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# Exploring Innovative Approaches: Optimizing Google Classroom for Enhanced Motivation in Science Learning

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**ABSTRACT**

**Purpose of the study:** This research aims to investigate the challenges encountered in utilizing Google Classroom as a learning platform and its implications for motivating students in studying science, with a focus on identifying both internal and external factors affecting students' engagement and interest in the subject.

**Methodology:** This study employs a descriptive qualitative approach to explore the challenges associated with using Google Classroom as a learning tool for motivating science study. Data collection methods include observation, questionnaires, interviews, and documentation. The analysis involves data reduction, presentation (Data Display), and conclusion drawing/verification stages. Data validity is ensured through triangulation of data sources, enhancing the reliability of the findings.

**Main Findings:** The research highlights internal problems like difficulty with Google Classroom, limited smartphone access (1.03%), material comprehension issues, and insufficient teacher explanations. External challenges include lack of family support and teacher interaction. Solutions include providing internet data for infrastructure issues, motivational videos on Google Classroom, video-based learning, and student self-initiated learning via Google, YouTube, and books. Student motivation for science learning through Google Classroom is moderate at 56%.

**Novelty/Originality of this study:** This research contributes novelty by scrutinizing the nexus between Google Classroom and student motivation in science education, addressing a significant gap in current literature. By elucidating nuanced challenges and implications for student engagement, the study offers fresh insights into optimizing digital learning platforms to enhance motivation and learning outcomes in science education amidst the evolving educational landscape shaped by technology.



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## 1. INTRODUCTION

Education is an effort that can accelerate the development of human potential to be able to carry out the tasks assigned to them, because only humans can be educated and educate [1], [2], [3]. The educational studies that need to be developed are of course both theoretically, practically and philosophically [4], [5], [6]. Theory and

practice in the world of education have developed along with the increasing human civilization [7], [8], [9]. The learning process actually has a very important role in improving the quality of education, so that the learning that will be held prioritizes and benefits students [10], [11]. This is expected to create a learning atmosphere that can stimulate students' abilities to explore and explore their potential optimally in a creative, innovative and fun way [12], [13]. Current learning is directed at modernization activities with the help of advanced technology with the hope that it will help students digest lesson material in an interactive, productive, effective, inspiring, constructive and enjoyable manner. Apart from that, students are also expected to have life skills from the application of this technology.

Education often calls education the era of the industrial revolution 4.0 to describe various ways of integrating cyber technology both physically and non-physically in learning [14], [15], [16]. Education in the era of the industrial revolution 4.0 is a phenomenon that responds to the needs of the industrial revolution by adapting the new curriculum to the current situation [17], [18], [19]. This curriculum is able to open a window to the world through the palm of your hand, for example by utilizing the internet of things (IOT) [20], [21]. One of them is the government's decision to move the learning process from school to at home. In this case, educators are expected to have the skills and ability to think creatively and innovatively to collaborate with students during the learning process [22], [23], [24]. With the era of increasingly developing technology, the learning process is directed at making good use of technology.

Learning media has a central role in the modern educational process, becoming a bridge between knowledge and learners [25], [26], [27]. In today's digital era, various learning media, such as learning videos, interactive simulations, and online platforms, provide a more dynamic and comprehensive learning experience. This media is able to visualize abstract concepts, inspire imagination, and facilitate project-based learning [28], [29]. The use of learning media not only creates a more interesting learning atmosphere, but also increases student engagement, allowing them to learn according to their individual style and pace. With the continued development of technology, integrating innovative learning media is the key to preparing a generation of learners who are adaptive and able to compete in the global era.

Technology has become the main driver of transformation in various aspects of human life [30], [31], [32]. Continuous innovation changes the way we work, communicate, and even learn. The development of information and communication technology, such as the internet and smartphones, has shortened distances and expanded access to global information [33], [34]. The technological revolution has also shaped the era of artificial intelligence, where computers and machines can process data and make decisions like humans [32], [35], [36]. Renewable energy technologies, such as solar panels and lithium-ion batteries, contribute to environmental efforts. Meanwhile, the latest medical technology has improved the diagnosis and treatment of disease. With so many positive impacts, ethical challenges related to data privacy and security are also a concern. As technology continues to evolve, it continues to shape our world, creating new opportunities and redefining the way we interact with our surroundings.

One of the current uses of technology is eLearning using the Google Classroom application. State Junior High School 4 Salatiga is one of the schools that uses e-Learning as a learning medium. Learning activities at school use e-learning media using the Google Classroom application. In the learning process, students are given assignments by 3 teachers and the results are sent to the application. Apart from that, students are also given learning materials via the Google Classroom application.

