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Practicum Model Using Gadget Facilities to Develop Students' Concept Understanding

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Abstract

This study discusses the utilization of gadgets used for virtual practicum in order to obtain data on students' conceptual understanding in physics subjects with electricity material. This study aims to determine the understanding of students' concepts in physics subjects. Student understanding of concepts was obtained by comparing knowledge before and after the treatment is carried out. This type of research was quantitative research, with sample of class XII MIPA MAN Kendal students. Data processing techniques used pretest data and posttest data between the experimental class and the control class. The average result of the experimental class was 0.28 with the low N-gain category and the average control class was 0.16 with the low category. However, the average N-gain in the experimental class is close to the medium category, thus the average level of understanding of the concept in the experimental class is higher than that of the control class.

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INTRODUCTION

In 2020 Indonesia slumped because of the arrival of the covid-19 outbreak which had such a big impact on all fields in Indonesia today. The education sector is one of the areas affected by the COVID-19. Learning had to be paralyzed and stopped for some time for the good of all school members so that the epidemic would not spread further. Schools, which are usually carried out face-to-face between teachers and students, have to stop for a moment and be replaced by other learning methods (Syaputral & Jannah, 2019). The use of online learning methods is an alternative to be able to continue the teaching and learning process during the pandemic. The use of smartphones and laptops are tool to help implement this learning. There are various methods used by teachers to transfer knowledge to students, starting from using zoom meetings, Google meet, video calls and many more.

The rapid development of science and technology around the world has now made the professionalism of educators not only limited to the ability to teach students, but also to manage information and the environment to facilitate student learning activities, one of which is by enriching learning resources and media. (Rahmawati, 2016). The existence of the Covid-19 pandemic which hampers the learning process in schools can be replaced by utilizing smartphone technology and media, which are mostly owned by students. The internet network in Indonesia is also getting better and more stable. Smartphones that are used for the learning process can of course access all the knowledge needed, one of which can do virtual practicum using this media.

The experimental method is needed in the physics learning process to help students understand existing physics concepts. In addition to understanding concepts, experiments can also be used to measure students' skills in the material being taught. Ummi & Mursal (2017) said that the experimental method is one of the methods used to increase students' understanding of science concepts in the learning process. The experimental method is better applied in learning because students are more able to prove, see firsthand, and conduct their own experiments. The experiment trained students' foresight and accuracy, so that they identified a better understanding of the material in the learning process (Kholifudin, 2012; Saraswati, et al. 2018).

The use of media in the form of virtual practice can be a very appropriate solution in the online learning process during the Covid-19 period, so that students can easily carry out independent practicums at home (Uriel, 2019). Smartphones that are increasingly sophisticated and offer a wide variety of applications are one of the tools that can be used in online practicums so that students can understand and obtain the information they want to get from these practicums (Rabek, M & Zakova, K, 2017). The results of a survey conducted by the Association of Indonesian Internet Service Providers (APJII) in 2016, out of a total of 256.2 million Indonesians there were 132.7 million Indonesians using the internet, this shows an increase in internet usage compared to 2014 which was only 88 .1 million population (Ansari, 2016). Of these, 84.6 million internet users use smartphones, in this case Waiwai Marketing revealed that Android occupies the largest market share in Indonesia, namely 94%, while iOS only accounts for 6% (Rachman, 2015). The reason for using the internet to get information such as education has users of 12.2 million. One of the benefits of a smartphone is that there are educational applications to support the learning process. This research has benefits for students in the form of being more enthusiastic in carrying out the learning process when Covid 19 hit and students can still carry out practicums even online. Smartphones also have many benefits for students in carrying out physics learning. Practicum during a pandemic can be done using a smartphone. So, students can still do practicum even though learning is carried out remotely.

METHODS

The type of research used in this research is quantitative research. Cresswell (2014) quantitative is an approach used to test an objective theory by using testing the relationship between variables. Basically, the research variable is an object that is considered to be studied, so that information and data about the object can be retrieved for further conclusions to be drawn. This study uses two variables, namely the independent variable and the dependent variable (Sugiyono, 2016). After determining the independent variable and the dependent variable, then there are the stages of testing questions and processing data from students. The test begins with determining the homogeneity of a sample used in this study. Then test the instrument questions, this step was carried out to find out whether the questions are feasible or not to be used in research. The next stage is about the analysis of the ability to understand the concept. The level of ability to understand the concept is obtained from the percentage value of the cumulative scores obtained by students on all questions. The percentage score is calculated using the following equation.

$$P = \frac{n}{N} X\ 100\% \quad (1)$$

where:
P = percentage results obtained
n = number of scores obtained
N = total maximum score

Table 1. Categories of Presentation

Presentation	Categories
76 % ≤ P ≤ 100 %	Good
56 % ≤ P < 76 %	Fairly good
40 % ≤ P < 56 %	Not good
P < 40 %	Not good

The most recent test uses the calculation of the normalized gain score (N-Gain), which can be expressed in the following formula:

$$g = \frac{sf-si}{100-si} \text{x } 100\% \quad (2)$$

where *g* is normalized gain (N-Gain), *sf* is *Posttest score,* and *si* is Pretest score.

