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The Effect of Online Learning on Students' Learning Achievement on Colloid Concept

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ABSTRACT
The era of the Covid-19 pandemic has encouraged learning to take place online. The development of technology and information was increasingly advanced to support online learning. This study aimed at describing the effect of online learning on high school students' learning achievement. This type of research was a quasi-experiment with a nonequivalent control group design. The population in this study was all students of the eleventh-grade students majoring in Mathematics and Natural Science at Public High School 1 South Kuta, Badung, Bali, Indonesia. The samples were selected using a cluster random sampling technique. An experimental group 1 was taught by online learning of Google Classroom, while an experimental group 2 was taught by online learning of WhatsApp group. The data were collected by giving tests before and after learning. Data were analyzed by descriptive and inferential statistics. The results showed that students' learning achievement taught by online learning of the Google Classroom was better than that of the WhatsApp group. The online learning has a positive impact on students' learning achievement.

Keywords: Google Classroom, learning achievement, online learning, WhatsApp group

1. INTRODUCTION

The Covid-19 pandemic is currently sweeping the entire world. The Covid-19 pandemic has greatly affected the education sector. The government issued circular number 4 of 2020 years as an effort to prevent the spread of Covid-19. The circular contains the implementation of learning carried out from home [1]. Based on these conditions, the teacher must continue to ensure that learning activities can be carried out properly. This pandemic condition requires learning to be done online. The teacher as a facilitator must be able to create innovative learning so that students learn fun [2].

The online learning can be supported by learning applications that have developed at this time so that the learning process can be carried out properly. The online learning applications are currently very important to be utilized in the learning process because technology is increasingly sophisticated [3]. The online learning is effective because learning can be done anywhere and anytime by utilizing modern technology that has developed [4]. The online learning is growing rapidly along with the advancement of technology and information [5]. The use of technology in online learning is expected to improve the skills of teachers and students so that learning is more effective and learning objectives are well achieved [6].

The development of technology and information that is getting faster has an impact on the learning process [7]. Increasingly sophisticated technology can be used in the online learning process. Many online learning applications can support the learning process. Several learning applications that can support online learning are Google Classroom, WhatsApp group, zoom cloud meetings, Cisco WebEx meetings, Google meet, Schoology, and many other applications [8]. The learning application certainly has its advantages and disadvantages [9].

This study used Google Classroom as an online learning application to support the learning process. Google Classroom is a free application developed by Google that aims to support the learning process [7]. Google Classroom has several advantages, including facilitating interaction between teachers and students or students and students, reducing paper usage (paperless), learning features, and more flexible learning [7],[9]. Online learning using Google Classroom can change learning to

be student-centered, increase students' learning motivation, think creatively, and improve problem-solving skills [5]. Based on this, this study aimed at describing the effect of online learning on students' learning achievement.

2. METHODOLOGY

This type of study is a quasi-experimental research, because not all the variables that arise and the experimental conditions can be strictly regulated and controlled. The research design used was the nonequivalent control group design. The research design of the nonequivalent control group design is a research design that provides a pretest without randomly selecting either the experimental group 1 or the experimental group 2 so that the treatment results can be known more accurately. Before starting the learning process, both groups were given a pretest which aimed to determine the extent to which the two groups had prior knowledge. After being given treatment in the form of learning, the two groups were given a posttest which aimed to determine the learning achievement of the two groups after learning.

The population of this study was all students of grade XI in Mathematics and Natural Science at Public High School 1 South Kuta, Badung, Bali, Indonesia. The samples were selected using cluster random sampling technique. The experimental group 1 is a class that was taught by online learning of Google Classroom, while the experimental group 2 is a class that was taught by online learning of WhatsApp group.

The instrument used in this study was a test of students' learning achievement. The tests used in this study were pretest and posttest. It used was the test that can measure students' learning achievement in the cognitive domain. The learning achievement test used in the pretest and posttest sessions are the same. The type of test used was an objective test (multiple choice) which is given online using the Google form.

The data obtained in this study were students' learning achievement scores. These data were analyzed using descriptive statistics and analysis of covariance (ANCOVA). All analysis of descriptive and inferential statistics were carried out with the help of SPSS software at the 5% significance level.

