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The Views of High School Students During The Covid-19 Period on Learning Mathematics

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ABSTRACT

The Covid-19 pandemic has reshaped people's lives, attacking the Indonesian state and spreading throughout the world. This condition necessitates that all teaching and learning take place online. However, students continue to face numerous obstacles during implementation. The purpose of this study is to ascertain the responses provided by students during the performance of online mathematics learning and to ascertain their suggestions and desires for the subsequent semester's implementation of mathematics learning. The study used a descriptive qualitative research approach to select 373 students as research subjects. The data collection method was a google form, and students were asked to provide an open response regarding their wishes and expectations for online mathematics education in the following semesters. The findings indicated that students expected face-to-face instruction to facilitate direct interaction with teachers and other students. Additionally, students desire to improve their ability to learn and organize their learning more effectively. Additionally, students express their opinions and responses about online mathematics education, including the level of mathematics material and technology (utilization of the zoom platform). Additionally, deadlines for extending tasks, the use and utilization of instructional videos, and the explanation of mathematics material are more comprehensive. Teachers can use the findings of this research to evaluate mathematics learning in order to improve their classroom instruction, and other teachers can do the same thing.

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A. INTRODUCTION

The Covid-19 pandemic has altered the fabric of people's lives, affecting not only Indonesia but also the rest of the world (Metcalfe, 2021; Mishra, Gupta, & Shree, 2020; Sung, Chang, & Liu, 2016). Since the Covid-19 virus was discovered in early March 2020 in Indonesia, social distancing has been imposed, with people quarantined and isolated in their homes, including performing work to ensure that no vulnerable individual contracts the virus. In education, the social distancing policy requires students to learn online rather than in person (Simorangkir, Manalu, & Masta, 2021; Wiratomo & Mulyatna, 2020).

Government-mandated learning from home activities rob students and teachers of face-to-face interaction. However, learning activities at home must be conducted to disrupt the chain of Covid-19 spread. Without exception, all subjects in school must be studied online. Numerous difficulties and roadblocks will arise during the implementation process of online mathematics education (Al-Balas et al., 2020; Amin Almaiah, Al-Khasawneh, & Althunibat, 2020; Babatunde Adedoyin & Soykan, 2020; Kearns, 2012).

One of the fundamental factors that contribute to the creation of barriers in online learning is the application of information technology (Blayone et al., 2018; Carrillo & Flores, 2020; König, Jäger-Biela, & Glutsch, 2020; Lockee, 2020; Sataloff, Johns, & Kost, 2020). The contribution of information technology is gaining momentum in the current COVID 19 pandemic scenario, owing to the closure of educational institutions, which impairs student learning. During this quarantine period, technology provides solutions for the ongoing learning process through innovation and learning management systems. This circumstance has created opportunities for mathematics teachers to implement information technology-based solutions for teaching and assessing student work completion (Mailizar, Almanthari, Maulina, & Bruce, 2020).

During the Covid-19 period, the implementation of online learning enabled mathematics teachers to make improvements to both the learning system and the implementation of learning and evaluation. Teachers must respond to student input, opinions, and perspectives throughout the learning process in order for the following semester's learning to run smoothly (Reimers, Schleicher, Saavedra, & Tuominen, 2020).

Numerous previous studies have examined students' perspectives and perceptions of online learning (Brown, Te Riele, Shelley, & Woodroffe, 2020; Bryson & Andres, 2020; Carrillo & Flores, 2020; Duraku & Hoxha, 2020; Efriana, 2021; Jandrić et al., 2020; Kalogeropoulos, Roche, Russo, Vats, & Russo, 2021; Kidd & Murray, 2020; Landrum, Bannister, Garza, & Rhame, 2020; Park & Kim, 2020). Even though the researches that were found still describe the views and perceptions of students in learning that are general. According to research conducted by (Efriana, 2021), students perceive online learning to be limited to completing teacher-assigned assignments. Additionally, (Krishnan, 2016) research examines students' perceptions of hybrid or blended learning in higher education, revealing a variety of findings. (Krishnan, 2016) conducted a unique study in that it compared two modes of mathematics instruction, namely face-to-face and online. According to Krishnan's research, students prefer traditional face-to-face methods of mathematics instruction and learning. Their lack of experience with non-traditional methods of learning mathematics may be one of the primary reasons for their apprehension toward online education. The study, however, discovered that students favored the hybrid model.

With this context in mind, this study will examine the perspectives of high school students specializing in Mathematics and Natural Sciences on the implementation of online mathematics learning during the Covid-19 pandemic, as well as the students' hopes and desires for mathematics learning in the upcoming semesters. The purpose of this study was to ascertain students' perceptions of online mathematics education during the Covid-19 pandemic.

