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## **Using Google Classroom in Biology Class and the Effect on Senior High School Students Motivation and Learning Outcome**

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### **ABSTRACT**

#### **KEYWORDS:**

*Motivation,  
Learning outcome,  
Google classroom,  
Biology learning.*

Industrial Revolution 4.0 causes changes in various fields, including education. One of the changes in the education sector is the integration of technology into the learning process. One of the integrations of technology in learning is the use of a Learning Management System (LMS). Google Classroom is one LMS choice that can be used for learning. This research aims to analyse the effectiveness of using Google Classroom on students' motivation and learning outcomes in Biology. This research is a pre-experimental research with a one-group pre-test and post-test research design. This research was conducted in 4 senior high school in Central Java namely SMA MTA Surakarta, SMA PGRI 1 Pati, MAN 1 Grobogan, and SMA Negeri 2 Mranggen. This research was carried out during the 2021/2022 academic year. Data collection techniques include questionnaires, tests, and observation instruments. This research sample consists of 184 students of XI grades. Each class is given treatment using Google Classroom. Based on the results of the research and discussion, conclusions can be drawn: (1) Learning using Google Classroom can have a positive impact on student learning motivation, as can be seen from the average motivation score of 77.47; (2) Learning using Google Classroom is effective for student learning outcomes in the medium effectiveness category (average N-Gain score 43.77).

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## **1. INTRODUCTION**

Generally speaking, there are a number of elements that can affect a person's learning outcomes. The internal factor comes first. Internal elements pertain to the entire individual, encompassing their mental, bodily, and/or psychological states. These internal variables, which are sometimes referred to as intrinsic factors, include a person's interests, IQ, talent, motivation, learning preferences, and other psychological and physiological traits. The external component comes in second. External elements originate from beyond an individual. This element, which is sometimes referred to as an extrinsic factor, encompasses everything that originates from outside of an individual and has the potential to impact their learning achievement in both social and other environments (Ekowati, 2019).

One of the internal factors that influences student learning outcomes is learning motivation. Motivation comes from the word motive, which means encouragement or strength that exists in an individual so that it causes the individual to act or act and try to make changes in behaviour for the better. The existence of student motivation can be seen from the level of student attendance in learning activities and student activity in participating in learning in accordance with their responsibilities as students. Motivation will also influence student learning outcomes. In the education system, teachers or educators are required to have appropriate learning methods that suit

the needs of students. That way, a pleasant atmosphere will be created, and learning objectives will be easily achieved (Al Yakin et al., 2022).

The global Industrial Revolution 4.0 indirectly altered the economic system, which in turn altered the system of education in a nation. Education specialists frequently refer to the integration of cyber technology into schooling as "education 4.0." The needs of the Industrial Revolution 4.0, in which humans and robots collaborate to find answers, resolve issues, and facilitate breakthroughs, are met by Education 4.0 (Heriyanto et al., 2019). Of course, education is greatly impacted by the Fourth Industrial Revolution. This effect causes interactions that were previously in-person classes to shift, which leads to an online metabolism. The process of evaluating learning also takes place in this manner, with facilities serving as a partner to integrate in-person activities with online learning and supporting classroom learning activities that are linked to the internet (Tangahu et al., 2021).

The educational process carried out will always be related to the learning process. Learning is a process carried out by two main components, namely students and teachers. The interaction between the two components forms a system where students become the main actors (subjects) of learning. In contrast, the teacher becomes a facilitator who accompanies students in achieving the expected learning goals. It can be understood that the process of educational interaction that occurs between teachers and students to achieve academic goals is defined as a learning process. Technological developments are also starting to play a role in maximizing the learning process so that learning objectives can also be achieved (Syamsuar & Reflianto, 2018).

The critical role of technology in the learning process can be seen from the pattern of delivering material, which is now equipped with learning media. The emergence of this learning media has brought significant changes to the learning process. By meeting face-to-face using a whiteboard, teachers will find it challenging to convey abstract learning material, such as blood circulation material. The presence of media that is integrated with existing technology will undoubtedly make it easier for teachers to explain abstract material (Yahya, 2018). One form of technology integration in learning is the use of a Learning Management System (LMS).

