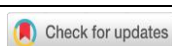# Analysis of the Effectiveness of Using Google Classroom and Science Learning During the COVID-19 Pandemic

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ABSTRACT

The rapidly widespread spread of COVID-19 in Indonesia has made the Indonesian government make policies, one of its policies is to carry out distance learning activities. This study aims to analyze the effectiveness of using Google Classroom in science learning during the COVID-19 pandemic. This research uses a literature study by reviewing 30 articles or journals published in the 2018-2022 period and comes from Google Scholar and several international journals that come from trusted and accountable websites. The data obtained will then be analyzed using qualitative analysis. The results showed that: (1) The use of Google Classroom is effectively used in science learning during the COVID-19 pandemic, (2) The advantages of using Google Classroom in science learning during the COVID-19 pandemic are that it can improve analytical skills, improve science literacy skills, and grow students' character in science learning, (3) The weakness of using Google Classroom in science learning during the COVID-19 pandemic is that students have difficulty in receiving material, especially those that require calculations such as mathematics, chemistry, and physics.

INTRODUCTION

The spread of the COVID-19 virus case in Indonesia continues to spread, impacting various aspects of life. COVID-19 is a new type of coronavirus, Sars-coV-2, which can be transmitted and was first discovered in Wuhan, China (Nafrin & Hudaidah, 2021). The story of the COVID-19 virus has a different ending in each country (Lee, 2020). In the conditions of the COVID-19 pandemic, the role and position of education have become very worrying (Wahyono et al., 2020). Various policies have been issued by the Indonesian government to reduce the spread of the COVID-19 virus (Herliandry et al., 2020). The government makes a policy, whereby the teaching and learning process is carried out at home through distance or online learning (W. A. F. Dewi, 2020).

Education is a lifelong necessity (Affandi et al., 2020) for anyone. Education is a forum for humans to develop into more qualified individuals who can think innovatively and creatively about the development of the times (Rahma & Agustin, 2021). Education becomes an important means (Gumay & Ali, 2019) of shaping active, and productive human resources (Romadon & Maryam, 2019). Education has a meaning of conscious effort to prepare students through preparation, teaching, and training activities in the future (Muliadi et al., 2020).

Learning is a very important thing in education (Saifulloh & Darwis, 2020). Learning is the interaction of important components between educators, learners, and sources of knowledge in one place (Sijabat et al., 2020). Online learning is formal education carried out by educational institutions whose students and educators are located in different or separate locations (Napaswati, 2020). Online learning can also be interpreted as a learning activity that uses interactive learning media provided for students (Nova et al.,

2021). However, despite certain restrictions, it is not an obstacle for students to continue learning (Ali, 2020) which can be done anywhere and anytime (Aristeidou & Herodotou, 2020). In online learning, an internet network is also needed (Efriana, 2021). Learning is taught by the teacher by memorization so students often do not get the essential essence of learning (Nuraini & Muliawan, 2020).

The nature of science does not only contain content but also contains the process (Gunawan et al., 2019). Science is one of the branches of science that is focused on studying nature and the processes that exist in it (Sugrah, 2019). Science learning is closely related to the knowledge gained from observation, proof, and experimentation using the scientific method (Rahmatih et al., 2020). Science learning emphasizes more on the process of forming skills in activities that gain knowledge as well as the development of scientific attitudes (Jalang Bayu Kelana et al., 2021). Science learning must be well prepared to improve student learning outcomes (Pritasari & Jumadi, 2018).

With the development of technology, learning activities do not have to be carried out in the classroom but can also be outside the classroom by utilizing an application, namely Google Classroom (Sutrisna, 2018). Google Classroom is a collaboration tool done by teachers and students for free (Abidin & Saputro, 2020) which can be used to create an online classroom, invite students to class and then create assignments and collect assignments (Okmawati, 2020). Google Classroom becomes a learning tool (Parwata & Sudiatmika, 2020) which helps facilitate education to improve the efficiency of teachers' work to more communication time with students (Suanse & Yuenyong, 2021). With the existence of learning media, it can be a solution or strategy to increase student interest and learning outcomes to be more effective (Maryam, 2019).

