Student Difficulties Investigation in Physics Subject During Pandemic at SMA Kristen Makedonia, West Kalimantan

Alpi Yanti[1], Ngia Masta[2], Taat Guswantoro[3], Manogari Sianturi[4]
{alfiyanti926@gmail.com[1], ngia.masta@uki.ac.id[2], taat.guswantoro@uki.ac.id[3], manogari.sianturi@uki.ac.id[4]}

Physics Education Study Program, Faculty of Teacher Training and Education, Universitas Kristen Indonesia Jakarta[1234]

Abstract. Students' difficulties during pandemic can be shown in technical, learning process, Internal factors, and external factors. This study aims to investigate student difficulties and the affect among indicators in physics learning at SMA Kristen Makedonia during pandemic. This is descriptive quantitative research, by using random sampling technique with Slovin method. The students' responses collected questionnaire and the affection among indicator have been investigated by using linear regression. The results obtained: 58.1%, students have no difficulty with technical indicator; 53.8%, students have no difficulty with learning process indicator; 61.0%, students have difficulty with internal factors indicator; 52.7%, students have no difficulty with external factors indicator. Based on linear regression test by using SPSS show that only learning process indicator affected the internal factors indicator. This students' difficulties investigation can be used as consideration to overcome the learning loss during pandemic in physics subject.

Keywords: Student difficulties; Physics subject; Distance learning

1   Introduction

Coronavirus disease 2019 (Covid-19) originating from Wuhan, Hubei Province, China has spread rapidly throughout the world. On March 11, 2020, the World Health Organization (WHO) even declared this incident a global pandemic (Cucinotta and Vanelli, 2020). Because of this we are required to self-quarantine at home to reduce and break the chain of spread of the virus. This situation causes all activities in various sectors to be hampered, one of which is in the education sector.

The Ministry of Education and Culture then issued a circular that regulates online learning and working from home in order to prevent the spread of coronavirus disease (Covid-19). The learning system, which was originally based face-to-face in the classroom, had to change to a virtual learning system through the internet network (online learning). The world of education requires educators and students to quickly adapt to existing changes. Online learning connects students with their learning resources who are physically separated or even far apart but can communicate, interact or collaborate either directly/synchronously or indirectly/asynchronously (Ningsih, 2020).

With the online learning system, students have more time to study, they can study anytime and anywhere. Online learning is also ideally able to facilitate students to interact with teachers and peers, through several applications that can support these activities (Khusna, et al., 2020). However, learning activities carried out at home at this time cannot be said to be an ideal learning condition, because both students and teachers still encounter many obstacles and shortcomings. So that this non-ideal condition can also be said as an emergency condition that must still be lived (Arifa, 2020).

In the implementation of online learning, of course, there are many difficulties faced by teachers and students. There are four obstacles faced by the world of education during the COVID-19 pandemic, namely: 1) limited internet control; 2) inadequate facilities and infrastructure; 3) limited internet access; and 4) Unpreparedness of funds in emergency conditions (Aji, 2020). Other obstacles experienced by students include internet quotas which are quite expensive and difficult internet access (Amelia, Y., & Darussyamsu, R., 2020).

Learning physics is one of the subjects that has had an unfavorable impact during the Covid-19 pandemic. Many students think physics is a scary and difficult subject because they have to memorize, apply concepts and analyze phenomena in the surrounding environment. Physics learning is still focused on face-to-face learning, online learning has never been applied. This online learning is a new thing for physics learning methods in schools, especially being a challenge for educators (Bagaskara, RF, 2021).

Both at the junior high school level and at the high school level the boring learning at school is physics learning (Pathoni, 2015). Besides being boring, learning physics is often considered difficult by most students at school (Pasaribu, Hendri and Susanti, 2017). Learning physics is said to be difficult and boring because most of the material is in the form of concepts (Yanti, 2019). Physics learning also requires a lot of media to convey material (Masyithah, 2017). The difficulties experienced by the majority of students in online learning are difficulties in implementing learning.

Based on the description that has been stated above, the researcher wants to conduct a study to find out the difficulties of students in online-based physics learning at Macedonia Christian High School, Ngabang City, West Kalimantan.

2   Method

The main text should be written using Times New Roman, 10pt, fully justified. Italics can be used for emphasis and bold typeset should be avoided. Type of research used in this study is descriptive research with a quantitative approach about students' difficulties in online-based physics learning at Macedonia Christian High School, Ngabang City, West Kalimantan. Quantitative research is a type of research in the form or in the form of numbers from the results of statistical calculations. Descriptive quantitative research is research that aims to describe the circumstances or phenomena that occur.