LMS has a basic understanding as a software application that can automatically handle the administration, implementation, and reporting of a learning activity. Currently, many LMSs are being developed to support various educational institutions in their learning systems (Ni'am, 2013). Furthermore, according to (Limantara & Jingga, 2014), A web-based tool called an LMS aids in the organization, distribution, and assessment of a learning process. Students, content developers, and administrators can all access an integrated platform for learning administration, delivery, and materials through LMS. The LMS serves as the focal point for implementing e-learning. The LMS needs to support multiple methods of material delivery. Google Classroom is one LMS that may be utilized for education.

Google Classroom is an LMS developed by Google. This application is free of charge but has various facilities to help educators in managing and planning "virtual classes." To support its use, this application can also be integrated with other online learning media. The following benefits of Google Classroom are a streamlined feedback process, accessible communication, fit for blended learning, free to use, and usable on many platforms (Paramahita, 2021). Google Classroom is a learning media that can create class groups for each class and sub-groups for several groups in the class, make assignments, create quizzes, discussion rooms, assessments, and copy material and tasks that are automatically stored in Google Drive. This application is also handy for education in the face of technological advances (Gopur, 2018).

Google Classroom is a learning aid media that offers material discussions and work assignments that can be used anywhere and practically without stationery. Google Classroom provides various facilities for teachers to provide teaching materials online. The teacher can upload PowerPoint presentations, videos from YouTube, and videos made by the teacher, and the teacher can upload questions that are used to assess student learning outcomes (Rachma et al., 2020). Google Classroom features enable educators to efficiently distribute assignments and submit and

assess assignments so that indirectly, students become motivated and can more easily access the assignments given.

In Biology subjects, the features in Google Classroom allow educators to visualize biology material digitally, so it is hoped that students will find it easier to understand biology material. Packaging biological materials in digital format, such as videos, will make them more interesting and easier to learn. For example, material about cells and cell images presented in the form of ordinary/two-dimensional (2D) images will certainly be different from cells presented in three-dimensional (3D) animation (Jayawardana, 2017).

This research aims to analyse the effectiveness of using Google Classroom on students' motivation and learning outcomes in Biology.

## 2. MATERIALS AND METHODS

### 2.1. Research Design

This research is pre-experimental. The research design is a one-group pre-test and post-test. Table 1 presents an overview of the research design.

**Table 1. Research Design**

Pre-test	Treatment	Post-test
O <sub>1</sub>	X	O <sub>2</sub>

Notes:

O<sub>1</sub> : Pre-test

O<sub>2</sub> : Post-test

X : Using Google Classroom

### 2.2. Date and Place of Research

This research was conducted in 4 senior high school in Central Java namely SMA MTA Surakarta, SMA PGRI 1 Pati, MAN 1 Grobogan, and SMA Negeri 2 Mranggen. This research was carried out during the 2021/2022 academic year.

### 2.3. Research Sample

The sample in this study is shown in Table 2.

**Table 2. Research Sample**

School	Number of Sample
SMA MTA Surakarta	56
SMAN 2 Mranggen	63
SMA PGRI 1 Pati	35
MAN 1 Grobogan	30
<b>Total</b>	<b>184</b>

### 2.4. Data and Data Sources

Data and sources of data in this study are shown in Table 3.

**Table 3. Data and Data Sources**

Data	Data Sources	Data Collection Technique
Students' motivation	Students	Questionnaire
Students' learning outcome	Students	Test
Implementation of Google Classroom	Learning Process	Observation

### 2.5. Data Collection Technique

The data collection techniques in this research will be described as follows.

#### 2.5.1. Questionnaire

Questionnaires are used to collect data on student learning motivation through Google Classroom. The learning motivation questionnaire is a closed-type questionnaire with weighted answers using a Likert scale. Questionnaires were given during the pretest and posttest. The motivation questionnaire consists of two aspects: intrinsic motivation and extrinsic motivation. The number of questionnaire statement items is 20.

