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## Online Learning in Border Isolated Areas on Temperature and Heat Materials

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Online learning; Teaching  
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### ABSTRAK

*Online learning in isolated areas is very difficult to implement, on the other hand direct learning cannot be carried out during this pandemic period. This study aims to see whether video-assisted learning (offline) is effective to be applied as an alternative in online learning. This quantitative study used a post-test only control-group design. The experimental class was treated with video-assisted teaching on the temperature and heat material. The control class was given learning treatment using the online learning method by giving assignments and online learning assisted by the whatsapp application. The population of this research is the seventh grade students of SMP Negeri 03 Entikong. The research sample amounted to 78 people were selected using a systematic sampling technique. The instrument in this study consisted of written test and video teaching on temperature and heat material. The written test given to students is in the form of an essay test with 4 questions related to heat material. The written test indicator consists of analyzing the temperature comparison of the thermometer; analyzing the effect of temperature on the long expansion of objects; using the specific heat data of material to determine the amount of heat required to raise the objects' temperature; calculating the amount of heat to change the state of objects. The results of this study indicate that there is a difference between the average student physics' learning outcomes in teaching video-assisted learning class and whatsapp-assisted online class.*

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## INTRODUCTION

The outbreak of the Covid-19 virus has forced educational institutions to eliminate direct learning activities as an effort to prevent and control the spread of Covid-19 virus. Consequences of closing educational institutions and replacing them with learning at home as the government's policy regarding changes in the teaching and learning system [1]. Schools, students, parents, and of course teachers must migrate to an online learning system, which is better known as e-learning [2].

For teachers who are accustomed to direct learning, this condition raises the unpreparedness of learning preparation that occurs quickly and suddenly as a result of the spread of Covid-19 [3]. In addition, the findings of study conducted by Hamdani & Priatna [4], 40.79% of students feel uncomfortable with online learning, about 34.22% of students experience difficulties in learning process, 34.22% of teachers experience difficulties in online learning, 28.95% of teachers have not mastered the use of gadgets, 27.64 % of teachers do not master the use of gadgets, and there is an increase of 69.73% in the cost of education.. This is in line with the findings of Hutauruk & Sidabutar [5], The obstacles that arise are fundamental or fundamental, including in terms of the internet network and also the services provided to students.

The obstacles experienced by respondents are an inadequate internet network [6]. In urban areas, there are many internet service providers, with adequate internet network capabilities to support the online learning process. However, for rural areas, there are very few choices of internet service providers, although sometimes the network is unstable, due to the geographical location that is still far from the coverage of the cellular signal [7]. This also occurs in the Indonesia-Malaysia border area in Entikong sub-district and several other areas, so we need an alternative in the implementation of the learning process other than using the online method. One of these alternatives is the teaching video assisted learning process.

Teaching materials in the form of audio-visual or video-based teaching materials are expected to be an alternative that can be used as learning resources in the implementation of physics learning. Video provides a very interesting way of conveying information live. Video is a useful medium compared to other media such as graphics, audio, etc. [8]. This video-based teaching material is a combination of text, images, animation, audio and video which can be used as an innovative solution to make the learning process more interesting, that can be packaged in the form of a compact disk (CD) [9]. Some of the advantages of using movies and videos are: (1) can add to the basic experiences of students when reading, discussing, practicing, etc, (2) can describe an iterative process, (3) increase and encourage motivation and instill attitudes and other affective aspects, (4) contains positive values that can invite thoughts and discussions carried out by students in groups, (5) can present a dangerous event if witnessed directly, (6) it can be shown to large or small groups, heterogeneous or individuals groups, (7) shorten the learning process time [10].

Findings from Simanjuntak [11] shows that learning videos can improve students' conceptual understanding on the topic of kinematics and dynamics. The improvement of students' conceptual understanding is caused by (1) video can be used to investigate real-life situation problems using contextual concepts, (2) video can be used to present the motion of objects in two dimensions, (3) the evaluation of the activity has the potential to visualize, investigate, analyze and understand various topics in physics, (4) Videos can be used easily so that they can construct and develop students' conceptual understanding. This is in accordance with Ain's findings [12] that learning videos as learning media can improve students' conceptual understanding on pressure material. Hafizah [13] stated that using video in learning physics is effective in improving student learning outcomes and encouraging students to be active in learning.

