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The Effectiveness of Google Classroom on Students' Biology Learning Outcomes during the Covid-19 Pandemic Era

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ABSTRACT

This research aimed to determine the effectiveness of Google Classroom learning on the learning outcomes of students of STKIP Pembangunan Indonesia at the Biology Study Program. The benefit of this research is that the results are expected to contribute to the teaching and learning process that lecturers will carry out, especially the application of the Google Classroom in improving students' learning outcomes. The researchers employed the quantitative approach with a pre-experimental design of one group pretest-posttest, which provided a pretest before the treatment. After the treatment, the researchers administered a posttest on the Vertebrate Zoology course. The data collection technique applied in this research was a description test administered during the pretest and posttest. This research found that the students' learning outcomes in the pretest were 36% in the completeness level. There was an increase in the posttest with a 72% completeness level. The results of hypothesis testing using an independent sample t-test obtained t_{count} value of 3,149, which was higher than $t_{observed}$ of 1.67. The results showed that students' learning outcomes after using Google Classroom were significantly better than before the application of Google Classroom. This research proved that Google Classroom was an online learning method that can improve the quality of education, especially students' learning outcomes, and could overcome the constricted learning process with the availability of actual classrooms.

Efektifitas Pembelajaran Biologi Berbatuan *Google Classroom* Terhadap Hasil Belajar Mahasiswa di Era Pandemi Covid

ABSTRAK: Tujuan penelitian ini adalah untuk mengetahui efektifitas pembelajaran Google Classroom terhadap hasil belajar mahasiswa prodi pendidikan biologi FMIPA STKIP Pembagunan Indonesia. Manfaat dari penelitian ini adalah Penelitian ini adalah diharapkan dari hasil penelitian adalah hasil penelitian ini diharapkan dapat memberikan kontribusi dalam proses pembelajaran yang akan dilakukan oleh dosen, khususnya penerapan aplikasi Google Classroom dalam meningkatkan hasil belajar mahasiswa. penelitian kuantitatif dengan menggunakan metode pre-experimental design tipe one group pretest-posttest (tes awaltes akhir kelompok tunggal) yang memberikan tes awal (pretest) sebelum

diberikan perlakuan, setelah diberikan perlakuan memberikan tes akhir (posttest) pada mata kuliah Zoologi Vertebrata. Teknik pengumpulan data dalam penelitian ini yaitu menggunakan tes esay yaitu pretest dan posttes. Hasil penelitian ini hasil belajar mahasiswa pada pretest dengan tingkat ketuntasan 36% mengalami peningkatan pada postest dengan tingkat ketuntasan sebesar 72%. Hasil uji hipotesis dengan uji t sampel independen diperoleh nilai thitung 3,149 lebih tinggi daripada t-tabel 1,67 yang menunjukkan hasil belajar mahasiswa setelah penggunaan aplikasi Google Classroom tersebut lebih baik secara signifikan dibandingkan mahasiswa sebelum penerapan aplikasi tersebut. penelitian ini membuktikan bahwa Google Classroom merupakan metode pembelajaran online yang dapat meningkatkan kualitas pendidikan terutama hasil belajar mahasiswa dan mampu mengatasi proses pembelajaran yang dibatasi oleh ketersediaan ruang kelas.

INTRODUCTION

The covid-19 pandemic has dramatically affected the order of life. The term pandemic in the Indonesian dictionary is an epidemic that spreads simultaneously everywhere, covering a wide geographical area. Since the first time this virus was detected in Wuhan, China, in December 2019, the outbreak has spread throughout the world. WHO has declared the Covid-19 virus outbreak a global pandemic (Abid Azhar & Iqbal, 2018).

