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Blended Learning Using Google Classroom on Critical thinking ability and Science Communication in Class V Elementary School

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Abstract

This paper briefly describes the background, problems, methods, and findings of a study on the use of Google Classroom-based blended learning to improve fifth-grade students' critical thinking and science communication skills at Madani Integrated Elementary School, Palu. The study aimed to determine the improvement of these skills in science learning through the implementation of blended learning. This quantitative research employed a quasi-experimental design using intact groups of fifth-grade students from the 2021/2022 academic year. Data were analyzed using significance testing and N-gain analysis. The results showed a significant improvement in students' critical thinking skills, with a significance value of 0.000 (< 0.05). The experimental class obtained an N-gain score of 70.51, categorized as moderately effective, while the control class achieved an N-gain score of 56.29 with the same category. The results also indicated a significant improvement in science communication skills, with a significance value of 0.000 (< 0.05). These findings demonstrate that the implementation of Google Classroom-based blended learning can improve the critical thinking and science communication skills of fifth-grade students in science learning at Madani Integrated Elementary School, Palu.

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Introduction

In the current era of globalization, technological advances are developing so rapidly. So that it becomes a trendsetter in the world of industrial revolution 4.0. With this in mind, all forms and activities have improved from the system and its use using technology. All fields are certainly inseparable from the role of technological developments which are the measuring power to support existing processes. Especially in the field of education, every school or college applies a learning model in accordance with the current technological developments (Deniswara et al., 2022; Fonna, 2019).

New innovations in the world of education are the most important thing to be able to adapt to all processes and aspects in the environment. The role of technology certainly plays a significant role in ensuring the learning process becomes more effective and efficient. Especially from the aspect of procedures, media and output produced. It is hoped that there will be updates in the learning system along with technological advances, making all processes in the field of education more flexible and effective (Santosa, 2022).

Based on observations made at the Madani Palu Integrated Model Elementary School, that students tend to be inactive in learning requires teachers to be creative in using learning models during the current Covid-19 pandemic. The Minister of Education and Culture of the Republic of Indonesia issued circular letter number 36962/MPK.A/HK/2021 concerning the obligation for educational institutions to implement online learning and stop teaching activities in class to prevent the spread of Covid-19. With this policy, the education system has changed, where students are required to do online learning (Indrayana & Sadikin, 2020).

The learning model that can be used in the conditions mentioned above is a blended learning model or a mixed learning model between designed online learning models and direct learning. Blended learning takes every type of learner into account whether they prefer familiar, traditional classes, prefer online learning or try a mix of both. Without the limitations of classrooms or online courses, blended learning uses a variety of methodologies so that content is learner-tailored and optimized for course content. While not all face-to-face learning easily translates to digital content, existing content can be re-engineered for online delivery in ways that complement existing training (Pratiwi et al.,, 2021).

Blended learning or blended learning is a combination of traditional classroom learning (face-to-face classes) and (modern) technology-based learning (online-based). This learning model combines classical face-to-face learning which can be used with the help of other Google media platforms such as Google Classroom. John Merrow

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explained that Blended learning is a learning strategy that aims to achieve learning objectives by combining class/face-to-face based learning with technology and information-based learning that is carried out online. (Widiara, 2018).

The blended learning method has advantages including: students are provided with multiple choices in addition to classroom learning, enhancing what is learned, and opportunities to access further levels of learning, the presentation of data is delivered more quickly by students who study using e-learning, students have the opportunity to learn the material they want, as well as setting flexible schedules and time on a subject, and cost-effective for agencies and students (Agustin, 2019).

Google classroom is an internet-based service provided by Google as an e-learning system and is designed to help teachers create and distribute paperless assignments to students. Google classroom can be accessed in two ways, namely through the website and application. The website can be accessed using browsers such as Chrome, Firefox, Internet Explorer or Safari. Meanwhile, the application can be downloaded for free via the Play Store for Android and the App Store for iOS (Agustin, 2019). Blended learning is expected to make a good contribution to the ability to think critically and communicate science in elementary schools.

21st century skills are the ability to learn independently, ethics and responsibility, communications skills, thinking skills; critical thinking, problem-solving, creativity, originality, strategizing, teamwork and flexibility, as well as digital skills and literacy skills (scientific literacy). scientific literacy skills can be developed and improved with appropriate methods and supported by adequate technology (Daga, 2022; Lestari, 2020; Widodo & Wardani, 2020).