#### 2.5.2. Test

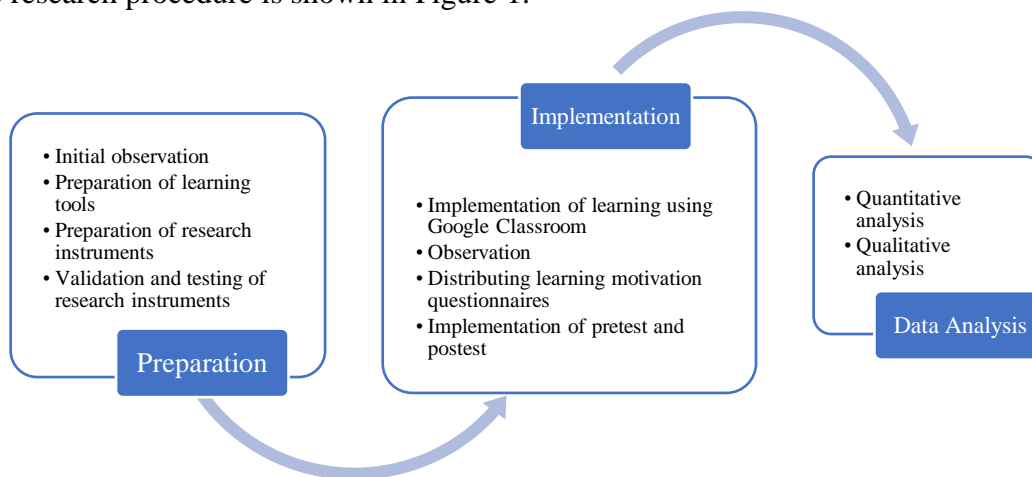
The test is used to obtain data on biology learning outcomes through Google Classroom. It consists of 20 multiple-choice questions. Before use, the questions are first tried out and then tested for validity and reliability. Validity and reliability testing of test items was carried out with the help of SPSS 20.

#### 2.5.3. Observation

Observations were carried out to obtain secondary data in the form of learning implementation using Google Classroom. The observations carried out were non-participatory observations, in which the researcher was not a member of the sample being studied.

### 2.6. Research Procedure

The research procedure is shown in Figure 1.



**Figure 1. Research Procedure**

### 2.7. Data Analysis Technique

Data analysis was carried out in two stages: descriptive and quantitative. Descriptive analysis includes the amount of data, maximum value, minimum value, average, and standard deviation. Quantitative analysis was carried out to determine the effectiveness of Google Classroom on student motivation and learning outcomes. Quantitative data analysis was carried out using prerequisite analysis tests, namely the normality test (using the Shapiro-Wilk test) and the homogeneity test. Hypothesis testing was used with the independent sample t-test, which was then followed by effectiveness testing using the N-Gain Score.

### 3. RESULTS AND DISCUSSION

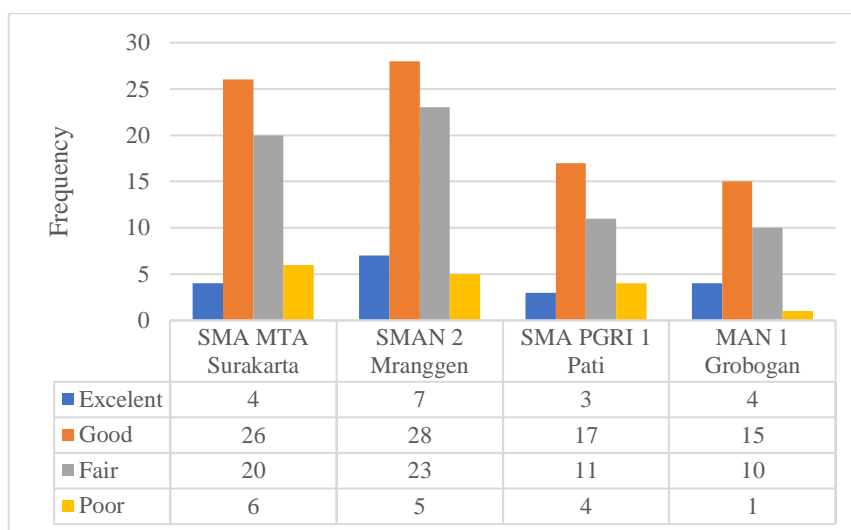
#### 3.1. Students Motivation on Biology through the Implementation of Google Classroom

Motivation is a driving force or pull that causes behavior toward a certain goal. It plays an important role in improving the quality of learning outcomes (Triyono et al., 2020). Learning motivation data was obtained from the results of a questionnaire administered after learning treatment using Google Classroom. Table 4 presents an overview of learning motivation data.

