participate in learning mathematics. Teachers and students must quickly adapt to online learning methods. Several aspects of students' difficulties in learning mathematics online can be identified, such as student interaction with online learning platforms, student interaction with teachers, and support for the home environment.

I understand more when offline math learning than online math learning

22 responses

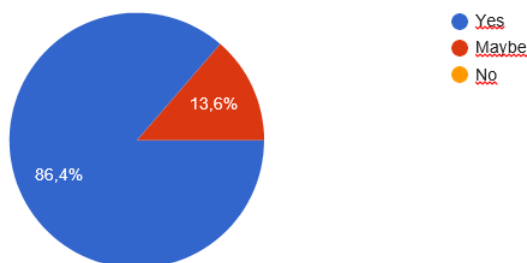


Figure 5. Students' Preferences In Math Learning

Based on the findings in this study, students face several difficulties in online math learning during Pandemic Covid 19 then categorized by 4 aspects presented in Table 4.

Table 4 showed that the main difficulty faced by students is the aspect of student interaction with online learning platforms used during online mathematics learning. The platform that teachers use to teach mathematics online is not able to provide a good explanation. So, students have difficulty understanding the material. This is because students do not have much experience using online learning platforms before. The use of YouTube as a learning medium is not optimal because there is no two-way interaction. Although, students still feel helped by the existence of youtube, not videos uploaded by the teacher. These results are in line with research conducted

before that Students found it difficult to understand the subject matter (Onyema, 2020; Yohannes et al., 2021). Research conducted by (Baticulon et al., 2021) revealed that the inability of students to understand the material is a personal barrier in learning mathematics online.

As learning that uses abstractions, models, and requires a high level of logic, online mathematics learning makes it difficult for students to understand the material presented through online learning. This difficulty causes students' interest to decrease. Mathematics was rated as a difficult subject before online learning. With online mathematics learning, students' enthusiasm is decreasing. The selection of the right platform that can meet the needs of students for clear and detailed explanations must be considered by the teacher. Mathematics is difficult to understand only with texts that are read

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and studied independently by students without presentation and explanation by the teacher.

Aspects of teacher and student interaction during online learning also experienced problems, which increased the difficulty of students participating in online mathematics learning. The low opportunity for students to discuss further the material both when online learning takes place and outside the study schedule. This is even worse when students do not get guidance from people who understand mathematics

when studying from home. This situation makes it difficult for students so that mathematical material cannot be understood properly. Unlike the research conducted before (Yohannes et al., 2021) regarding the burden of internet quotas, in this study, students do not have problems with internet quotas, because parents' support in the form of internet quotas is obtained by students. In addition, students also have an internet quota provided by the government.

Table 4. Aspects of Difficulties Faced by Students'

Difficulties faced by students	Aspect Reduction
Do not have enough experience using online learning platforms Not proficient in using online learning platforms difficult to understand math material through online learning platforms The online learning platform used cannot display a good explanation of mathematical material The online learning platform used does not allow direct two-way interaction The teacher seems not very proficient in using the platform to explain the material.	Online Math Learning Platform Used
Math material delivered online in a short time The material is delivered in file Word/PDF by WA messages without verbal explanation Some materials are not explained but are given exercises and independent assignments There is no opportunity to discuss is same between online and offline math learning with teacher There is an opportunity to discuss outside of online time with the teacher	Teacher-student Interaction
Students still have to do home working, such as cleaning, nurturing younger brother/sister, looking at the store. Parents didn't facilitate students to find other learning resources There is no one to ask about math at home during online math learning hard to get together with friends to learn about math tasks.	Environment Support

The research data also shows how their environment supports them at home during online math learning. Some students are disturbed in different situations at home. The change in

learning mathematics from offline to online, where students previously received a systemized learning environment to learn online at home with an unsystematic environment,

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raises other concerns for students Majority of participants to have no private learning space during online learning sessions. This is consistent with the findings of that Students who do not have private room facilities will be disturbed by noise and other disturbances (Baticulon et al., 2021; Fabito, et al., 2021; Bringula, Reguyal, Tan, & Ulfa, Said, 2021).

Some students stated that:

"I still have to help my parents look after the shop"

"I'm still burdened with cleaning the house between online studies"

"No one understands math that I can talk to at home"

Several students who choose to study mathematics online rather than offline stated that:

"I like to learn math online because I can eat chili sauce"

"More free and unlimited time when learning math online"

"You don't have to come forward to work on the questions on the blackboard"

"No need to be ashamed if you don't understand and can't answer"

However, the majority of students choose to study mathematics offline for various reasons, including that:

"The material is explained by the teacher directly"

"Can ask questions and discuss directly with teachers or friends"

"The teacher's explanations are not detailed when studying online"

These results are in line with research conducted (Capinding, 2021) which explains that the difficulties experienced by students at home when students are still burdened with various jobs at home by the family. This is also in line with the opinion of (Pe Dangle, 2021) which states that online learning provides challenges, namely, students struggle in independent learning, and lack of knowledge of parents to educate their children. Various literature reveals that there are many benefits of online learning, including cost savings and efficiency (Zhao, 2003; Purwanto et al., 2020). Various literature reveals that there are many benefits of online learning, including cost savings and efficiency. The difficulties that were successfully revealed in this study became a new challenge in the implementation of online mathematics learning. Teachers and students should be able to improve the quality and effectiveness of online mathematics learning with technical guidance and practice in applying online mathematics learning. In addition, creating an interesting and fun experience and maintaining a supportive interaction and learning environment. Among them can form a mathematics community among students, scheduling special feedback sessions outside of time to explain material regularly and continuously, as well as providing opportunities for individual students and groups to explain what they know from the

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material (Chakraborty & Muya Nafukho, 2014; Purwanto et al., 2020).

CONCLUSION AND SUGGESTION

This study shows that the implementation of online mathematics learning provides various learning difficulties for students, including: (1) Students have difficulty using online learning platforms to get direct explanations about mathematics material because the use of learning platforms does not accommodate direct interaction in the network, (2) Students have difficulty communicate optimally with teachers and peers to discuss material that has not been understood, (3) Students have difficulty understanding abstractions and mathematical models due to limited time and online learning platforms, (4) Students have difficulty getting additional explanations because they do not have support for studying at home. Difficulties in learning mathematics online faced by students during the Covid 19 pandemic in this study had an impact on students' low learning achievement as the studies mentioned in this study. So it needs concrete efforts to minimize student learning difficulties in order to overcome the decline in student learning outcomes. For example, teachers should prepare learning materials as simple as possible but still interesting so that even though time is limited, the material can be delivered in its entirety and optimally. In addition, the online platform used can really provide an opportunity for teachers to explain the material directly and students can ask questions directly at the same time. This is to provide support to students who do not get support for studying at home but receive learning support in the form of a re-explanation from the teacher. With the

results of this study, it is suggested that further research can be carried out on other subjects, and on a wider group of students. Furthermore, student learning difficulties can be identified from the perception of teachers preparing students for online learning during the Covid 19 pandemic and reviewing the differences in students' mathematics learning outcomes when studying online compared to learning mathematics offline.

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