The method used in this study is a survey method. Descriptive research with survey methods is research that only describes what is or occurs in a particular field or area (Arikunto, 2010). This research was conducted at Macedonia Christian High School, Ngabang City, West Kalimantan in class XI MIA and XII MIA. To determine the number of samples in this study, the Slovin method in Supriyanto and Iswandiri (2017) was used. The Slovin method is a method for calculating the minimum sample size that can be taken from the research population. The calculation using the Slovin method is formulated as follows:

$$n = \frac{N}{1 + Ne^2}$$ (1)

Description:

N : Number of samples = 77 people

N : Total Population = 96 people

E : Maximum fault tolerance (error tolerance) = 5% or 0.05

This research was done by spreading the questionnaire using the form google online to 77 respondents are students of class XI and XII Christian n High School MIA Macedonia which consists of four classes: XI MIA 1, XI MIA 2, XII MIA 1 and XII MIA 2.

Table 1. Grid of Research Questionnaire Instruments

No	Indicator	Sub Indicator	Number Statement +	Number Statement -	Total
1	Technical	Availability of internet service		1, 2, 3	3
		Facilities and accessibility		4, 5, 6, 7	4
		Inability of students in online learning		8, 9, 10	3
2	Implementation of learning Teacher	Competence in online learning		11, 12, 13	3
		Students' participation	14, 15,	16	3
		Assignment		17, 18, 19, 20	4
3	Internal Factors	Motivation and students' interest	24, 25, 26	21, 22, 23,	6
4	External Factors	Economic		27	1
		Support from parents		28, 29	2
		Support from the environment		30, 31	2
		Total	**5**	**26**	**31**

The data analysis technique used in this study is a descriptive quantitative technique. The percentage of student responses was calculated using Microsoft Excel 2019 with statistical calculations of the percentage of data processing techniques calculated from the following equation (Hidayatulloh, 2021).

$$P = \frac{f}{N} \times 100\%$$ (2)

Description:

P : Percentage sought (Relative Frequency)

f : Frequency

N : Number of Respondents

To determine the influence between indicators in this study, Linear Regression Test was used using IBM SPSS Version 26. Analysis between indicators was used to determine whether or not there was a influence or influence between indicators.

3 Result and Discussion

3.1 Questionnaire Analysis Results

The results of the research on students' difficulties in online-based physics learning at Macedonian Christian High Schools in this study were obtained from an instrument in the form of a questionnaire containing 31 statements.

Questionnaire distributed by sending a link google forms via group Whatsapp to students of class XI and XII MIA with a total of 77 people. After the questionnaire was distributed, the data was then processed and analyzed to find out the difficulties experienced by students in online-based physics learning at Macedonian Christian High School. Here are the results of the data collected in the Christian High School Macedonia on July 24, 2021 based on the individual indicators:

a. The results of the inquiry Difficulties Students in Learning Physics-Based Online on Technical Indicators

Based on the results in Table 3.1 can be seen that, the difficulties of students in learning physics-based online for technical indicators as a whole shows an average result of 53.7%, meaning that students do not agree if they are declared to have technical difficulties during online-based physics learning, because not all students experience this. In the technical indicators there are three sub-indicators, namely the availability of internet services, facilities and accessibility, and the inability of students in online learning. This indicator contains 10 statements and all of them are negative statements.

Table 2. Results Percentage of Technical Indicators

Statement	Respondents					f	Index (%)
	STS	TS	KS	S	SS		
A. Sub-Indicator of Internet Service Availability (-)							
1. I have problems with the internet network when learning physics based online because my area is far from internet coverage	12	15	25	10	15	232	60
2. I run out of quota during online-based physics learning	17	19	17	12	12	214	56
3. My home location is far from the internet, which makes me lazy to participate in online learning activities	33	16	15	3	10	172	45
Average index							**53.7%**
B. Sub Indicator Facilities and Accessibility (-)							
4. I do not have a special room/place that supports online learning activities	17	11	12	11	26	249	65
5. I have difficulty in online learning because I do not have my own cell phone/laptop	37	15	12	10	3	158	41
6. Learning resources provided by the school are not complete	20	26	21	8	2	177	46
7. Learning resources suggested by the teacher are difficult to access	18	23	16	12	8	200	52
Average index							**51.0%**
C. Student Disability in Development learning online (-)							
8. I do not proficient to operate applications in learning online	22	22	13	12		8193	50
9. I'm having trouble understanding the material physics for learning only through the *chat room* only	3	12	12	27	23	286	74
10. I'm having trouble understanding the material physics when studying independently at home	2	3	11	19	42	327	85
Average index							**69.7%**
Average technical indicators							**58.1%**

b. Questionnaire Results of Student Difficulties in Online-Based Physics Learning Implementation Indicators.