The impact of the pandemic has changed almost every sector. Education is one of the sectors affected by it. The face-to-face learning that has been done for years must be replaced with distance learning. Learning that was initially connected lecturers and students through face-to-face settings must be done remotely through online education (Khoiroh Ni'matul, Munoto, 2017)

The physical and mental health of students, lecturers, and all campus residents are the primary consideration in implementing social distancing policies to break the spread of COVID-19. It is also one of the considerations for the Minister of Education and Culture of the Republic of Indonesia to issue Circular No. 4 of 2020. The policy makes schools perform teaching and learning from home. To produce meaningful learning, lecturers must be good at choosing the proper methods and media. The application of online learning is an alternative to prevent the spread of Covid-19. Online-based learning is the proper learning for now. One of the factors that are discussed in this learning is being able to facilitate broader, varied, and more exciting learning (Deviyanti, 2020; Yasin et al., 2019)

One form of online learning is through a learning management system (LMS). LMS is a system that can facilitate students to learn more broadly and more varied. Students can learn anytime and anywhere through learning facilitated by the system without being limited by space and time. LMS is software designed to create, distribute, and manage the delivery of learning materials. This system can help lecturers plan and create a syllabus, manage learning materials, manage student activities, manage grades, recapitulate attendance, display learning outcomes, hold a discussion, and administer quizzes. Also, learning with this system can motivate lecturers to understand information technology (Ibrahim & Suardiman, 2014).

Students will also try to learn independently by developing material that has been delivered by the lecturer assisted by other references to support the material. LMS can be attractive by applying Google Classroom. Google

Classroom-based LMS is an application that can help in the learning process. The application is flexible, easy to learn, and applicable to all subjects. This application also has various features and facilities that can be used for distance learning (Suryani, 2010).

In May 2014, Google announced a new Google app called Google Classroom. Google Classroom is considered the best platform for existing applications. The Google Classroom-based LMS is available as a tool for developing teaching and learning processes worldwide. Google Classroom is an application that can be used as an LMS and is flexible. This application can be implicated in scientific learning materials related to information and communication technology. This application is designed to facilitate the interaction of lecturers and students in cyberspace. Google Classroom provides an opportunity for lecturers to explore students' scientific ideas. Lecturers have the flexibility to share scientific studies and independent assignments with students. Lecturers can also open online discussion rooms for students (Sudjana, 1987; Wahyuni et al., 2019)

Google Classroom is designed for several users, namely teachers, students, and administrators. Teachers can create and manage classes, assignments, grades and provide real-time feedback. Students can monitor assignments and materials. Administrators can use it to get an email summary regarding student assignments. Google Classroom is valuable for lecturers to create and share assignments quickly and save time. Likewise, students will find it easier to do assignments anywhere and anytime. Various efforts were made to determine and select innovative learning to produce maximum learning outcomes, even in the current situation. Innovative learning needs to be done to get a better learning output than before. However, there are various challenges and developments in technology (Latif, 2017)

According to research presented by (Hamka & Vilmala, 2019), Google Classroom makes it easier for lecturers to carry out learning and deliver information precisely and accurately to students. Lecturers can take advantage of various features found in the Google Classroom such as assignments, grading (assessment), communication, time-cost, archive course, mobile application, and privacy. The use of learning applications with Google Classroom also makes it easier to evaluate the implementation of learning. Through online learning, students will feel comfortable and active in building their knowledge.

According to research by (Nirfayanti & Setyawan, 2018), mathematics learning using Google Classroom can improve students' learning outcomes. In line with research conducted by (Rikizaputra & Sulastri, 2020), Google Classroom can take advantage of electronic technology services and computers, use independent teaching materials, and take advantage of learning schedules and curriculum. Materials can be presented in graphics, text, and other multimedia. The teaching materials are relatively easy to update and can increase interaction between teachers and students. Communication is conducted simultaneously through video conferences, chat rooms, or discussion forums.

Based on the background, the researchers identified the problem: the effectiveness of Google Classroom on students' learning outcomes at STKIP Pembangunan Indonesia. The objectives to be achieved in this research are to determine the effectiveness of the Google Classroom on students' learning outcomes. In this research, the students were expected to apply the Google Classroom to gain new knowledge and experience. The expected benefit from the

research results is that the results of this research are expected to contribute to the teaching and learning process that will be carried out by lecturers, especially the application of the Google Classroom in improving students' learning outcomes, activities, thinking power, and understanding.

The interesting thing in this research was integrating Google Classroom and several ICT-based learning media, such as learning videos from the Phet application and other learning videos in the Vertebrate Zoology course. There was a remote practicum with the lecturer as a facilitator during several meetings. The students observed the practical demonstration of various animals in the vertebrate category. The students were also be guided by lecturers and could discuss the practicum material.