Based on the above background, this study aims to analyze the effectiveness of using Google Classroom in science learning during the COVID-19 pandemic through a literature study.

RESEARCH METHOD
This study used a literature study (Khairunnisa & Aziz, 2021) which aims to analyze the effectiveness of using Google Classroom in science learning during the COVID-19 pandemic. This research was conducted based on previous research (Kamaliya & Indana, 2022). This study reviewed 30 articles or journals published in the 2018-2022 period which discusses the use of Google Classroom in science learning during the COVID-19 pandemic and came from Google Scholar and several international journals from trusted and accountable websites. The data obtained will then be analyzed using qualitative analysis. The flow of research used in the study will be shown in **Figure 1.**
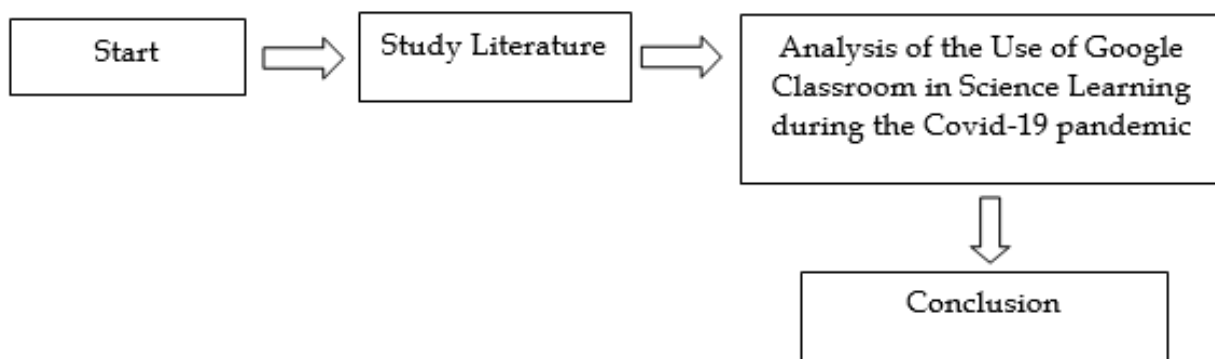

Figure 1. Research Flow

Figure 1. Explaining that the first flow is to find ideas for research, then look for 30 articles and national and international journals that discuss the use of Google Classroom in science learning during the COVID-19 pandemic. The next step is to continue analyzing the articles that have been obtained related to the use of Google Classroom in science learning during the COVID-19 pandemic and the last step is to draw the conclusions obtained after making the analysis.

RESULTS AND DISCUSSION

A summary of research on the use of Google Classroom learning media in science learning during the COVID-19 pandemic in the 2018-2022 timeframe is presented in **Table 1.**

Google Classroom Definition

Google Classroom is one of the educational apps or features provided by Google Apps For Education (GAFE) published on August 12, 2014 (Monalisa et al., 2021). Google Classroom serves as a means of distributing assignments, collecting, and grading collected assignments (S Putri, 2017). In addition, Google Classroom also provides several features such as a discussion forum so that educators can open class discussions that can be given feedback and can be commented on (Maman et al., 2021). In Google Classroom, uploaded materials can be saved again (Sipayung et al., 2022). In addition, there are evaluation materials that can measure students' understanding of the material provided (Saputra & Fahrizal, 2019). Google Classroom was created so that interaction between educators and students can be more efficient and can save time (Fitriningtiyas et al., 2019).
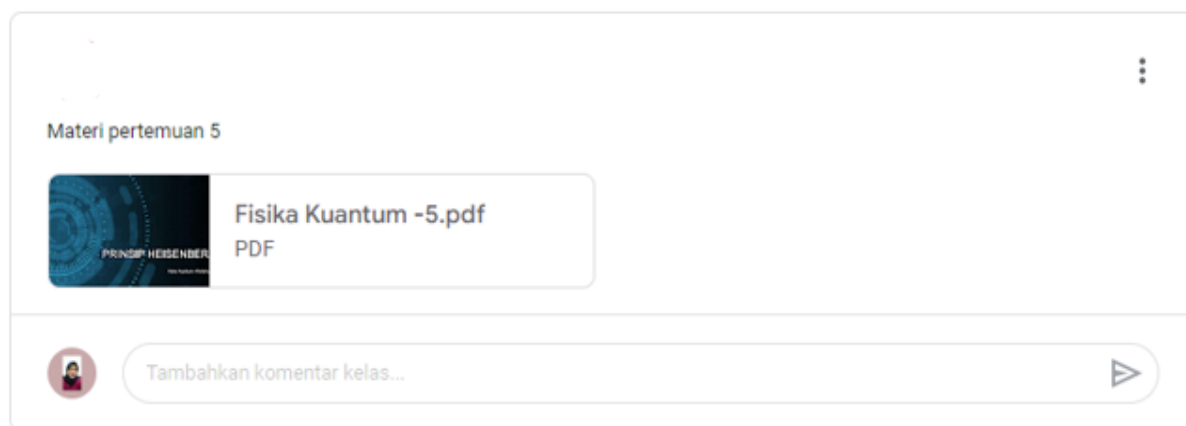