## METHODS

This quantitative study used a post-test only control-group design. The experimental class was treated with a video-assisted learning process on temperature and heat material. The control class was treated using the online learning method by giving assignments and online learning using the whatsapp application. Materials in the form of modules in the form of soft-files are given to online classes and hard-files to offline classes. The population of this research is the seventh grade students of SMP Negeri 03 Entikong. The sample amounted to 78 people who were selected using systematic sampling technique. The instrument in this study consisted of written test and video teaching material on

temperature and heat. Written tests were given to students to measure the effectiveness of video teaching materials on temperature and heat as an alternative to online learning, that given to students in form of essay test with 4 questions related to heat material. The indicators of the written test consist of analyzing the temperature comparison of the thermometer, analyzing the effect of temperature on length expansion of objects, using specific heat data of the material to determine the amount of heat needed to increase the temperature of objects, and calculating the amount of heat to change the objects' shape. A written test was given at the end of the treatment. The data obtained from the written test results will be tested using independent sample t-test to see whether there is a difference between the average written test results in experimental class and control class. Teaching videos are declared effective as an alternative to online learning if there are differences after statistical tests, and the average value in experimental class is higher than control class.

### RESULT AND DISCUSSION

Based on the statistical test using the Kolmogorov-Smirnov test with the SPSS tool, the data on student learning outcomes in classes that take lessons using teaching videos and online classes are normally distributed. The significant value of data from learning outcomes in the learning class using teaching videos is  $> 0.05$ . In the online learning class, a significant value was obtained  $> 0.05$ , so that the data on student learning outcomes in the learning class using teaching videos and online classes could be continued for inferential statistical testing using the independent sample t-test statistical test. Hasil uji normalitas data dapat dilihat pada Table 1.

**Table 1. Kolmogorov-Smirnov<sup>a</sup>**

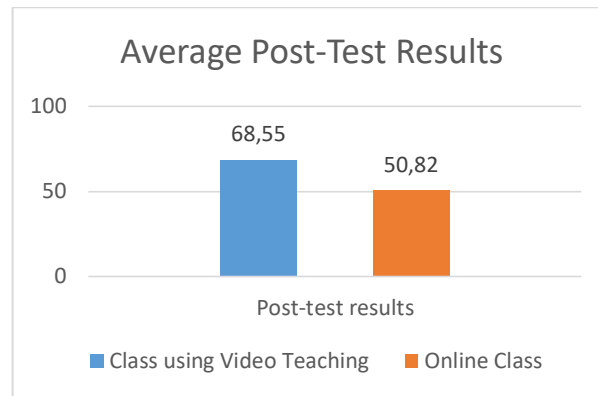
	<b>Statistic</b>	<b>df</b>	<b>Sig.</b>
Class A	,079	39	,200*
Class B	,130	39	,095

\*. This is a lower bound of the true significance.  
a. Lilliefors Significance Correction

The results of statistical tests can be seen in Table 2. Based on the statistical test, obtained the value of sig (2-tailed)  $< 0.05$  so it can be concluded that there is a difference between student learning outcomes in learning classes using teaching videos and online classes on average. The average students' learning outcomes in learning classes using teaching videos and online class can be seen in Figure 1. The average students' learning outcomes in the learning class using teaching videos is 68.55. While the average students' learning outcomes in online learning class is 50.82.

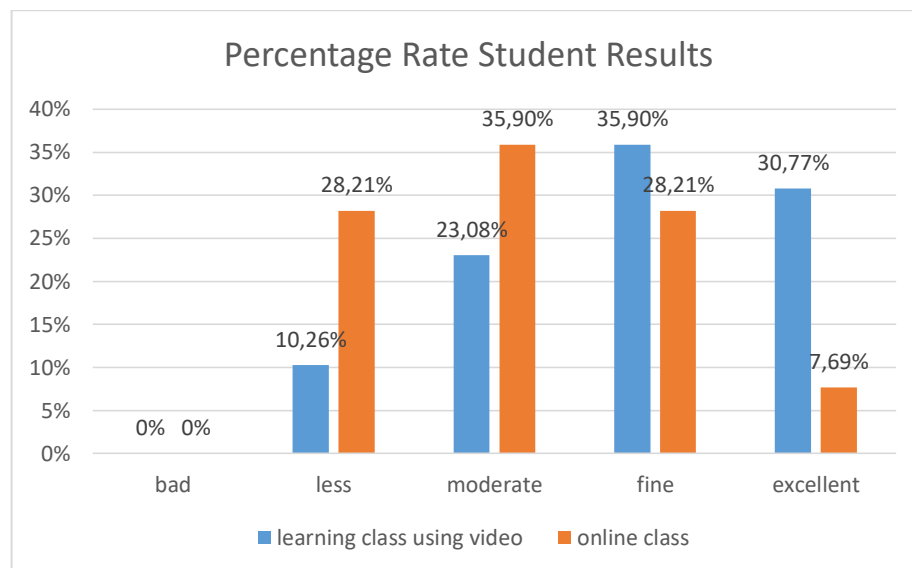
**Table 2. Independent Samples Test**

		<b>Levene's Test for Equality of Variances</b>		<b>t-test for Equality of Means</b>		
		<b>F</b>	<b>Sig.</b>	<b>t</b>	<b>df</b>	<b>Sig. (2-tailed)</b>
Learning Outcomes	Equal variances assumed	1.400	.240	3.900	76	.000
	Equal variances not assumed			3.900	74.705	.000



