The Effectiveness of Physics Learning on E-Learning Based Application During the Covid-19 Pandemic at Dwitunggal Private Senior High School Tanjung Morawa in 2020/2021 Academic Year

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Abstract

This study describes the effectiveness of the physics learning implementation of e-learning-based application during the COVID-19 pandemic at Tanjung Morawa Dwitunggal Private High School for the 2020/2021 Academic Year. The goal to be achieved is to find out how effective the implementation of e-learning-based physics learning has been during the covid-19 pandemic. The research method used is a descriptive research method with a quantitative approach. The population in this study were all students of Tanjung Morawa Dwitunggal Private High School for the 2020/2021 academic year which consisted of 3 classes. The sampling technique used in this research is non-probability sampling with the purposive sampling technique. Therefore, the sample in this study was all students of class XI, totaling 35 people. The data collection technique used a questionnaire with a modified Likert scale. The results showed that the application of e-learning-based in physics during the COVID-19 pandemic at Tanjung Morawa Dwitunggal Private High School for the 2020/2021 academic year was in the effective category with an average of 72.8%. Based on the five existing indicators, namely the readiness of students to participate in e-learning-based physics learning; the convenience of students participating in e-learning-based physics learning; the adequacy of facilities and infrastructure to support e-learning-based physics learning; aspects of learning independence; and student commitment to e-learning based physics learning after the covid-19 pandemic.

Keywords: effectiveness, learning physics, e-learning, covid-19, etc.

Introduction:

Learning is a process of interaction that encompasses students with teachers and learning resources that take place in the learning environment. Learning is assistance provided by teachers to students with the aim of students to gain knowledge, creativity and skills and instil positive values in students by utilizing various learning resources. The most imperative measure of the learning process is the occurrence of the learning process itself.

Carroll (1963) who is famous in the field of psychological education and his book entitled "A Model of School Learning," states that effectiveness depends on the following five factors:

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i.   Attitude;
ii.   Ability to Understand Instructions;
iii.   Perseverance;
iv.   Opportunity; and
v.   Quality of Instruction.

Knowing some of these indicators shows that learning can be effective if there is an attitude and a will in students to learn, the readiness of students and teachers in learning activities, the quality of the material presented and the facilities and infrastructure to support learning. If these indicators are non-existent, the learning activities will not run well. Effective learning activities are needed by students to help develop students' thinking power without compromising the level of understanding of students according to their developmental age.

E-learning is a learning process that utilizes information technology and computers. E-learning is the basis and logical consequence of the development of information and communication technology. By utilizing e-learning, students do not need to sit in the classroom to hear and listen to the teacher's explanation directly. E-learning can save time and costs that must be incurred by an educational institution.

Based on the results of interviews conducted by researchers with Physics teachers at Tanjung Morawa Dwitunggal Private High School, information obtained was that since the Minister of Education and Culture of the Republic of Indonesia (Kemendikbud RI) issued circular letter number 4 of 2020 regarding the implementation of education policies in the emergency period of the spread of Corona Virus Disease (Covid- 19) and also based on an appeal letter from the Governor of North Sumatra number 420/001/2021, learning activities at the Dwitunggal Private High School Tanjung Morawa are carried out online (E-Learning), including the physics learning process. The physics learning process itself is carried out by utilizing various supporting applications such as Whatsapp, Google Meet, and Youtube applications (Abidin, Hudaya & Anjani, 2020)..

Based on these facts, the researchers are interested in conducting a study that discusses the Effectiveness of the Implementation of E-Learning-Based Physics Learning during the Covid-19 Pandemic at Dwitunggal Private High School Tanjung Morawa T.P. 2020/2021. Based on the formulation of the problem, the objectives to be achieved in this study is on describing the effectiveness of the implementation of E-Learning-based physics learning during the Covid-19 pandemic at Dwitunggal Private High School Tanjung Morawa T.P. 2020/2021.

Literature Review:

The Nature of Learning:

Learning is related to changes in individual behavior towards certain situations caused by repeated experiences in life, these changes in behavior are difficult to explain based on innate response tendencies as well as maturity and individual momentary circumstances. Learning occurs when a stimulus situation along with the contents of the memory can affect the individual in such a way that their actions change from time to time (Damyanti and Mudjiono, 2019:10).