Figure 2. Google Classroom view

Figure 2. Demonstrate the use of Google Classroom in classroom learning during the COVID-19 pandemic. Teachers can send material that will be studied or has been learned in learning during teaching and learning activities. Students can also save material files at any time without worrying about missing materials because the materials will be able to be in Google Classroom so students can access them anytime and anywhere. As long as the teacher doesn't delete the submitted document, the material will remain in the Classroom.

Figure 3. Examples of Using Google Classroom

Figure 3. Shows examples of other uses of Google Classroom in science learning during the COVID-19 pandemic. In addition to being able to send materials as well as store materials that have been submitted by the teacher, Google Classroom can also be a place for teachers to give assignments and there is a place to collect assignments for students. In the Google Classroom application, there are scores that students will get after collecting the work. In Google Classroom, there is also a deadline for collecting assignments that can be set by the teacher so that if students collect more than the given time limit, the Google Classroom display will show if students are late in collecting assignments and the teacher can know who is collecting on time and collecting assignments late.

In addition, there is also a comment column that can be filled in by teachers and students if they want to add comments related to assignments or discuss related to material submitted by the teacher in Google Classroom. That way, communication between teachers and students can still run remotely even though learning is carried out remotely.

The Advantages of Google Classroom in Science Learning During the COVID-19 Pandemic

The advantages of Google Classroom are that there is assessment administration, process speed, and paperless (Hidayat & Sudibyo, 2018). Google Classroom is a free application that can be accessed by anyone and anytime (Abidin & Saputro, 2020). The use of Google Classroom can save time and can facilitate collaborative learning, and students can also download materials and make personal comments (Fitriningtiyas et al., 2019).

During the COVID-19 period, the government made the latest policy regarding the implementation of teaching and learning activities. The government makes a policy, namely carrying out teaching and learning activities from their respective homes or commonly called distance learning. Due to this policy, the learning process is carried out at home using technology. The use of Google Classroom is an alternative solution to the learning process and that helps facilitate education to increase teacher work efficiency to more communication time with students (Suanse & Yuenyong, 2021). Another benefit of Google Classroom is that it provides educational services for people

who cannot participate in face-to-face learning, is environmentally friendly because teachers do not have to go to school to reduce air pollution, can increase cooperation and communication indefinitely, and can save documents so that teachers and students do not have to worry about missing documents (Ketut Sudarsana et al., 2019).

In the previous research conducted by Dewi, (2020) the use of Google Classroom was considered effective in improving students' analytical skills in online science learning in the COVID-19 era. In addition, there is previous research conducted by Pitnelly, (2021) that the use of Google Classroom can improve science literacy skills and foster student character in science learning.

Weaknesses of Google Classroom in Science Learning During the COVID-19 Pandemic

In addition to the advantages, there are also several disadvantages of Google Classroom. The weakness of Google Classroom is that it requires internet access to apply Google Classroom (Silaen & Syofra, 2020). This requires a fee to buy a quota to be able to apply to Google Classroom.