RESULTS AND DISCUSSION

Students' understanding of concepts can grow and develop in learning at school to obtain information from educators (Ningsih, 2017). This research aimed to find out students' understanding of concepts. then do a posttest after learning with the gadget application for the experimental class and lecture model learning for the control class.

At the beginning of learning, apperception was conveyed to students. The purpose of the learning apperception was to provide a stimulus to students on the concept of electricity. Implementation of learning in the control class was carried out by conveying the concept of electricity using the lecture method via online via zoom meetings. When control class using the online lecture method, during the online learning process students were asked to pay attention to the teacher's delivery when conveying the concept of electricity. After being given the material, students were asked to work on the posttest questions. The posttest questions were given with the aim of knowing students' conceptual understanding of the concept of electricity. The average posttest results in the control and experimental classes are shown in Table 2.

Table 2. The average value of the control and experimental class posttest

Class	*Posttest* Average
Experiment	75.92
Control	61.84

Based on Table 2, it is known that the average posttest scores in the experimental class and control class show that the experimental class has a higher average than the control class. The experimental class obtained an average of 75.92, while the class 61.84. The results of the posttest in the experimental and control classes were also analyzed for the posttest normality test. The normality test analysis in this study aims to determine whether the data that has been obtained is normally distributed or not. This normality test was performed using the Kolmogorov-Smirnov analysis. The results of the analysis are in Table 3.

Table 3. Kolmogorov-Smirnov *Posttest Normality Test*

Class	Statistics	df	Sig
Control	0.164	38	0.011
Experiment	0.197	38	0.001

Based on Table 3, it is known that the posttest normality test results for the experimental and control classes have normal data. This is because the value of the control class statistic (0.164) and experiment (0.197) is more than 0.05 so that the posttest results are normally distributed. After analyzing the normality test, the independent samples test was carried *out*. The results of the test analysis are shown in Table 4.

Table 4. The analysis of independent samples test

Result	F	Sig	t	Sig. (2-tailed)
Equal variances assumed	2.219	0.141	10.134	0.000
Equal variances not assumed			10.134	0.000

Table 5. Results of N-gain analysis

Criteria	Class	
	Experiment	Control
Low	15	25
Currently	23	13
Tall	0	0
N-Gain Average	0.28	0.16

Based on Table 4, it can be shown that the results of the independent samples test analysis were used to determine differences in conceptual understanding between the experimental and control classes after being given treatment. The result of the analysis is that there are two t values and a significance level in the form of *variance assumed* (identical population) and *equal variance not assumed* (population not identical). Since the value of Sig. (2-tailed) on Equal variances assumed 0.000 is less than 0.05, it is stated that between the experimental class and the control class after being given treatment have a different understanding of the concept. After the treatment, the students' understanding of the concept in experimental class is higher compared to the students' understanding in control class due to differences in the media used in the learning process. According to one of the students from MAN Kendal, learning with the application that has been presented is very interesting. Therefore, it can motivate students in learning physics. With this motivation, students' understanding of physics concepts is better.

Once it is known that students' understanding of concepts in the experimental class was better than that of the control class, an N-gain analysis was performed. The N-gain test in this study was used to determine how much students' understanding of concepts increased in the experimental class and the control class. The results of the N-gain calculation are in Table 5.

Table 5 shows the average *N-gain* of the understanding concept between the experimental class and the control class. The results of the N-gain analysis in the experimental class were 0.28 in the low category, while in the control class the results were 0.16 in the low category. Judging from the analysis, it shows that the understanding of concepts in the experimental class is higher than that of the control. This shows that the gadget application applied to the experimental class helps improve students' understanding of concepts.

CONCLUSION

The use of the practicum model using gadget facilities was used to find out students' understanding of concepts during the Covid-19 pandemic. The practicum was carried out virtually using gadgets to make it easier for students to learn concepts and try to practice. Data analysis using various tests shows that the method is effective. The experimental class obtained 0.28 in the medium category, and the control class 0.16 in the low category in understanding the concept.

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