**Fig 1.** Average Post-test Result

Based on Figure 2, in less category, student learning outcomes in online learning classes are 17.95% higher than learning classes using teaching videos. in the moderate category, the online learning class is 12.82% higher. In the fine category, the learning class using teaching videos is 7.26% higher. In the excellent category, the learning class using teaching videos is 23.68% higher than the online class.



**Fig 2.** Percentage Rate Student Results

From the statistical test, it shows that there is a difference in average value between classes that use teaching videos and online classes using WhatsApp. The average value of students in classes that use teaching videos is higher than online classes using WhatsApp. This happens because of the determinants of the success of online learning, technology, teacher characteristics and student characteristics [14]. If one of these determinants is not met and understood, then online learning will be inefficient and ineffective. The use of online learning will be very effective if it fulfills the essential components in learning, namely discursive, adaptive, interactive and reflective with elements, which will be best if integrated with the learning environment, so that it can become online learning that is integrated with the environment, or fulfills the digital learning ecosystem component because it can accommodate the learning styles, flexibility and learning experiences of students so that it can create positive feelings [15].

Students' learning outcomes in online learning classes using whatsapp groups in less and fine categories, are higher than offline learning classes using teaching videos. In online learning class, students have difficulty understanding the learning material. This is in line with Hutauruk & Sidabutar

findings [5], According to respondents, online learning class are not optimal, because the explanations given by the lecturer via chat or comments are not easy to understand, and are limited in delivery. Effective online learning activities carried out as learning activities must use adequate internet network so that they can be connected online [16]. In remote areas that are isolated from the internet network, online learning will be hampered in its implementation. This is in line with the findings of Kusumaningrum [17], that as many as 69% of research subjects have difficulty in accessing the internet.

The delay in the implementation of online learning can cause new problems for students if it is not addressed immediately. Students will tend to be less active and interested in participating in online learning even though they are supported by adequate infrastructure [7]. This is in line with the findings of Atiqoh [18], that 50% of parents think that online learning makes their children bored quickly.

In the good and excellent categories, students' learning outcomes in learning class using teaching videos are higher than in online learning class. This is due to several things. First, videos make it easier for students to repeat lessons. When students forget the subject matter, they can play back the existing video [19]. Videos help students to re-listen to parts of the material that they think need to be elaborated, repeated, or better understood. Students can understand the subject matter better because of this repetition process. This is in line with the findings of Hamdanillah [20], that the use of videos can hone students' initial ability to understand learning materials and improve their thinking skills. Second, the use of video in learning is considered as a tool to improve distance learning system in particular, and as a solution to problems related to social aspects and the learning process [21]. The advantages of video media in learning include being able to attract more attention, even if it is of a short duration. Demonstrations of complex work processes can be prepared and pre-recorded, so the teacher can focus on the presentation [22]. This is in line with the findings of Hafizah [13], that the use of video in physics learning is effective for improving students' learning outcomes and encouraging students to be more active in learning process. The use of media in the learning process can deepen students' understanding and make learning activities more meaningful. Learning videos are one of the media that can help teachers in the learning process [23]. Third, the process of distributing videos in learning classes does not require an internet network. So that all students can play videos without depending on the internet network, can play videos repeatedly without having to experience buffering problems. This is in line with the opinion of Batubara & Batubara [24], that the distribution of tutorial videos should be through offline media so that students are not financially burdened when accessing tutorial videos.

## CONCLUSION AND SUGGESTION

The use of teaching videos can make it easier for students to understand in studying physics on the temperature and heat material. Students can play videos without having internet access. There is a difference in the average student learning outcomes between class using teaching videos and online class using whatsapp groups. The average student learning outcomes in learning class using teaching videos are higher than those in online learning class. The use of teaching videos can be applied as an alternative to learning during the pandemic in areas with inadequate internet access. The implementation of online learning must be prepared as well as possible by teachers, students and parents during the learning process. The availability of infrastructure must be taken into consideration, so new problems do not arise in the learning process.

Although the average learning outcomes in learning class using teaching videos are higher than those in online learning class, there are still 10.26% of students who are in the less category. This should be a concern for further research, in order to help students who are in the less category. On the other hand, the learning process using teaching videos cannot measure students' psychomotor and affective abilities, so it is necessary to develop separate instruments to measure these two aspects.

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