In the previous research conducted by Meriyanti, (2021) that the use of Google Classroom is quite good, but students still have difficulties related to network or signal constraints, thus hindering the material received by some students in science learning. In addition, research conducted by Marisda, (2021) explained that the use of Google Classroom in physics-mathematics learning is less effective because students find it difficult to accept physics material that has many mathematical formulas and calculations. So that students still feel that they need face-to-face learning to better understand the physics material.

CONCLUSIONS

Based on the results of a literature review related to the use of Google Classroom in science learning during the COVID-19 pandemic, it can be seen that: (1) The use of Google Classroom is effectively used in science learning during the COVID-19 pandemic, (2) The advantages of using Google Classroom in science learning during the COVID-19 pandemic are that it can improve analytical skills, improve science literacy skills, and grow students' character in science learning, (3) The weakness of using Google Classroom in science learning during the COVID-19 pandemic is that students have difficulty in receiving material, especially those that require calculations such as mathematics, chemistry, and physics.

The implication for future research is that it can take advantage of the advantages of the Google Classroom feature by using other models in the implementation of science learning so that the implementation of learning can be more conducive and will improve skills and abilities that will be measured in subsequent research. The limit of this study is that it only uses exploration in Google Classroom features. For future research, researchers are expected to be able to use other features of Google Classroom by using other learning models in science learning so that the learning process is more optimal and can explore further related to the use of Google Classroom.

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APPENDIX

Table 1. Literature review of the use of Google Classroom in Science Learning During the COVID-19 Pandemic

No.	Author	Purpose	Result
1.	(Amelia et al., 2020)	Reviewing student responses to online learning.	Students gave a positive response to online learning which began with using handout distribution in Google Classroom.
2.	(Arnellis et al., 2021)	Describes the effect of using Google Classroom learning media on student learning motivation.	The results of student learning motivation using Google Classroom learning media are better than if they don't use Google Classroom.
3.	(I. S. Dewi & Nugroho, 2020)	Knowing students' Analytical skills using scientific models in the era of the COVID-19 pandemic.	Google Classroom is effective in Improving students' analytical skills in online learning in the era of the COVID-19 pandemic.
4.	(Etika et al., 2020)	Knowing research profiles related to Google Classroom on mathematics learning.	After reviewing 17 journals in the 2016-2020 period, it was explained that the use of Google Classroom had a positive impact on mathematics learning in Indonesia.
5.	(Fikriah et al., 2021)	Knowing mathematics learning in e-learning during the COVID-19 pandemic.	The use of the Google Classroom application helps students in learning mathematics but this can be optimal if the teacher continues to coordinate with the homeroom teacher.
6.	(Firdaus et al., 2021)	Describes the online learning process through the Google Classroom online application of magnetic material science material.	The use of the Google Classroom application is less effective in online learning.
7.	(Handayani & Jumadi, 2021)	Analyze online learning activities, supporting factors, obstacles, and the effectiveness of online learning in the era of the COVID-19 pandemic.	The use of Google Classroom is less effective in online learning because the delivery of the material is not conveyed properly.
8.	(Hayah & Aslam, 2021)	Knowing the effectiveness of online learning using Google Classroom in	The use of Google Classroom can make it easier for students in online-based learning.

No.	Author	Purpose	Result
		science learning in the era of the COVID-19 pandemic.	
9.	(Harefa & Sumiyati, 2020)	Knowing students' perceptions of Google Classroom as an LMS during the COVID-19 pandemic.	The use of Google Classroom makes students more interested and happy in online learning.
10.	(Hernawati & Pradipta, 2021)	Analyzing students' mathematical comprehension ability in solving matrix problems in the application of Google Classroom-based e-learning.	Students' mathematical comprehension skills are better if they use Google Classroom.
11.	(J. B. Kelana et al., 2021)	Knowing the learning outcomes, student responses and student difficulties in implementing science learning during the COVID-19 pandemic.	Students said online learning is fun and the obstacles faced are that the facilities in learning are still inadequate, and interaction is limited.
12.	(Marisda & Ma'Ruf, 2021)	Knowing the atmosphere of learning mathematics physics online during the COVID-19 pandemic.	Learning is carried out using Google Classroom, but students find it difficult to accept physics material that has many mathematical formulas and calculations.
13.	(Mellawaty & Taufan, 2021)	Knowing the influence of self-concept and mathematics anxiety on the critical thinking ability of mathematics teachers during the COVID-19 pandemic.	Teachers feel that the use of Google Classroom has an effect on learning during the COVID-19 pandemic. However, it must have the right readiness to prepare for the learning process.
14.	(Meriyanti et al., 2021)	Knowing the analysis of science critical thinking skills through the use of Google Classroom media in junior high schools.	Learning using Google Classroom goes quite well, and can make students' analytical skills better.
15.	(Nisa et al., 2021)	Knowing student responses, student learning outcomes, and the influence of learning models on students of SMK Negeri 6 Samarinda.	The use of Google Classroom is suitable for use in e-learning models during the COVID-19 pandemic.