METHOD

This research was quantitative research using a pre-experimental one-group pretest and posttest. The independent variable in this research was Google Classroom, and the dependent variable was students' learning outcomes. This research used one class. The pretest was administered before implementing the Google Classroom, and the posttest was administered after the application was implemented. The design of this research is shown in the table below:

Table 1. One Group Pretest Posttest Design

X1	**O**	**X2**

Source: (Sugiono, 2011)

Information:
X1 : Pretest
O : Google Classroom treatment
X2 : Posttest

The population of this research was all students of the Biology Education Study Program, STKIP Pembangunan Indonesia, which consisted of 185 students. The researcher determined the sample of this research, namely 29 fourth-semester students in the 2020/2021 academic year who took the Vertebrate Zoology course.

The research instrument was a test to measure the students' level of mastery. The test was a description test consisting of ten items. Two experts had validated the test. The scheme for assessing students' learning outcomes is shown in the table below:

Table 2. Students' Learning Outcomes Categories

Interval	Category
0 – 20	Poor
20 – 40	Low
41 – 60	Moderate
61 – 80	High
81 – 100	Excellent

The working procedure of this research began by determining the population and sample. After that, the test instrument was adapted to various aspects of Bloom's taxonomy. After the instrument test had been completed, it was then validated by two experts. The validated test could be used to measure the cognitive aspects of students in the pretest and the posttest. The researcher then applied the Google Classroom for three weeks. While implementing the application, the researcher added several supporting task materials, namely identification of vertebrate animals and reflective discussions among peers.

The data analysis technique in this research was a questionnaire using validity testing. The researchers employed the Pearson product-moment validity test by collaborating each questionnaire item score with the total

score of respondents' answers. The reliability testing in this research was assisted by IBM SPSS assistance to perform the Cronbach's Alpha calculation. The questionnaire is reliable if the Cronbach's Alpha value is higher than 0.6 (Sugiono, 2016).

Testing the validity of the test instrument was assisted by the SPSS for Windows Version 17.0 program. The validity testing was only carried out on 20 respondents in this research. The decision making was based on the value of r_{count} (Corrected item-total Correlation) > r_{count} of 0.378, with df = 20–2 = 18; = 0.05. Therefore, out of 15 tested items, ten items are declared valid. A variable is reliable if the answers to questions are always consistent. So, the result of the reliability coefficient of the instrument was $r_{11} = 0.929$, and the learning outcome test instrument was $r_{11} = 0.947$; both had a "Cronbach's Alpha."

RESULTS AND DISCUSSION

This research was conducted from April to June 2021. The pretest was conducted at the second meeting on April 20, 2021. The pretest data were processed using the SPSS for Windows Version 17.0 program. The analysis result can be seen in Table 3.

Table 3. Distribution and Frequency of Pretest

No	Value Interval	Category	Meeting I	Average	Percent (%)
1	0 – 20	Poor	0	0	0%
2	20 – 40	Low	6	6	24%
3	41 – 60	moderate	12	12	40%
4	61 – 80	High	10	10	32%
5	81 – 100	Excellent	1	1	4%
Total			29		100%

The table shows the learning outcomes category for the pretest. The percentage of the average score of 0 was 0%. The percentage in the low category was 24%. The average score of 12 was 40% in the moderate category. The average score of 10 was obtained by 32% in the high category. The average score of 1 was 4% in the excellent category.

A posttest was administered after the treatment was held on July 18, 2021. The data was then processed using SPSS software for Windows Version 17.0. The result can be seen in Table 4.

Table 4. Distribution and Frequency of Posttest

Value Interval	Category	XIV meeting	Average	Percent (%)
0 – 20	Poor	0	0	0%
20 – 40	Low	3	3	8%
41 – 60	moderate	5	5	20%
61 – 80	High	12	12	48%
81 – 100	Excellent	9	9	24%
Total		**29**		**100%**

The table shows the learning outcomes category for the posttest. The percentage of the average score of 0 was 0%. The average score of 3 was 8% in the low category. The average score of 5 was 20% in the moderate category. The average score of 12 was 48% in the high category. The average score of 9 was 24% in the excellent category. The category comparison of frequency between pretest and posttest is presented in Table 5.

