DE_JOURNAL (Dharmas Education Journal)
http://ejournal.undhari.ac.id/index.php/de_journal
E-ISSN : 2722-7839, P-ISSN : 2746-7732
Vol. 6 No. 2 (2025), 18-24

# Google Classroom-Based Project Learning On Science Literacy

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**Abstract**

During this COVID-19 period, all activities, especially education, are carried out at home. Using online learning media, such as Google Classroom, has led to online learning (in the network). This study aims to generate and determine the effectiveness of online learning using Google Classroom based on project-based learning on scientific literacy. This research method uses the type of research and development with the ADDIE development model. The stages in the ADDIE model consist of 5 stages, namely the analysis, design, development, implementation, and evaluation stages. Data collection techniques used are test and non-test. The subjects in this study were elementary school students. From the research results obtained from the validation results of learning materials and media, the results of the assessment of Google Clasroom learning media based on project learning on scientific literacy obtained a percentage of 95% with the category "Very Valid" and the results of the validation of learning media obtained a percentage of 92%. So based on these results, this Google Clasroom based on project learning media product is suitable for use during the learning process at school.The result of the development of this learning media is a project-based learning media based on Google Classroom. It can be concluded that Google Classroom learning media based on project-based learning is suitable for use in online learning and improving students' scientific literacy.

***Keyword: Google Classroom,Project based learning, Scientific Literacy.***

**Abstrak**

Selama periode COVID-19 ini, semua kegiatan, terutama pendidikan, dilakukan di rumah. Penggunaan media pembelajaran daring, seperti Google Classroom, telah mengarah pada pembelajaran daring (dalam jaringan). Penelitian ini bertujuan untuk menghasilkan dan mengetahui efektivitas pembelajaran daring menggunakan Google Classroom berbasis project based learning terhadap literasi sains. Metode penelitian ini menggunakan jenis penelitian dan pengembangan dengan model pengembangan ADDIE. Tahapan dalam model ADDIE terdiri dari 5 tahap, yaitu tahap analisis, desain, pengembangan, implementasi, dan evaluasi. Teknik pengumpulan data yang digunakan adalah tes dan non tes. Subjek dalam penelitian ini adalah siswa sekolah dasar. Dari hasil penelitian yang diperoleh dari hasil validasi materi dan media pembelajaran, hasil penilaian media pembelajaran Google Clasroom berbasis project learning terhadap literasi sains memperoleh persentase 95% dengan kategori “Sangat Valid” dan hasil validasi media pembelajaran memperoleh persentase 92%. Maka berdasarkan hasil tersebut, produk media pembelajaran Google Clasroom berbasis pembelajaran proyek ini layak digunakan pada saat proses pembelajaran di sekolah. Dapat disimpulkan bahwa media pembelajaran Google Classroom berbasis project based learning ini layak digunakan dalam pembelajaran online dan meningkatkan literasi sains siswa.

**Kata Kunci : Google Classroom, Pembelajaran Berbasis Proyek, Literasi Ilmiah**

Info Artikel : Diterima Mei 2024 | Disetujui Maret 2025 | Dipublikasikan Juni 2025

## Introduction

The impact of the Covid-19 pandemic that hit the world, including Indonesia. The spread of Coronavirus Disease 2019 (Covid-19) is the cause of the highest death rate for now. The Covid-19 pandemic has changed the order of life, especially in the education sector. In addition to the closure of many public facilities, all educational institutions, especially schools and universities, were forced to postpone face-to-face learning activities. Until early 2021, the learning process carried out in Indonesia is still online-based because this method is considered quite effective in minimizing the spread of COVID-19 (Naila & Khasna, 2021). Online learning is understood as distance learning, which is the use of information technology such as laptops and mobile phones between students and teachers so that teaching and learning activities can run as they should (Sadikin & Hamidah, 2020). Online learning for some schools is very burdensome because they are not used to using online media in learning. Support for mobile devices—such as smartphones or Android phones, laptops, PCs, tablets, and iPhones—that can access information anywhere at any time is necessary for the adoption of online learning (Gikas & Grant, 2013). Fully online learning is indeed not easily accepted by some fields in higher education, one of which is learning on the topic of science or Natural Sciences. (Kelana et al., 2021). The existence of physical limitations and perspectives in online learning, of course, will impact the learning outcomes obtained, in this case, scientific literacy skills (Sadikin & Hamidah, 2020). Based on PISA 2018, Indonesian students are ranked 72 out of 79 test-taking countries. The test results showed that the average score of the students was 371 in reading, 379 in mathematics, and 396 in science. This achievement score is below the average of 79 PISA participating countries, namely 487 for reading ability and 489 for math and science ability (OECD, 2018). As for other problems, the teacher has never seen scientific literacy skills using Google Classroom, so educators still use written media and lectures during the COVID-19 pandemic (Naila & Khasna, 2021). Although schools have the infrastructure and resources to facilitate learning, such as computer labs, science labs, and LCDs, their utilization is not optimized, (William et al., 2021; Shinta, 2023).