Learning is a change in individual behavior, where this behavior changes in addition to leading to better behavior. However, there is also the possibility of leading to bad behavior. To be said to be learning, the change must be relatively stable and last for a long time (Mujiman, 2011). The interval between these periods is very difficult to determine with certainty, but it is the end of

a period that may last for years. Therefore, we must rule out changes in behavior caused by motivation, fatigue, adaptation, acuity of attention or self-sensitivity of the individual which usually only lasts for a very short time.

Understanding E-Learning:

E-Learning consists of two parts, namely 'e' which stands for 'electronic' and 'learning' which means 'learning'. So, e-learning is learning by utilizing the assistance services of several electronic devices, especially computer devices (Darmawan, 2014). For this reason, e-learning is often referred to as an 'online course. In its implementation, e-learning uses audio, video and computer equipment or a combination of the three. In other words, e-learning is learning which in its implementation is supported by technology services such as telephone, audio, videotape, satellite or computer transmission (Tafiardi, 2005). In short, Horton (2003) suggests that e-learning is a web-based learning activity (which can be accessed from the internet).

Evaluation of Learning in E-learning:

From several assessment patterns that have been possible and have been carried out by many educational institutions in the context of implementing the electronic learning service program, it turns out to be quite comprehensive (Rifa'ie, 2020).. Of course, this condition will need a pattern and design of learning flow that is not simple, at least the existence and support of several facilities and infrastructure and even competent human resources will be needed (Permata & Bhakti, 2020).. As when designing an assessment system that measures interactive direction and content, learning content specialists must coordinate and collaborate actively and productively with expert programmers. Because those who will translate interactive content are programmers who must also refer to what is designed in the learning program from content specialists. Likewise, with other assessment systems, several parties with the required background and expertise will continue to be required to be able to build meaningful aspects in conducting this digital and online assessment process (Hidayah,Aldawiyah & Mahanani, 2020).

Coronavirus Disease 2019 (COVID-19):

At the beginning of 2020, the world was shocked by the incidence of severe infections with unidentified cause; this problem was first reported by the Chinese state to the World Health Organization (WHO) that there were 44 severe pneumonia patients that occurred in an area precisely in Wuhan City, Hubei Province, China, late 2019. Initially, it was suspected that this was related to a wet market selling fish and various other animals. Until January 10, 2020, the cause was known and the genetic code was obtained, namely the new coronavirus (Handayani, 2020: 120).

As of March 2020, the World Health Organization (WHO) has declared Corona Virus Disease (COVID-19) as a pandemic that has hit almost all countries in the world. Corona Virus is a type of virus that can attack the immune system in animals and humans. Transmission of COVID-19 can occur in several ways, for example through droplets and aerosols, airborne transmission, object surface transmission and faces-oral transmission. To prevent the spread of infection from this virus, it can be done by implementing 3M behaviour (Using a mask, washing hands, maintaining distance) and 3T practices, namely Tracing, Testing and Treatment (Putri, 2020).

Research Method

1. Research Design
The researcher chose the type of quantitative descriptive research because the research conducted was related to events, phenomena, attitudes, social activities, thoughts and perceptions of individuals and groups that were developing and related to current conditions (Setyosari, 2016)

2 Participants
Participants are subjects who are involved in research to provide direct responses to research activities and are expected to support the research process and are responsible for involvement (Arikunto, 2010).. In this study, the researchers involved participants, namely: students of Dwitunggal Private High School Tanjung Morawa. This study focused only on class XI students, who had previously carried out face-to-face learning. However, during the COVID-19 pandemic, they switched to e-learning-based learning.

3. Population and Sample
The population in this study was all students of Dwitunggal Private High School Tanjung Morawa. The sampling technique used in this research is non-probability sampling with purposive sampling technique. Therefore, the sample in this study was all students of class XI.

4. Data Analysis Techniques
The data analysis technique used in this research is descriptive statistical analysis. This method is used in assessing the variables contained in the research, namely: The Effectiveness of the Implementation of E-Learning-Based Physics Learning (Moleong, 1995). Descriptive statistical analysis used in this study is the percentage, using the following steps:

a. Create a distribution table from the answers to the questionnaire obtained
b. Determine the score of respondents' answers with pre-determined conditions
c. Sum up the answer scores obtained from each respondent
d. Input the score into the formula

$$DP = \frac{n}{N} \ x \ 100\%$$

DP   : Description of percentage
n   : Number of expected scores
N   : Percentage value or yield (Riduan, 2013:89)

Research Results:

The Effectiveness of the Implementation of E-Learning-Based Physics Learning During the Covid-19 Pandemic can be seen by looking at the total score of the questionnaire answers that have been given by students. Based on the answers to the questionnaires that have been obtained, the average percentage value per item of the questionnaire statement is obtained, as follows:

Table 1: Average Data for Answer Scores per Statement Item

No. Statement Item	SS	S	TS	STS	Average Percentage per Statement Item
1	9	15	9	2	72.1%
	25.7%	42.9%	25.7%	5.71%	

2	7	19	8	1	72.9%
	20.0%	54.3%	22.9%	2.86%	
3	12	18	4	1	79.3%
	34.3%	51.4%	11.4%	2.86%	
4	10	18	7	0	77.1%
	28.6%	51.4%	20.0%	0.00%	
5	7	20	7	1	73,6%
	20.0%	57.1%	20.0%	2.86%	
6	11	14	10	0	75.7%
	31.4%	40.0%	28.6%	0.00%	
7	8	19	7	1	74.3%
	22.9%	54.3%	20.0%	2.86%	
8	8	20	7	0	75.7%
	22.9%	57.1%	20.0%	0.00%	
9	16	17	2	0	85.0%
	45.7%	48.6%	5.7%	0.00%	
10	6	24	5	0	75,7%
	17.1%	68.6%	14.3%	0.00%	
11	5	29	1	0	77.9%
	14.3%	82.9%	2.9%	0.00%	
12	4	23	8	0	72.1%
	11.4%	65.7%	22.9%	0.00%	
13	3	21	11	0	69.3%
	8.6%	60.0%	31.4%	0.00%	
14	6	13	14	2	66.4%
	17.1%	37.1%	40.0%	5.71%	
15	6	19	10	0	72.1%
	17.1%	54.3%	28.6%	0.00%	
16	5	20	10	0	71.4%
	14.3%	57.1%	28.6%	0.00%	
17	7	17	11	0	72.1%
	20.0%	48.6%	31.4%	0.00%	
18	7	15	12	1	70.0%
	20.0%	42.9%	34.3%	2.86%	
19	6	15	14	0	69.3%
	17.1%	42.9%	40.0%	0.00%	
20	5	16	13	1	67.9%
	14.3%	45.7%	37.1%	2.86%	
21	6	16	13	0	70.0%
	17.1%	45.7%	37.1%	0.00%	
22	2	26	7	0	71.4%
	5.7%	74.3%	20.0%	0.00%	
23	5	20	10	0	71.4%
	14.3%	57.1%	28.6%	0.00%	
24	5	16	11	3	66.4%
	14.3%	45.7%	31.4%	8.57%	
25	7	18	8	2	71.4%
	20.0%	51.4%	22.9%	5.71%	
Average Answer					**72.8%**

Discussion:

Based on research that has been conducted on 35 respondents, data is obtained regarding the effectiveness of the implementation of e-learning-based physics learning during the COVID-

19 pandemic at Dwitunggal Private High School Tanjung Morawa. The discussion of the data analysis is described as follows:

i. Students' Readiness to participate in e-learning-based physics learning. In the implementation of the physics learning process, most students have the readiness to take part in learning so that they become more prepared to accept the learning delivered by the teacher.

ii. Student convenience in participating in e-learning-based physics learning. In carrying out e-learning learning activities, the premises' conditions around where students study greatly affect the concentration of students' learning itself, a learning environment with high noise intensity, close to industrial areas and polluted air will also cause learning discomfort in students.

iii. Adequacy of Facilities and Infrastructure to Support E-Learning-Based Physics Learning. The availability of facilities such as internet networks, computers, systems, and e-learning software will support the implementation of an e-learning-based physics learning process for class XI students of SMA Dwitunggal Private High School Tanjung Morawa. This shows that the obstacles that arise due to facilities and infrastructure can be minimized.

iv. Aspects of Student Learning Independence. Based on the research, it was found that most of the class XI students of SMA Dwitunggal Tanjung Morawa had independent learning in participating in e-learning based physics learning. Independent learning of e-learning is really needed considering that students must be separated from one another during the learning process.

v. Student Commitment to E-Learning-Based Physics Learning After the Covid-19 Pandemic. Based on the research, it was found that most students were committed to continuing to follow e-learning-based physics learning even though the COVID-19 pandemic had been declared complete by the World Health Organization (WHO) and by the Indonesian government.

Conclusion:

After describing and discussing the results of the research that has been carried out, it can be concluded that the application of e-learning-based physics learning during the covid-19 pandemic at Dwitunggal Private High School Tanjung Morawa T. P. 2020/2021 is in the effective category.

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