21st century skills are the ability to learn independently, ethics and responsibility, communications skills, thinking skills; critical thinking, problem-solving. Observations showed that some students were less active during the science learning process. This can be seen from the fact that most of the students could not ask questions even though they did not understand and when asked they could not answer, students could not give reasons and were even confused in responding to questions from the teacher. The science learning style is still by memorizing, assignments in student books that are sent to students in e-learning learning (Wahyuningsih, 2021). Assignments are communicated online during the learning process but are carried out at home and submitted to the teacher by sending via social media WhatsApp or delivered directly by parents or students at school at certain times in accordance with the assignment agreement.

The purpose of this study is to determine the improvement of the ability to think critically to communicate science in fifth grade students of Integrated Madani Elementary School, Palu using blended learning based on Google Classroom.

Materials and Method

The population of this study were fifth grade students at the Integrated Madani Model Elementary School in Palu for the 2021/2022 Academic Year. The sampling technique used by researchers is purposive sampling technique, where the determination of the sample is done with the consideration that these classes have almost the same characteristics. Based on this technique, the samples in this study were students in the VA class as the experimental class with a total of 28 students (12 men and 16 women) and in the VB class as the control class with a total of 23 students students (12 men and 11 women).

This study involved two variables, namely the independent variable and the dependent variable. The independent variable in this study is the google classroom-based blended learning model and the dependent variable in this study is the ability to think critically and the ability to communicate science.

The data analysis used in this study is the normality test (requirement test) followed by a similarity test of two means (t-test) for the critical thinking analysis with instruments referring to indicators: elementary clarification, basic support, advanced clarification, strategy and tactics. science ability with the topic of natural science the effect of moringa on life through a parametric t-test, namely the Independent-sample T Test.

Results and Discussion

The results of the analysis of the normality test using the Shapiro-Wilk analysis obtained a significance value for the experimental class of 0.376 at the pretest and 0.092 at the posttest, this indicates that the significance is > 0.05, which means that the critical thinking ability data of the experimental class is normally distributed. While the normality test results for the control class were 0.672 in the pretest and 0.253 in the posttest. This shows that the significance is > 0.05, which means that the control class's critical thinking ability data is normally distributed.

Testing the research hypothesis using the two average difference test through the parametric t-test, namely the independent-sample T Test. The results of the prerequisite tests that have been carried out indicate that the data are normally distributed and homogeneous so that hypothesis testing can be carried out. The results of the independent-sample T test for critical thinking .

Table 1. Critical Thinking Analysis

Class	Critical thinking score (mean $\pm$ ***SD***)		Δ critical thinking
	Pretest	Posttest	
Experiment	63.50 $\pm$ 6,136	89.63 $\pm$ 3,790	26.13 ↑
Control	63.20 $\pm$ 5,831	84.62 $\pm$ 4,121	21.42 ↑
Sig.		0.000*	

Description: * Independent T test

Based on the test results obtained sig 0.000 < α = 0.05, it means that there is an increase in students' critical thinking skills in science lessons using blended learning based on google classroom. Based on the N-gain value, the experimental class was 70.51 with quite effective criteria compared to the control class with an n-gain value of 56.29 with the same criteria, namely quite effective. This means that the increase in students' critical thinking skills in the experimental class is higher than in the control class.

The average pretest and posttest scores for the experimental class taught using the google classroom-based blended learning model were higher than the control class taught using the direct learning model (e-learning). The improvement of students' critical thinking skills in the experimental class and control class for each indicator can be seen in Table 2.

The average student pretest results in science lessons with the theme of heat and their displacement for each indicator of critical thinking ability show that in general the control class is higher than the experimental class. On the indicator of building basic skills, the results of the pretest showed that the experimental class (62.50) was higher than the control class (61.41), as well as the strategy and tactics indicator showed that the experimental class (66.07) was higher than the control class (59.24). If viewed from each indicator of students' critical thinking skills, it can be said that the control class has a higher score than the experimental class, even though based on the pretest average the experimental class is higher than the control class.

Table 2. Improvement of Students' Critical Thinking Indicators in Pretest and Posttest Experiment Class and Control Class

No	Critical Thinking Ability Indicator	Class			
		Experiments		Control	
		Pre Test	Post Test	Pre Test	Post Test
1	Give a simple explanation	61.51	88.89	65.22	84.54
2	Build basic skills	62.50	90.18	61.41	82.61
3	Draw conclusions	63.39	89.73	64.67	84.78
4	Make further explanations	64.29	89.73	65.22	86.41
5	Set strategy and tactics	66.07	89.73	59.24	84.78

The average student pretest results in science lessons with a hot theme and their displacement for each indicator of critical thinking ability show that in general the control class is higher than the experimental class. On the indicator of building basic skills, the results of the pretest showed that the experimental class (62.50) was higher than the control class (61.41), as well as the strategy and tactics indicator showed that the experimental class (66.07) was higher than the control class (59.24). If viewed from each indicator of students' critical thinking skills, it can be said that the control class has a higher score than the experimental class, even though based on the pretest average the experimental class is higher than the control class.