Based on the observations and interviews on online learning, the teacher only gives assignments regarding scientific literacy in the Whatapp Group. The teacher is less innovative in using online learning media. The teacher still uses many lecture methods in online classes, which certainly makes students bored; students are still objects in learning, so they are less creative. Scientific literacy is a crucial skill needed in today's digital era. There are many problems related to knowledge and technology and empowering people to make personal decisions and participate in the formulation of public policies that impact their lives. These problems can result in low student scientific literacy, (Manuscript, 2019). Given these issues, learning activities must be updated, modified, and improved in light of the COVID-19 pandemic. Specifically, this can be achieved by creating and employing learning materials based on Android that can enhance students' scientific literacy about science education during the pandemic.

Some literature provides an overview of the effectiveness of using Google Classroom in learning. One study by Kassim (2021) found that Google Classroom as a Learning Management System (LMS) has features that can make the learning process more interactive and facilitate students in improving skills. Winarti et al (2020) His research suggests that Google Classroom is an effective medium if used in the teaching and learning process. Implementation related to Google Classroom is considered to be able to develop independence and creative thinking,(Bondarenko & Mantulenko, 2018). Other research proves that the application of Google Classroom can make the learning process more effective, (Shaharanee et al., 2016) and (Paristiowati et al., 2020). In addition to being efficient, Google Classroom is also free and simple for teachers and students to utilize.

Google Classroom is an online learning platform on smartphones and personal computers (PCs) with an internet connection, (Fitri Rahmawati et al., 2020). To improve efficiency and save time and space, Google Classroom allows professors and students to participate in learning activities virtually. Furthermore, Google Classroom is offered without charge and has never been turned into paid material, (Abid Azhar & Iqbal, 2018). Google classroom is used to help teachers manage the learning process

without a sheet of paper by utilizing the features contained in the application, (Rani & Beutlin, 2020). Google Classroom's advantages are easy to use, time-saving, cloud-based, flexible, and accessible, (Thi & Nhat, 2021; Divariyani, 2022). Google Classroom facilitates teachers' ability to study and communicate knowledge to students exactly and accurately, (Winarti et al., 2020). The design of google classroom is familiar to students because they have used several products from google via their Google Apps account. Students like how the connectivity between Google Classroom and Google Drive accounts is, (Zuniga-Tonio, 2021; Santos, 2021). Google Classroom makes it easier for teachers to manage to learn and convey information precisely and accurately to students. Previous research has examined the effectiveness of using Google Classroom based on project learning. Still, not many have investigated the effectiveness of Google Classroom on scientific literacy during the covid-19 pandemic. The contribution of this study has the potential to provide an evaluation of the importance of setting up an online learning platform that is easy and has various features to be developed in the future. This study aims (1) to produce Google Classroom media based on project learning on scientific literacy during the Covid-19 pandemic and (2) to determine the effectiveness of using Google Classroom based on project learning on scientific literacy during the Covid-19 pandemic in elementary schools. The problem formulation of this research is: (1) How is the development of Google Classroom learning media based on project-based learning on scientific literacy? (2) Is there effective use of project learning-based google classroom media on scientific literacy in elementary schools?

## Method

This study uses a research development design to develop project learning-based google classroom media. This research resulted in an e-learning learning using google classroom based on project learning, assessed based on the model quality criteria, namely validity and effectiveness. Data collection techniques using tests and non-tests. Data was collected using online questionnaires, observations, and interviews. The questionnaire instrument uses a Likert Scale as a validation instrument to assess feasibility. This validity data were obtained from the assessment of material experts and media experts. The sample of this study amounted to 100 elementary school students. Data collection techniques using tests and non-tests. The research development model that is the reference for researchers in developing this learning media is the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) developed by Dick and Carry. The data analysis used is descriptive analysis with a quantitative approach that produces the effectiveness criteria of the quantitative data of the research questionnaire instrument. The data analysis described in this study was intended to describe and interpret the effectiveness of the project-based learning-based google classroom as a learning medium to improve scientific literacy in elementary schools during the covid-19 pandemic. Quantitative data includes scores on each instrument item that material experts and instructional media experts have filled in. The assessment by the validators is based on the validation rating scale table, which can shown in Table 1.