This research is in line with research conducted by Johnson [37], which discusses the context of using the Google Classroom application in learning, presenting evidence about the platform's effectiveness in facilitating communication and collaboration between teachers and students, as well as enabling flexible access to learning materials. Education faces new challenges that require rapid adaptation to changing learning environments. This is also in line with a study by Khan [38], highlighting the important role of e-learning technology, including applications such as Google Classroom, in facilitating the continuity of the learning process in the midst of a crisis. However, these two studies did not discuss the use of Google Classroom as a learning tool for motivation to learn science as did this study. So this research is new which discusses the use of Google Classroom as a learning tool for motivation to learn science.

The novelty of this research lies in its specific focus on the use of Google Classroom to increase motivation to learn science among students at Negeri 4 Salatiga Junior High School. While previous studies by Johnson [24] and Khan [25] have explored the general effectiveness of Google Classroom in facilitating communication, collaboration, and continuity of learning during crises, they have not specifically addressed how this platform can be used to boost student motivation in science education. This study breaks new ground by examining the unique challenges and factors that influence student engagement and interest in science through the lens of e-learning technology, specifically Google Classroom.

This research has several important implications in the educational context, especially in the use of e-learning technology to increase students' learning motivation in the field of science. The results of this research can help educators and policy makers design effective strategies for utilizing e-learning platforms such as Google Classroom to increase students' science learning motivation. Additionally, the findings of this research can be used

to develop professional training programs for teachers, helping them use Google Classroom more effectively to inspire and motivate students in science lessons. Furthermore, the results of this research can also contribute to formulating educational policies that support the integration of digital tools in science learning, ensuring the use of technology not only to deliver material but also to increase students' motivation and interest in learning.This research aims to investigate the challenges encountered in utilizing Google Classroom as a learning platform and its implications for motivating students in studying science, with a focus on identifying both internal and external factors affecting students' engagement and interest in the subject.

## 2. RESEARCH METHOD

### 2.1 Types of Research

This research adopts a descriptive qualitative approach to understand more deeply the challenges associated with using Google Classroom as a learning tool in motivating students to study science [39], [40], [41]. This approach was chosen because it allows researchers to explore the experiences and perceptions of students and teachers in depth, as well as to gain a holistic understanding of the dynamics of the interaction between Google Classroom and student motivation. Thus, this research will provide richer and more contextual insights into how these digital platforms influence students' motivation to learn science.

### 2.2 Population and Sample

The population of this study were students at State 4 Salatiga junior high school who used Google Classroom as a learning tool. The sample was selected from 7th and 8th grade students representing a wide range of ability levels and backgrounds. A total of 50 students were randomly selected as research samples. Sample selection was carried out by considering representativeness and diversity in the context of student characteristics relevant to the research objectives.

### 2.3 Data Collection Techniques

The data in this research was collected through several methods, including observation, questionnaires, interviews, and documentation. Observations were carried out to gain a direct understanding of student interactions with Google Classroom. Questionnaires were distributed to students to collect data about their perceptions and experiences regarding the use of Google Classroom. Interviews were conducted with teachers to gain insight into the challenges they face in using the platform. In addition, documentation is used to collect information regarding the use of Google Classroom in science learning.

### 2.4 Data Analysis Techniques

Data analysis in this research involves several stages, including data reduction, data display, and conclusion drawing/verification. Data from various sources is collected, analyzed, and grouped to identify patterns, themes, and relationships relevant to the research objectives. The analysis was carried out systematically and holistically to ensure the accuracy and reliability of the findings [42], [43].

### 2.5 Research Procedures

The research procedure begins with preparation which includes planning the research design, developing research instruments, and preparing logistics. Then, the data collection approach was carried out in accordance with the planned stages, namely observation, questionnaire distribution, interviews, and documentation collection. After the data was collected, detailed data analysis was carried out to identify the main findings. Conclusions are drawn based on analysis of research findings and implications for science learning practices using Google Classroom.

## 3. RESULTS AND DISCUSSION

The research findings have provided insights into the challenges encountered in utilizing Google Classroom as an educational tool and its impact on students' motivation to learn science. This study employed a questionnaire distributed via Google Form to students at State 4 Salatiga junior high school. A total of 50 students from 7th and 8th grades participated in the survey. Data collection through the questionnaire method comprised statements addressing the challenges associated with using Google Classroom for science learning, including both internal and external factors. Apart from using a questionnaire, this research also used a structured interview method regarding various problems and efforts of school principals, science subject teachers and students when facing learning using Google Classroom. Internal problems Internal problems are problems that originate from within the student himself. Or problems that occur because of the student's personal self, examples of internal problems are motivation and interest as well as basic knowledge about the subject matter.