Based on the results of the analysis of the normality test for the ability to communicate in science using the Shapiro-Wilk analysis, a significance value for the experimental class was obtained at 0.212. This shows that the significance is > 0.05, which means that the data on the ability to communicate science in the experimental class is normally distributed. Meanwhile, the normality test results for the control class were 0.128. This shows that the significance is > 0.05, which means that the data on the ability to communicate science in the control class is normally distributed. The results of the analysis of the application of the google classroom-based blended learning model can improve students' science communication skills in science lessons. Based on the test results obtained sig 0.000 <α = 0.05, meaning that there is an increase in students' science communication skills in science lessons using google classroom-based blended learning. The results of the independent-sample T test for the ability to communicate in science can be seen in table 3.

Table 3. Analysis of Science Communication Ability in the Experiment Class and Control Class

Class	Science communicating score (Mean ± SD)
Experiment	88.93 ± 2.355
Control	82.79 ± 4.005
Sig.	0,000*

Description: * Independent T test

Google classroom-based blended learning learning can improve students' critical thinking skills in lessons. This finding is in line with Triyanti (2022) that the application of blended learning can improve students' critical thinking skills in biology lessons at SMA Negeri 4 Rejang Lebong. Furthermore, Anggraini, (2019) concluded that there was a significant influence on the application of blended learning on students' critical thinking skills in the subject of temperature and heat. The application of blended learning learning can improve students' critical thinking skills because the application of this learning combines face-to-face learning and online learning so that students get more information compared to students taught using the e-learning model, in addition to learning with blended learning based on Google classroom students get additional information in the form of in-depth material, learning videos and pictures provided by teachers through google classroom and also students can study independently anywhere and anytime (Khairiyyah et al., 2021; Sulisworo et al., 2020). This is different from the control class which uses e-learning, students are only given material online and just asking questions, besides that students only receive homework assignments without receiving in-depth material so that it seems that the material that has been delivered by the teacher is just information and will be easily forgotten by students (Anggraini, 2019; Liando et al., 2022; Triyanti, 2022).

Based on the results of data analysis, it can be seen that blended learning can improve students' critical thinking skills. This research is supported by other research that has been done previously that blended learning can affect critical thinking skills in physics (Anggraini, 2019; Najib & Jatmiko, 2022; Nasution et al., 2022 ; Prifti, 2022; Wahyuni et al., 2019).

The results of this study are in line with research conducted by Nurismayanti (2022) which states that blended learning model learning can improve conceptual understanding and reasoning in science material, as well as train students to be independent and active, so as to maximize student learning outcomes. Apart from that, this is also in accordance with the results of research conducted by Sari et al. (2021) using Google Classroom. Teaching
materials can be provided in various formats, such as sending learning videos that are easy to understand and played by students repeatedly. Google classroom can train students to be independent in understanding subject matter (Herian et al., 2022; Nurismayanti, 2022; Sari, et al., 2021).

The google classroom-based blended learning model provides an increase in students' science communication skills in science lessons. Based on the SPSS test, it was obtained sig = 0.000 <0.05, which means that there is a difference in the increase in the science communication skills of the experimental class students taught using blended learning based on Google classroom and the control class taught with e-learning learning. The increase in the ability to communicate science in experimental class students is due to the influence of the blended learning model. While the control class only applies e-learning learning with lecture and question and answer methods. Research conducted by Nuraini et al., (2018) states that learning using the blended learning model can in fact increase the motivation and learning outcomes of students, because learning using the blended learning model raises students' interest in learning and will affect their learning outcomes (Adnyana & Sudaryati, 2022; Kasli et al., 2022; Nuraini et al., 2018).

Conclusion

The application of google classroom-based blended learning improves the critical thinking skills of students in grade V Integrated Madani Palu in science lessons with an N-gain value of 70.51% for the experimental class while the control class is 56.29%. The application of google classroom-based blended learning improves communication skills science class V students at Integrated Madani Elementary School Palu in science lessons with an average science communication ability of students for the experimental class of 88.65% while the control class was 83.07%.

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