**Table 4. Students Motivation through the Implementation of Google Classroom**

School	Average	Category
SMA MTA Surakarta	73,76	Good
SMAN 2 Mranggen	76,80	Good
SMA PGRI 1 Pati	80,06	Good
MAN 1 Grobogan	79,26	Good
<b>Average</b>	<b>77,47</b>	<b>Good</b>

Table 4 shows that, in general, the average student motivation score after learning using Google Classroom is in a good category, with an average score of 77.47. The results of the learning motivation questionnaire were then categorized into excellent, good, fair, and poor learning motivation categories. A comparison of the frequency of learning motivation categories is shown in Figure 2.



**Figure 2. A comparison of the frequency of learning motivation categories**

Students' motivation for learning comes from inside of themselves, which is an essential factor in determining successful learning. According to Ghazali et al. (2022) several factors influence students' motivation to learn, namely material and personal needs, knowledge, and attitudes of teachers. Firdaus (2019), in his study, stated that factors influence students' motivation, which he summarized into four factors: parents (who have formal educational background and support), good teachers' role, good friends' influence, and cohesive school management.

Google Classroom can positively impact students' learning motivation. Its features allow students to interact actively with other students and teachers through discussion forums, making learning more interactive. Google Classroom also gives teachers the freedom to upload interactive teaching materials such as student worksheets or learning videos. This is consistent with a study by Paramahita (2021), that revealed most students thought Google Classroom was helpful for their academic work. According to this study, pupils thought that learning had become simpler with Google Classroom. The students' view was mostly impacted by four factors: stability, ubiquity,

familiarity, and ease of use. Because Google Classroom is free to use, it is widely used by teachers and is therefore well-known to students. Students also had no difficulty using it due to its simplicity, which made it simpler for them to get more accustomed to it. Ultimately, the majority of students who had previously used alternative programs thought that Google Classroom was more reliable and much simpler to use.

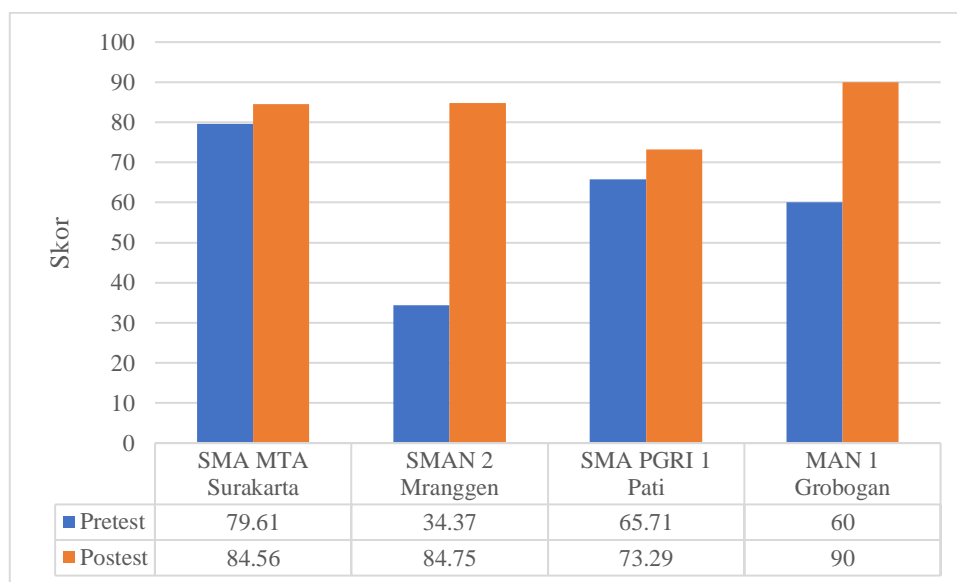
### 3.2. Students Learning Outcomes on Biology through the Implementation of Google Classroom