Table 5. Distribution Table of Frequency Comparison of Pretest and Posttest

Statistics	Pretest	Posttest
Subject	29	29
Ideal Value	100	100
Average value	59.31	77.45
The highest score	83	90
Lowest Value	30,50	35,10
median	57.33	77.03
Mode	57	80
Standard Deviation	11.65	7.35

Based on the table above, there was an increase in posttest seen from the frequency values. Thus, Google Classroom was more effective in increasing the frequency of students' learning outcomes. The comparison can also be seen in the following diagram.

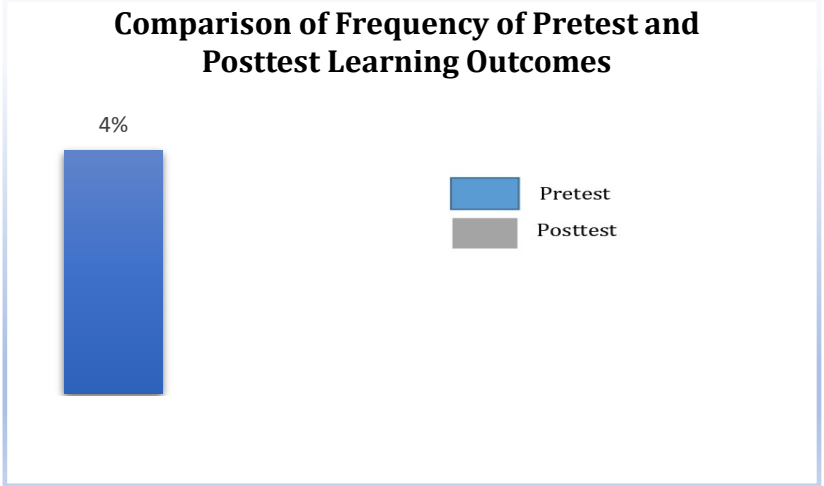

Figure 1. Bar Chart Comparison of Statistical Values of the Highest Learning Outcomes in the Pretest and Posttest

Table 6. Comparison of The Distribution of the Level of Mastery in Pretest and Posttest

Category	Complete Percentage (%)	Not Complete Percentage (%)
Pretest	36%	64%
Posttest	72%	28%

The results showed that Google Classroom could improve students' learning outcomes. Based on the table above, the complete percentage value was 36% in the pretest and the incomplete percentage value of 64%. In the posttest, the completed percentage value was 72%, and the incomplete percentage value was 28%. The comparison of the level of completeness of student learning outcomes can be seen in the following bar chart:

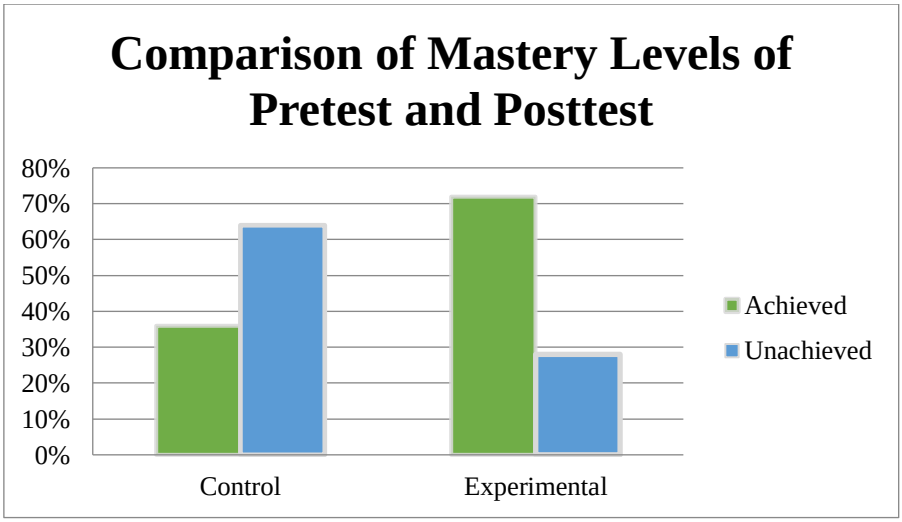

Figure 2. Bar Chart Comparison between the Pretest and Posttest

A normality test is used to determine whether the data is normally distributed or not. To test the normality of the data, the researchers used SPSS 25 for Windows software. The data is declared normally distributed (H_0 is accepted) if the sig. Value in the Shapiro-Wilk test is more than the predetermined alpha level (p-value > a = 0.05). Based on the normality test results, the p-value of the Shapiro-Wilk test was more than 0.05. Since the value in the experimental class was more than 0.05, the data in this research came from a normally distributed population.