3. RESULTS AND DISCUSSION

In this study, the experimental group 1 was taught by online learning of Google Classroom and the experimental group 2 was taught by online learning of WhatsApp group. The learning achievement data obtained were in the form of pretest and posttest scores of the experimental group 1

and the experimental group 2, respectively. A descriptive statistical analysis produced a summary of students' learning achievement based on pretest and posttest scores (Table 1).

Table 1. Summary of student's pretest and posttest scores

Data	Statistics	Experimental group 1	Experimental group 2
Pretest	Lowest score	4.0	8.0
	Highest score	48.0	44.0
	Mean score	26.1	23.8
	Standard deviation	12.7	11.0
Posttest	Lowest score	56.0	52.0
	Highest score	92.0	84.0
	Mean score	74.8	68.7
	Standard deviation	10.0	9.5

Based on Table 1, the posttest mean score of experimental group 1 is 74.8, while the experimental group 2 is 68.7. The results showed that the mean score posttest of the group was taught by online learning of Google Classroom was higher than that was taught by online learning of WhatsApp group.

The data analysis technique used for hypothesis testing is the analysis of covariance (ANCOVA). Before testing the hypothesis, assumption tests were carried out which consisted of a normality test, a homogeneity test of variance between groups, a linearity test, and an interaction test. The results of data analysis on students' learning achievement using the ANCOVA technique were presented in Table 2.

The result of the analysis showed that the significance value was 0.042 (<0.05) so that H0 was rejected or H1 was accepted. This indicated that students' learning achievement taught by online learning of the Google Classroom was better than that of the WhatsApp group. The online learning has a positive impact on students' learning achievement [4], [10]-[12]. The online learning is effective because the learning can be done anywhere and anytime by utilizing modern technology that has developed [4]. The use of technology in online learning is expected to improve the skills of teachers and students so that learning is more effective and learning objectives are well achieved [6]. The online learning can increase motivation and student's learning achievement because the online learning can create a learning process that is fun, student-centered, and flexible [2], [13]. The online learning can improve students' critical thinking skills, creative thinking skills, and improve problem solving skills [5], [14].

Table 2. Hypothesis test results

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3352.751a	2	1676.376	33.005	0.000
Intercept	45897.316	1	45897.316	903.647	0.000
Pretest	2758.105	1	2758.105	54.303	0.000
Learning	218.730	1	218.730	4.306	0.042
Error	3047.471	60	50.791		
Total	331985.000	63			
Corrected Total	6400.222	62			

In this study, the online learning of Google Classroom better than the online learning of WhatsApp group because Google Classroom has features that are structured to support the learning process. A virtual classroom is an online classroom that allows participants to communicate with one another, view presentations or videos, interact with other participants, and engage with resources in work groups [15].

The Google Classroom application can be used on computers, laptops, or cellphones. Google Classroom is designed for facilitating the interaction of teachers and students in cyberspace. This application delivers opportunities for teachers to explore students' scientific ideas. The online learning using the Google Classroom provides new experiences for students in the learning process so that it makes students enthusiastic and motivated to learn [5], [7], [16].

Google Classroom is considered as one of the online learning platforms that can support learning because this platform can be easily understood by students and teachers [15]. Google Classroom has structured features allowing users to create virtual classrooms so that the Google Classroom is effectively to support the learning process [5]. Learning using Google Classroom can create learning convenience for students and teachers [7]. The use of Google Classroom in online learning is an effort to simplify and streamline time so that its application can have a positive impact on students' learning achievement [9]. Some of the advantages of using Google Classrooms are as follow, including being able to create virtual classrooms, easier access, easier assignment delivery, reducing paper usage (paperless), easier access to materials and assignments given by the teacher, being able to be in a virtual classroom anytime and anywhere, receiving feedback assignments that have been created, sharing resources related to learning, being easy to obtain, use storage time, direct storage via Google drive, and viewing other materials or documents at any time [5], [7], [17], [18].

4. CONCLUSION

The online learning has a positive impact on students' learning achievement. The students' learning achievement taught by online learning of the Google Classroom was better than that of the WhatsApp group. The online learning using the Google Classroom provides new experiences for students in the learning process so that it makes students enthusiastic and motivated to learn. The Google Classroom used in online learning is an effort to simplify and streamline time so that its use can have a positive impact on students' learning achievement

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