**Table 1. Validation Rating Scale**

| Rating | Score | Criteria |
|---|---|---|
| 25%-43% | 1 | Invalid |
| 44%-62% | 2 | Valid |
| 63%-81% | 3 | Valid |
| 82%-100% | 4 | Very Valid |

## Result and Discussion

### a. Research result

Analysis stage. At this analysis stage, what is done is to validate curriculum analysis learner analysis, examine available resources, and prepare work plans. The analysis results that have been carried out are used as guidelines and considerations in compiling learning media and identifying possible causes of problems that arise. After preparing the work plan in the analysis, the stage is completed. The following procedure is to make a design/framework/display for project learning-based Google Classroom media guided by the analysis stage where researchers get the information needed in

product development. In addition to making the concept of displaying the learning media, the preparation of materials/materials that will load into the e-learning media is also carried out.

Development Stage. At this stage, the project learning-based Google Classroom media validation was carried out through expert considerations to obtain data on the results of project learning-based Google Classroom media products. This validation is carried out directly by experts to assess and validate the product. The assessment results of material experts on the developed e-learning learning media score 95%, which is included in the very feasible category.

**Table 3. Material Expert Validation Results**

| No | Indicator | Score | Presentation | Indicator |
|---|---|---|---|---|
| 1 | Content Quality | 35 | 98% | Valid |
| 2 | Integration of Learning Objectives | 20 | 91% | Valid |
| 3 | Language | 8 | 78% | Valid |
| 4 | Presentation | 10 | 100% | Valid |
| **Total score** | | **73** | **95%** | **Very Valid** |

For media experts, the project-based learning-based Google Classroom media that was developed, in this first stage, obtained a score of 51 with a percentage of 92%, which was categorized as very feasible to use.

**Table 4. Media Expert Validation Results**

| No | Indicator | Score | Presentation | Indicator |
|---|---|---|---|---|
| 1 | Content Quality | 4 | 100% | Very Valid |
| 2 | Learning Media Display Design | 4 | 100% | Very Valid |
| 3 | Motivation | 8 | 88% | Valid |
| 4 | Ease of Interactive | 20 | 92% | Very Valid |
| 5 | Accessibility | 7 | 78% | Valid |
| 6 | Language | 8 | 100% | Very Valid |
| **Total score** | | **51** | **92%** | **Very Valid** |

The implementation phase is carried out on students in class V elementary schools in Yogyakarta, totaling 60 students. At this stage, the activities carried out by researchers are implementing and testingdthe product against the use of project-based learning-based Google Classroom media. The trial's purpose was to collect data about the quality of the product produced and its role in improving students' scientific literacy. The assessment of this is through a questionnaire stated through 15 question items obtained from the validity and reliability tests on the instrument trials that were tested on 100 students. The trial consisted of three stages: individual trials, small group trials, and large group trials.

The development that has been carried out is the result of applying the development steps of the ADDIE model with the stages (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation.

**a. Analysis Stage**

The development of Google Classroom media based on project-based learning is carried out according to what is needed by teachers and students. The purpose of the development is to produce effective, efficient, and interesting learning media. In addition, with the existence of learning media, students can receive the material delivered by the teacher well and can learn independently.

b. **Design Stage**

In this design stage, it is necessary to design several elements needed to make learning media. Preparation of Learning Plans: Designing syllabus and learning modules based on Project Based Learning that can be integrated into Google Classroom. Learning is designed to encourage collaboration between students, using projects to develop a deep understanding of concepts. The

second stage is to design Google Classroom learning media based on project learning. At this design stage, researchers carry out several stages, such as determining the development team, determining the resources needed, determining the scope of the material, determining product specifications, and creating a product prototype.

c. **Development Stage**

The development stage involves creating and compiling learning materials that will be used in Google Classroom. Some activities carried out at this stage include Creating learning materials and compiling teaching materials in the form of videos, documents, and other resources that will be uploaded to Google Classroom. Project task settings: Arranging project tasks that can be done individually or in groups and setting deadlines for assignment submission and evaluation. Platform trials: Conduct initial testing to ensure that all features in Google Classroom are functioning properly, such as assignment division, providing feedback, and assignment submission. Researchers developed Google Classroom learning media based on project-based learning based on previously created designs using the Canva and Google Classroom applications.