B. METHODS

This is a descriptive qualitative study. Qualitative research is defined by (Creswell, 2014) as "methods for exploring and comprehending the meanings ascribed to social or humanitarian problems." The qualitative research process entails several critical steps, including the formulation of questions, the execution of procedures, the collection of specific data from

participants, the inductive analysis of data from specific to general themes, and the interpretation of data. Students in grades ten, eleven, and twelve with a specialization in Mathematics and Natural Sciences (MIPA) at one of the high schools in Jambi City, Jambi Province, Indonesia, served as respondents to this study. "Please write down your suggestions or wishes for the online mathematics learning process in the even semester 2020/2021," the researcher instructed in an open questionnaire distributed via Google Form. 373 students responded to this online questionnaire, with 149 tenth-grade Mathematics and Natural Sciences students, 120 eleventh-grade Mathematics and Natural Sciences students, and 104 twelfth-grade Mathematics and Natural Sciences students, as shown in Table 1.

Table 1. Number of Respondents

No	Grade	Class	The Number of Respondents in Each Class.	Total
1	X MIPA	X MIPA 1	5	149
		X MIPA 2	4	
		X MIPA 4	34	
		X MIPA 5	30	
		X MIPA 6	34	
		X MIPA 7	42	
2	XI MIPA	XI MIPA 1	1	120
		XI MIPA 2	1	
		XI MIPA 4	35	
		XI MIPA 5	42	
		XI MIPA 6	41	
3	XII MIPA	XII MIPA 1	21	104
		XII MIPA 2	10	
		XII MIPA 3	4	
		XII MIPA 4	16	
		XII MIPA 5	13	
		XII MIPA 6	19	
		XII MIPA 7	21	

Analyses of data are a critical aspect of qualitative research. The responses of students submitted via Google Form are presented and narrated. Additionally, data analysis was performed concurrently with data collection. The data is organized around research questions about students' attitudes toward online learning and their expectations for it. After analyzing the students' candid responses for topic similarity, the results were presented. The responses focused on expectations for face-to-face learning (Figure 1), student self-regulation (Table 2), and the implementation of online mathematics learning. Additionally, responses to questions about face-to-face learning, the difficulty of the mathematics material, the use of the zoom platform), the deadline for collecting assignments, the use and utilization of instructional videos, and explanations of the material (Table 2).

C. RESULT AND DISCUSSION

Qualitative analysis was conducted on student responses to an open questionnaire regarding their desire and suggestions for the mathematics learning process in the following semesters. Additionally, similar student responses are collected and presented to illustrate the percentage of student expectations and desires for specific online learning themes.

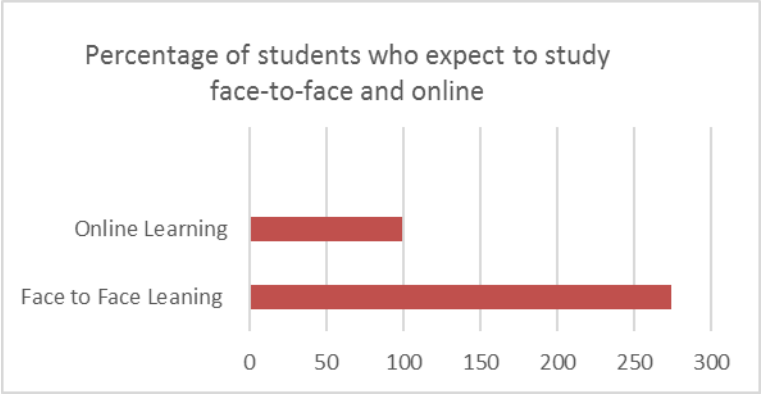

Figure 1. Percentage of students who expect to study face-to-face and online

As illustrated in Figure 1, the majority of students anticipate learning to take place in a face-to-face setting. However, due to the ongoing Covid-19 pandemic, students continue to receive online education. Despite the numerous obstacles to its implementation, students continue to hope for optimal learning. To optimize mathematics learning during the Covid-19 pandemic, students stated that they must first develop self-discipline and organization in order to succeed. Table 2 below summarizes student responses to the process of self-organization.

Table 2. The Examples of The Participants' Statements About Self-Regulated Learning

No	Name*	Class	Responses
1	Diva	XI MIPA 4	"I'm hoping to improve this semester. Collecting assignments on time, avoiding procrastination, and gaining a better understanding and comprehension of the lesson."
2	Mulya	X MIPA 5	"Hopefully, I can improve my performance and gain a better understanding of semester two learning."
3	Yansi	X MIPA 7	
4	Sari	X MIPA 7	"Hopefully, you will always be able to complete the teacher's assignments."
5	Audina	X MIPA 4	
6	Idham	XI MIPA 5	"The desire to improve one's low score"
7	Wali	XI MIPA 5	"Want to gain a better understanding of all the educational materials available online."