Online-based physics learning for overall learning implementation indicators shows an average result of 53.8%, meaning that students do not agree that they have difficulties in implementing learning during the online-based physics learning process. In the indicators of learning implementation, there are three sub-indicators, namely teacher competence in online learning, student participation, and assignment. This indicator contains 10 statements, 8 negative statements and 2 positive statements.

Table 3. Percentage Results of Learning Implementation Indicators

Statement	Respondents					f	Index (%)
	STS	TS	KS	S	SS		
A. Teacher Competency Sub-Indicators (-)							
11. Teachers do not master technology about online learning	32	22	20	2	1	149	39
12. Teacher explanations in online-based physics learning are not interesting	8	17	24	18	10	236	61
13. More than two times the teacher was late in starting physics learning activities	30	15	18	12	2	172	45
index						**Average**	**48.3%**
B. Student Participation Sub-Indicator (+)							
14. I gave feedback/feedback to the teacher about the material being taught in online learning	2	6	28	21	20	180	47
15. I attend every online physics learning activity	2	2	12	17	44	132	34
Sub-Indicator of Student Participation (-)							
16. I have difficulty being actively involved in online physics learning because I am unable to understand the material presented by teacher	6	8	22	19	22	274	71
index						**Average**	**30.5**
C. Sub Indicator Assignment (-)							
17. I feel burdened by the physics assignment that the teacher gives during the lesson online because it has to be handwritten and submitted inform *soft file*	14	18	21	14	10	219	57
18. The physics assignment given is difficult to do	3	8	26	28	12	269	70 The
19. number of questions given is too much	9	17	28	15	8	227	59
20. The assignment time is too long brief	10	14	19	21	13	244	63
index						**Average**	**62.3%**
Average index of learning implementation indicators							**53.8%**

c. Questionnaire Results of Student Difficulties in Online Based Physics Learning on Internal Factors Indicators

Based on the results of the study in table 3.3, it can be seen that the difficulty of students in online-based physics learning for indicators of internal factors as a whole for negative statements shows an average result of 61.0%, meaning that students agree that they have internal difficulties in online-based physics learning. In the indicator of internal factors, there are sub-

indicators of student motivation and interest with 6 statements, 3 negative statements and 3 positive statements.

Table 4. Results of Percentage of Internal Factors Indicators

Statement	Respondents					f	Index (%)
	STS	TS	KS	S	SS		
A. Sub-Indicators of Student Motivation and Interest (-)							
21. I am not excited when online-based physics learning starts	14	16	26	12	9	217	56
22. I think online-based physics learning difficult and boring	4	14	20	21	18	266	69
23. Online-based physics learning makes me inactive during the learning process	5	16	22	16	18	257	67
						Average index	**64%**
B. Sub-Indicator of Student Motivation and Interest (+)							
24. I am confident to express my opinion about physics material when learning online	8	32	19	13	5	256	66
25. I enjoy online learning	15	16	29	6	11	249	65
26. Learning physics online makes me master new technologies	1	5	16	35	20	163	42
						Average index	**57.7%**
Average The average index of internal factor indicators is							**61.0%**

d. Results of Student Difficulty Questionnaires in Online-Based Physics Learning on External Factors Indicators

Based on the results of the study in table 3.4, it can be concluded that it is known that students' difficulties in online-based physics learning for external factor indicators as a whole show an average result of 52.7%, meaning that students do not agree that they have external difficulties in online-based physics learning. In the external factor indicator, there are 3 economic sub-indicators, support from parents and support from the environment consisting of 5 statements and all of them are negative statements.

Table 5. Results of Percentage of External Factors Indicators

Statement	Respondents					f	Index (%)
	STS	TS	KS	S	SS		
A. Economic Sub-Indicators (-)							
27. During online learning, sometimes I can't afford to buy quotas due to family economic limitations	20	12	18	15	12	218	57
						Average index	**57.0%**
B. Sub Indicator Support from Parents (-)							
28. My parents do not support and encourage me during online learning at home	45	10	12	8	2	143	37
29. My parents do not provide facilities that support me in participating in online learning	42	12	13	8	2	147	38
						Average index	**37.5%**
C. Sub Indicator Support from the Environment (-)							

30. I am lazy to participate in online based physics learning because there are no friends around me to discuss	12	16	11	13	25	254	66
31. My neighbors are often noisy when I am attending online-based physics learning	25	6	14	4	28	235	61
						Average index	**63.5%**
					Average external factor indicator index		**52.7%**

3.2 Linear Regression Test Between Indicators

Linear Regression Test Results between indicators using IBM SPSS Version 26. In this test the Internal Factor indicator is used as the dependent variable because the indicator shows that students experience difficulties in the online-based physics learning process caused by internal factors.

a. Linear Regression Test Between Technical Indicators and Internal Factor Indicators

This linear regression test is used to see the extent of the influence between technical indicators and internal factor indicators on students' difficulties in online-based physics learning.