d. **Implementation Stage**

In the implementation stage, project-based learning using Google Classroom is carried out according to the plan that has been prepared. Some of the activities carried out include the delivery of material, such as using Google Classroom to provide an introduction to the project and the necessary instructions. Collaboration between students: Encouraging students to interact with each other through discussion and collaboration features in Google Classroom so that they can work together to complete the project. After carrying out media development based on direction and advice from experts, Google Classroom project-based learning can be implemented in the field, namely in elementary schools in Yogyakarta,, to get responses from teachers and students in elementary school classes.

e**. Evaluation Stage**

In the evaluation stage, an assessment is carried out on the effectiveness of Google Classroom media in supporting project-based learning. Some of the evaluations carried out include: Evaluation of project results: Assessing student project results based on a previously prepared rubric. Evaluation of the learning process: Collecting feedback from students and teachers regarding their experiences in using Google Classroom, whether this platform is effective in supporting collaboration and project management. Evaluation Stage, Next in this evaluation stage is to see the effectiveness of the project learning-based Google classroom media on scientific literacy activities in online classes. To measure the level of effectiveness of the Google Classroom learning media based on project based learning, it can be seen from the scientific literacy of students.

**Table 5. The analysis result of T-test**

| Treatment | T-arithmetic | T-table | Conclusion |
|---|---|---|---|
| **Google Classroom based Project learning** | 2,888 | 2,000 | H0 was rejected/ H1 accepted |

Based on the table below, it could be gotten that T-arithmetic was 2,000 whereas T-table was 2,888. In regard with the criteria of the test, Ho was rejected / H1 was accepted in this research since there was T-arithmetic > T-table or 2,888 > 2,000. Based on Table 5, the results of the effectiveness of using Google Classroom media based on project-based learning are compared to using other learning media applications. The results of this study indicate that the project learning based Google classroom media is beneficial for students in scientific literacy learning activities. Smooth communication between teachers and students during the learning process and helping students learn optimally indicates that the learning process runs smoothly.

Based on the T-test scores on the project learning based Google classroom media, the data obtained that Google Classroom is very effective in online scientific literacy activities. In Google Classroom media based on project learning, students can view and open materials and assignments

uploaded to Google Classroom anytime and anywhere. Google Classroom media has features: creating classes, distributing an assignment, giving grades to selected students, filling in the comments field for input on student assignments, and seeing all student activities, (Ventayen et al., 2018). Teachers can use the features in the application such as assignment, grading, communication, mobile application, archive courses, privacy, time-cost, (Shaharanee et al., 2016).

This study can say that the Google Classroom learning media based on project-based learning can be used as online learning media. In addition, using Google Classroom media based on project-based learning makes it easier for students to get announcements given by the teacher effectively and efficiently. By using Google Classroom media based on project-based learning, students can carry out online learning processes that can improve scientific literacy activities in the process of learning activities. According to the educator's perspective, interactive learning media using Google Classroom during the coronavirus outbreak 19 makes it easy to share and deliver teaching materials, both in the form of text, images, audio, and video. Online learning makes teaching and learning activities more interactive, effective, and efficient between teachers and students, (Sriyani, 2021; Zaiturrahmi,2023). The use of Google Classroom online media has an important impact on learning during a pandemic, including learning is done online and supporting government policies for physical distancing. Compared to other media, Google Classroom is simple, easier to implement, (Shaharanee et al., 2016). Project-based learning-based google classroom media can be used as a solution for teachers during this covid 19 outbreak as an accessible online learning facility for students in today's era.

## Conclusion

This development research is the result of Google Classroom learning media based on project learning. The stages used are the ADDIE model, namely analysis, design, development, implementation, and evaluation. The novelty of this research is using an innovative approach in science learning through the integration of Google Classroom as a digital learning medium. The project-based approach allows students to be more active in exploring scientific concepts, developing critical thinking skills, and collaborating effectively. By utilizing Google Classroom features, students can access materials, interact with teachers and classmates, and collect project assignments in a structured manner. This research is expected to improve students' understanding and scientific literacy through a more interactive and real-world problem-based learning experience in the context of everyday life. Using Google Classroom based on project-based learning makes online learning more effective and better. In addition, the development of the project learning-based Google Classroom application as an online learning medium is more effective in terms of student responses. Based on the results of this study, the advice given to other researchers is to develop project learning based Google Classroom learning media with different materials and levels and fields and can be tested in a broader population as well.

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