**pseudonym*

As seen in Table 2, students hope to organize themselves well for the upcoming semesters of online mathematics learning. From their responses, it is clear that they committed to not procrastinate on assignments, to being disciplined with their learning time, to attempting to improve low grades, to maintaining an enthusiasm for learning, and to attempting to create an environment conducive to learning. This condition is consistent with recent research (Zhu, Zhang, Au, & Yates, 2020) indicating that students' self-regulated learning will influence their perceptions of online interactions and, as a result, their attitudes toward both face-to-face and online learning. This circumstance will have an effect on students' intentions to continue optimizing online learning as illustrated in Figure 2.

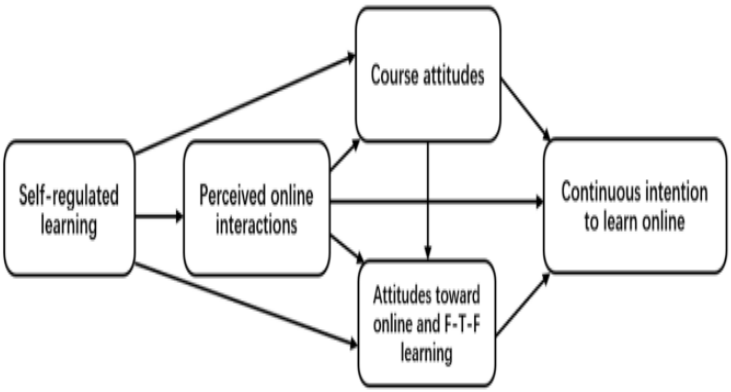

Figure 2. The Initial Model of the Relationships Between the Participants' Continuous Intention to Learn Online, Attitudes, SRL, and Perceived Online Interactions (Zhu et al., 2020)

Concerning the responses provided by students in an open questionnaire, the researchers classified them according to their similarity. There are six prominent responses that many students give, namely that they desire face-to-face instruction and that the teacher's primary concern should be the difficulty of the mathematics material provided. Additionally, a common theme mentioned by many students is a desire to use zoom media, particularly when learning essential math material. Additionally, the use of instructional videos simplifies the process of providing material explanations and deadlines for assignment collection, which must be a concern for mathematics teachers. All student responses are included, and a selection of sample responses is included in Table 3 below.

Table 3. Student Responses and Examples

No	Topic	n	Percent (%)	An example of a Student Response
1	Implementing face-to-face learning	88	74,5	"Hopefully, we can quickly learn offline, as online learning is a little more difficult to comprehend the explanation."
2	The mathematics material's degree of difficulty	88	23,6	"Thus, the material delivered via video is graded according to the difficulty of the questions to be asked. Occasionally, we have difficulty answering questions because the learning materials or videos assign a different level of difficulty to the questions, causing us to struggle to solve them."
3	Utilizing the Zoom platform	18	4,8	"Learn to zoom in on text to make it easier to understand."
4	Due date for task submission	110	29.5	"My recommendation is that the collection of assignments be expanded even further during the even semester."
5	Utilization and application of instructional videos	60	16,1	"Increase the number of material comprehension videos."
6	Mathematical material explained	24	6,4	"The explanation of the provided material is more understandable."

1. Face to Face Instruction

The findings indicated that students desired to observe the learning process in person. According to Table 3, 74.5 percent of students desire face-to-face instruction. This desire arose as a result of the difficulties they encountered while learning mathematics online. Among the difficulties encountered is the difficulty of comprehending math material when studying online with only a minimal amount of explanation from the teacher. Additionally, students complained about the large number of short-duration assignments assigned by the math teacher. This condition results in students feeling bored and dissatisfied with the mathematics learning process. Constraints and challenges associated with the shift from face-to-face to online learning are consistent with research conducted by (Almarashdi & Jarrah, 2021; Habibi et al., 2021; Irfan, Kusumaningrum, Yulia, & Widodo, 2020; Wahyuningrum & Latifah, 2020; Yuzulia, 2021). Due to the numerous obstacles that arise, students return to class expecting to learn face to face.