The researchers performed the homogeneity test with the help of SPSS 25 software for Windows. The data are homogeneous (H_0 is accepted) if the sig. The variance value is more than alpha level (a) = 0.05. The analysis results can be seen in Table 7 and Table 8.

Table 7. Normality Test Result

Variable	Pretest	Posttest	Description
Learning outcomes	0.753	1,249	Normal

Table 8. Homogeneity Test Result

Variable	Levene Statistics	P-Value	Description
Learning outcomes	1.416	0.281	Homogeneous

The significance value was 0.450. The data was homogeneous because the significance (0.450) was higher than 0.05.

The hypothesis testing measured the effectiveness of Google Classroom based on the increase in pretest and

posttest. The independent sample t-test was employed assisted by SPSS 25 software for Windows.

Table 9. Hypothesis Test Result

Group	t_{count}	$t_{critical}$
Experimental	3.149	1.67722

Based on the hypothesis testing, the t_{count} value was 3,149, and the $t_{critical}$ value was 1.67722. The researchers found that H_0 was rejected and H_1 was accepted by comparing both values. Thus, Google Classroom effectively improved learning outcomes for fourth-semester students in the Vertebrate Zoology Course. Based on descriptive analysis, Google Classroom influenced students' learning outcomes, indicated by the average posttest score (77.45) and posttest (59.31).

Google Classroom applied to the Biology Study Program students in the Invertebrate Zoology Course could overcome the problems. The inferential analysis also shows the same facts based on the independent sample t-test with a significance level of $a = 0.05$. The t_{count} value was 3,149, which means that H_0 was rejected. Thus, Google Classroom was more effective and had a higher effect on learning outcomes.

The results of this research are in line with research by (Salamah, 2020). She found that Google Classroom can attract students to show a very responsive interest in learning. They are also enthusiastic about the application. The learning atmosphere becomes more interactive during the teaching and learning process and can arouse their interest in the material.

The research results are also reinforced by (Rikizaputra & Sulastri, 2020), who prove through their research that Google Classroom is an online learning method that is intended to improve the quality of education to overcome the learning process that is limited by the availability of classrooms. Students can be invited to a classroom in several ways: through the institution's database and a private code. With this application, assignments can be created and assigned through the Gmail application and then forwarded to the Google Classroom (Sabran & Sabara, 2019).

Through Google Classroom, lecturers can discuss with students during the online learning process. The researchers observed several aspects of the learning process from the research results, including the aspects of communication and discipline in doing and collecting the assignments. The process began with an introductory stage, where the students were involved in finding out the features available in Google Classroom. At this stage, the students actively participated in finding and providing sources of information in articles, tutorials, and others related to the use of Google Classroom.

The first test using this method went smoothly even though there were technical problems related to the internet network (Nirfayanti & Nurbaeti, 2019). However, all students could use the features provided by Google Classroom. The students were involved in finding out the features available in Google Classroom. At this stage, the students actively participated in finding and providing sources of information in articles,

tutorials, and others related to the use of Google Classroom.

The lecturers created a class in the implementation stage, and students joined the learning process. According to (Muslik, 2019) and (Sadiman, 1984), this stage is carried out by providing learning materials such as PowerPoint, videos, flash, textbooks, and questions for students. Students actively conducted discussions related to the material presented in the learning process. Some students asked questions, and some students commented on the questions asked. The last stage was the evaluation stage, where the lecturer assigned an assignment for the students to be collected at the specified time. The researchers noted that the students' discipline to submit assignments was highly satisfying from the observations. It was in line with the aim of this research which was to increase students' activity and discipline during the learning process.

CONCLUSIONS AND SUGGESTIONS

Based on the results and discussion, learning using Google Classroom effectively improves Biology Education Study Program students' learning outcomes at FMIPA STKIP Pembangunan Indonesia. It is suitable to be applied to the Vertebrate Zoology course. Based on the fulfillment of the completeness category, the students obtained 36% in the pretest and 72% in the posttest. It is suggested that further researchers further optimize the Google Classroom features used in learning.

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