Table 6. Linear regression coefficients

		Unstandardized Coefficients		Standardized Coefficients		
	Model	B	Std. Error	Beta	t	Sig.
1	(Constant)	10.384	1.405		7.390	.000
	Teknik	.276	.047	.563	5.902	.000

From the table above, it can be seen that the Constant (a) value is 10.384 while the Engineering value (b/ regression coefficient) is 0.276 so that the regression equation can be written:

$$Y = a + bX$$
$$Y = 10.384 + 0.276X$$

Information:
- The constant of 10.384 means that the consistent value of the Internal variable is 10.384.
- The X regression coefficient of 0.276 states that for every 1% tethering of the technical value, the Internal value increases by 0.276. The regression coefficient is positive, so it can be said that the direction of the influence of the variable X on Y is positive.

Decision making in the Simple Regression test:
1) Based on the significance value: the coefficients table obtained a significance value of 0.000 <0.05 so it can be concluded that the Trust(X) variable has an effect on the Participation variable (Y).
2) Based on the t value: it is known that the tcount value is 5,902 < ttable 7,390 so it can be concluded that the Trust(X) variable has no effect on the Participation variable (Y)

b. Linear Regression Test Between Learning Implementation Indicators and Internal Factor Indicators.

This linear regression test is used to see the extent to which the influence between the indicators of the implementation of learning and the indicators of internal factors on students' difficulties in online-based physics learning.

Table 7. Linear regression coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	7.282	1.452		5.016	.000
	Pelaksanaan Pembelajaran	.403	.051	.672	7.856	.000

From the table above, it can be seen that the Constant (a) value is 7.282 while the Engineering value (b/ regression coefficient) is 0.403 so that the regression equation can be written:

$$Y = a + bX$$
$$Y = 7.282 + 0.403X$$

Information:
- The constant of 7.282 means that the consistent value of the Internal variable is 7.282.
- The X regression coefficient of 0.403 states that for every 1% increase in the value of the implementation of learning, the Internal value increases by 0.403. The regression coefficient is positive, so it can be said that the direction of the influence of the variable X on Y is positive.

Decision making in the Simple Regression test
1) Based on the significance value: the coefficients table obtained a significance value of 0.000 <0.05 so it can be concluded that the Trust(X) variable has an effect on the Participation variable (Y).
2) Based on the t value: it is known that the tcount value is 7.856 < ttable 5.016 so it can be concluded that the Trust variable (X) has an effect on the Participation variable (Y).

c. Linear Regression Test Between External Factor Indicators and Internal Factor Indicators

This linear regression test is used to see the extent of the influence between external factor indicators and internal factor indicators on student difficulties in online-based physics learning.

Table 8. Linear regression coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	14.321	1.323		10.828	.000
	Eksternal	.306	.095	.349	3.221	.002

From the table above, it can be seen that the Constant (a) value is 14,321 while the External value (b/ regression coefficient) is 0.306 so that the regression equation can be written:

$$Y = a + bX$$
$$Y = 14.321 + 0.306X$$

Information:
- The constant of 14.321 means that the consistent value of the Internal variable is 14.321.
- The X regression coefficient of 0.306 states that for every 1% tethering of the External value, the Internal value will increase by 0.306. The regression coefficient is positive, so it can be said that the direction of the influence of the variable X on Y is positive.

Decision making in the Simple Regression test
1) Based on the significance value: the coefficients table obtained a significance value of 0.002 <0.05 so it can be concluded that the Trust variable (X) has an effect on the Participation variable (Y).
2) Based on the t value: it is known that the tcount value is 3,221 < ttable 10,828 so it can be concluded that the Trust(X) variable has no effect on the Participation variable (Y).

4 Conclusions

Based on the research results obtained, it can be concluded that students often experience difficulties in online-based physics learning, including internal factor indicators. This indicator is most often experienced by students in online-based physics learning. Students have difficulty in learning physics based online on internal factor indicators. In this case, students have difficulty because learning physics is difficult and boring, students are less active in participating in physics learning, and students are also less confident in expressing opinions about the physics material presented. Of the four indicators used, the results showed that there was an influence between indicators of learning implementation and indicators of internal factors.

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