2. The Mathematics Material's Degree of Difficulty

Many people are aware that mathematics is a subject that is considered complicated and difficult by the majority of students (Johns & Mills, 2021). Additionally, some students dislike mathematics due to its abstract nature and abundance of formulas (Yurniwati & Hanum, 2017). The findings of this study indicate the percentage of students who reported having difficulty comprehending the mathematics material provided by the teacher during online learning. As many as 23.6% of students reported having difficulty comprehending the mathematics material they were studying. The findings of this study corroborate those of previous research (Fikriah, Darhim, & Prabawanto, 2021; Kalogeropoulos et al., 2021; Rahayu, Altaftazani, Kelana, Firdaus, & Fauzi, 2020; Wulantina et al., 2020) which indicate that many students experienced difficulties with mathematics during the Covid-19 pandemic. Furthermore, research conducted by (Kurnia, Bettin, Handayani, & Sari, 2020) states that the difficulty of learning mathematics in online education has not resulted in the discovery of an effective teaching method or method of instruction for students. In the future, teachers as educators must provide reasonable solutions to students regarding how to learn online properly and correctly, so that online mathematics learning becomes more comfortable and measurable, and its implementation becomes easier to direct.

3. Applied Technology (Utilizing Zoom)

During the Covid-19 Pandemic, students are expected to use Zoom in their mathematics learning process. As many as 4.8 percent of students provided feedback, indicating that the teacher frequently used the zoom when teaching mathematics, as illustrated in Table 3. Students perceived that zooming enabled them to hear the teacher's explanation of the mathematics material being studied more directly. Additionally, research (Adarkwah, 2021; Darragh & Franke, 2021; Jandrić et al., 2020; Zuo, Ma, Hu, & Luo, 2021) demonstrates that the use of zoom benefits both students and teachers during the learning process. Synchronous lessons simulate a real-world classroom by utilizing a video conferencing software application (e.g., Zoom) and incorporating all three segments as "life" sessions. Zoom also appears to be face-to-face, despite the fact that it is implemented virtually (Tay, Lee, & Ramachandran, 2021). Zooming in at the start of a lesson can also help students' socio-emotional development in an online classroom (Lambert & Schuck, 2021).

4. Due Date for Task Submission

According to the study's findings in Table 3, 29.5 percent of students anticipate that assignment collection deadlines will be extended (Table 3). They are inundated with assignments from math and other subject teachers. The Covid-19 pandemic has forced the majority of students to adapt to a new way of learning. Students stated that prior to the pandemic, they could gather with classmates and discuss the material being studied. However, due to the conditions created by the Covid-19 pandemic, they were unable to gather and discuss the tasks assigned by their teachers (Andriyono & Herman, 2021). Teachers can assist students and parents in collecting assignments directly from the school while still adhering to health protocols. According to the school (OECD, 2020), public and private organizations collaborate to provide laptops and internet access to disadvantaged students. Where this is not possible, a mechanism is established in collaboration with the Post Office Service to enable students who live a long distance from school or do not have access to the internet to receive lessons and hard copy assignments from the school. Additionally, the distribution of homework/assignments to students, as well as the subsequent collection and return to the teacher, should be organized and managed properly.

5. Employing and Utilizing Instructional Videos

Teachers' use of instructional videos to guide students is critical, even more so in light of the current Covid-19 pandemic. As shown in Table 3, students desire and intend to use instructional videos at a rate of 16.1%. This figure is high because students require access to learning tools such as videos when learning online. Teachers must communicate with students and have access to online resources such as videos (Attard & Holmes, 2020). This simplifies the implementation of online mathematics learning for teachers. Additionally, (Febrianto, Mas'udah, & Megasari, 2020) asserts that images, videos, and audio are required to facilitate learning. This condition can be met via online education. On the other hand, social media platforms such as YouTube can serve as an alternative medium of instruction. If used as part of the learning process, this video-based social media platform provides numerous benefits.

6. Mathematical Material Explained

The findings indicated that there was still a dearth of explanations available to mathematics teachers participating in online learning during the Covid-19 pandemic. Students expect teachers to place a premium on explaining fundamental mathematics concepts. 6.4 percent of students who are learning mathematics online require an in-depth explanation of the material. This condition is consistent with research conducted by (Febrianto et al., 2020), which indicates that one of the barriers students face when participating in online learning is the teacher directly asking questions without providing any explanations. The teacher should consider how to resolve issues so that students who do not comprehend the material can comprehend it more efficiently. Students have suggested that teachers create videos or explain material through videos (Ariyanti & Santoso, 2020), so that students can better understand how to complete steps and formulas.

D. CONCLUSION AND SUGGESTIONS

The study's conclusion is that students have a strong desire to learn face-to-face. Additionally, students respond to online learning with a desire to be more disciplined in their

learning and to manage their time effectively. Additionally, students express their opinions and responses about online mathematics education, including those regarding the difficulty of the mathematics material and technology (utilization of the zoom platform). Additionally, deadlines for extending tasks, the use and utilization of instructional videos, and the explanation of mathematics material are more comprehensive. Teachers can use the findings of this research to evaluate mathematics learning in order to improve their classroom instruction, and other teachers can do the same thing.

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