Learning outcomes are the degree to which students succeed in learning a subject in school, as shown by test scores. These results provide insight into the subject matter being studied. Individuals engage in a process known as learning outcomes in order to modify their behavior in general as a result of their interactions with their surroundings. Learning outcomes are the results, expressed as numbers, that students obtain at the conclusion of a meeting, midterm, or semester after taking a test on them (Herian et al., 2022). Data on student learning outcomes is limited to cognitive learning outcomes obtained based on the results of tests carried out before and after the implementation of learning using Google Classroom. Table 5 describes the learning outcome data.

**Table 5. Students Learning Outcomes through the Implementation of Google Classroom**

School	Pretest	Category	Average Posttest	Category
SMA MTA Surakarta	79,61	Good	84,56	Good
SMAN 2 Mranggen	34,37	Very Poor	84,75	Good
SMA PGRI 1 Pati	65,71	Good	73,29	Good
MAN 1 Grobogan	60,00	Fairly	90,00	Very Good
<b>Average</b>	<b>59,92</b>	<b>Fairly</b>	<b>83,15</b>	<b>Good</b>

Table 5 shows an increase in students' cognitive learning outcomes before and after implementing Google Classroom. Figure 3 presents a comparison of pretest and posttest scores.



**Figure 3. A comparison of the pre-test and post-test score**

Cognitive learning outcome data was analyzed quantitatively using the N-gain score test. The N-gain score test analyzes the effectiveness of learning using Google Classroom on student learning outcomes. The results of the N-gain score test are presented in Table 6. Table 6 shows that the categories of effectiveness of implementing Google Classroom on students' cognitive learning outcomes vary by school.

**Table 6. Result of N-Gain Score Test**

School	N-Gain Score	Category Effectiveness
SMA MTA Surakarta	23,74	Low
SMAN 2 Mranggen	76,38	High
SMA PGRI 1 Pati	14,29	Low
MAN 1 Grobogan	60,67	Medium
<b>Average</b>	<b>43,77</b>	<b>Medium</b>

Google Classroom is an educational tool that provides discussions and work assignments that are practically stationery-free and can be utilized anywhere. Google Classroom offers educators a number of tools to create online lesson plans. The instructor has the ability to submit PowerPoint presentations, videos from YouTube, videos that they have produced, and questions that are used to gauge the learning objectives of their students. Three perspectives are available to observe student learning outcomes: cognitive, affective, and psychomotor. The results of daily examinations, midterm exams, and final semester evaluations can be used to determine the cognitive learning outcomes of students. Students no longer need to utilize paper to gather their assignments because the teacher can post daily exam questions online for them to complete instantly. Because student grades are automatically released in the Google Classroom application, teachers may also evaluate the results of students' daily assessments directly, which makes it easier for teachers to evaluate student learning outcomes (Rachma et al., 2020).

The efficacy of student learning can be increased with Google Classroom-Based Learning. Because it can be done at any time and from any location, it can help students study even in distant settings. It is anticipated that students participating in online learning will have an alternative to improve their learning outcomes through the use of Google Classroom-based online learning resources to assess the learning outcomes of fourth-grade students in elementary schools. Some students struggle with not having an internet quota, and some students still face challenges with online learning based on Google Classroom because they are still in the adjustment stage. These are the challenges encountered in the online learning process based on Google Classroom. Giving impoverished students assistance with their internet allotment is one way for schools to get past the first hurdle. The teacher can then get around the second challenge by giving instructions or doing simulations before the actual learning process begins (Mutmainnah et al., 2022).

#### 4. CONCLUSIONS

Based on the results of the research and discussion, conclusions can be drawn: (1) Learning using Google Classroom can have a positive impact on student learning motivation, as can be seen from the average motivation score of 77.47; (2) Learning using Google Classroom is effective for student learning outcomes in the medium effectiveness category (average N-Gain score 43.77).

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