No.	Author	Purpose	Result
16.	(Nurani et al., 2020)	Describes the analysis of the online-based mathematics learning process using Google Classroom.	Online learning using Google Classroom has proven to be effective during WFH.
17.	(Nurkhasanah, 2021)	Describe the implementation of the flipped classroom learning model in distance learning.	The use of flipped classroom learning models increases the number of student participation in the teaching and learning process.
18.	(Pertiwi et al., 2021)	Knowing the application of science practicum online using Microsoft Teams and Learning Management System (LMS).	The use of Microsoft Teams and the Learning Management System (LMS) can improve aspects of student knowledge.
19.	(Pitnelly et al., 2021)	Improving students' science literacy skills by using contextual teaching learning using Google Classroom media.	The use of contextual teaching learning with Google Classroom has increased students' science literacy and character skills.
20.	(Putro et al., 2021)	Identifying the chemistry learning experience of high school students using the Learning Management System (LMS) in the era of the COVID-19 pandemic.	Students are comfortable using the Learning Management System (LMS) by doing assignments through WhatsApp, Google Classroom, Microsoft teams.
21.	(Rohmah, 2022)	Improving science learning outcomes for junior high school students by using Google Classroom media assisted by liveworksheets.	The science learning process using Google Classroom media assisted by liveworksheets can increase student activity and student learning outcomes.
22.	(Sahlan et al., 2022)	Analyze student responses in using Google Classroom in physics learning.	The use of Google Classroom media in physics learning during the COVID-19 pandemic has a positive impact on students.
23.	(Sari, 2021)	Knowing the planning of learning and learning outcomes in the implementation of Google Classroom during online learning in the era of the COVID-19 pandemic.	The implementation of Google Classroom in online learning can improve student learning outcomes.
24.	(Sudibjo, 2019)	Knowing student motivational responses and student learning	The use of Google Classroom is worth using and can improve learning outcomes and increase

No.	Author	Purpose	Result
		outcomes by using Google Classroom services as a science learning medium.	student motivation in science learning.
25.	(Sulistyaningrum et al., 2020)	Knowing the application of mind mapping assisted by Google Classroom to improve the learning outcomes of grade VII students.	The application of Google Classroom-assisted mind mapping is at a moderate level or effective enough to improve student learning outcomes.
26.	(Suryani et al., 2021)	Knowing the effectiveness of using scaffolding-based blended learning strategies assisted by Google Classroom to improve student learning outcomes in physics learning.	The strategy of using a scaffolding-based blanded learning model assisted by Google Classroom is effective in improving student learning outcomes in the era of the COVID-19 pandemic.
27.	(Sutia et al., 2019)	Describe students' responses to project learning by using Google Classroom on biology projects.	The use of Google Classroom is quite effectively used to guide student projects. However, students find it difficult to understand the suggestions and feedback teachers provide through Google Classroom.
28.	(Umairah & Zulfah, 2020)	Increase student learning motivation in online mathematics learning using Google Classroom in the era of the COVID-19 pandemic.	Online learning using Google Classroom can increase student learning motivation.
29.	(Widiyatmoko, 2021)	Knowing the effectiveness of using Google Classroom as a tool to support online science learning during the COVID-19 pandemic.	The use of Google Classroom can regulate the online learning process during the COVID-19 pandemic.
30.	(Uliya & Muchlis, 2022)	Knowing the application of google classroom-based guided inquiry model.	The application of Google Classroom guided inquiry is quite effectively used in learning and can improve students' science process skills.