The following are answers to questions given by researchers to respondents regarding the efforts made when learning science using Google Classroom. As stated by AAH, an 8th grade student, "I rewrote the material in my notebook, and read material I didn't understand and searched for knowledge on Google." Apart from AAH, VE also answered, "The effort I make if I don't understand the content of the science material delivered via Google Classroom is that I will open other media, namely Google and supporting media (Brainly, Wikipedia, etc.) to ask about material that I don't understand. Sometimes, I will also ask my friends who understand the material a little bit about the material that I don't understand better."

Apart from that, teachers who teach science subjects also make efforts so that students can understand the science subject matter. The following are the efforts of EP and NAA as science teachers in grades 7 and 8 at State 4 Salatiga junior high school. "Use instructions to search on Google web or use YouTube." Apart from the EP, NAA also answered, "efforts are being made using learning media in the form of videos, and students are asked to look for references to animated videos on YouTube. And if students find it difficult to contact the teacher via private chat." In this case, the principal also makes efforts to encourage students to face online learning or learning using Google Classroom. The following are the results of the interview from the school principal, For students who experience difficulties in terms of infrastructure, the class teacher is tasked with collecting data and then the school provides assistance in the form of providing internet data. Apart from that, don't forget to provide motivation in the form of videos that students can directly access via the forum on Google Classroom.

Internal problems are one of the problems that exist within a person. In terms of the problems of using Google Classroom as a science learning tool, there are several problems that occur to students, namely as follows: Problems of online-based learning (Google Classroom) Problems of online-based learning using Google Classroom are one of the problems regarding the basic knowledge that a student must have in facing the current situation. Like the efforts made by State 4 Salatiga junior high school, namely using Google Classroom in its learning system. Based on the research results, there are several problems with online-based learning experienced by students, namely that there are students who do not have smartphones. According to information from the head of the curriculum at State 4 Salatiga junior high school, there are 1.03% of students who do not have smartphones.

This is very much a problem faced by the students concerned. Signals are also one of the problems in online-based learning experienced by students. Apart from that, there are still students who cannot operate Google Classroom. b. Problems of motivation and interest Problems of motivation and interest are problems that influence determining a goal, both goals in the field of education and other goals. In the field of education, the problem of motivation and interest has a very important role. Without motivation and interest, you will not know your goal. Based on the research results, there are students who lack motivation and interest in learning science using Google Classroom. That is, students do not understand the content of the material presented by the teacher via Google Classroom. Apart from that, there is a lack of explanation of the science material delivered by the teacher. From several problems experienced by students. This has a big influence on students' motivation and interest in learning science during learning using Google Classroom.

External problems are problems that arise from outside the student and greatly influence the student's attitudes. There are several problems that are external. Namely, family environmental problems and school environmental problems. The following are the results of research data analysis regarding external problems. a. Problems of the family environment The family environment is a very important factor in shaping a student's personality. A family that is harmonious, full of attention, affection and fun will have a good influence on a child. From the researchers' findings, most of the family environment supports and encourages students when doing assignments or taking part in online-based learning. However, there are still students who receive less attention from their family environment. The lack of attention and support causes students to be less than optimal in dealing with online-based learning [44], [45].

Apart from the obstacles of lack of attention and support from the family environment. Harmony in the family also greatly influences students' readiness to face online-based learning. Problems of the school environment The school environment is an environment that also plays an important role in shaping the personality of its students. Teachers have an important role in shaping the attitudes of their students. However, in the school environment, the problem faced when learning using Google Classroom is the lack of direct interaction between teachers and students. This is due to online learning. Teachers can only monitor students via WhatsApp, Google Classroom and other applications. From the teacher's observations through the online learning application, there are still students who lack interaction with the teacher. And causes students to participate less actively in learning activities using Google Classroom.

Efforts made by school principals, science subject teachers and students in dealing with science learning using Google Classroom. Efforts are an effort to increase a person's knowledge from not knowing to knowing. Regarding the problem of using Google Classroom as a learning tool, many efforts have been made by school principals and science subject teachers to improve the quality of knowledge during the online learning process [39].

Apart from the school principal and science subject teachers, students are also trying to deal with the online-based learning process. The school principal must be able to carry out good management functions and be

able to manage all the school's potential so that it runs optimally in supporting the achievement of school goals. The efforts made by the principal of State 4 Salatiga junior high school during online learning were for students who experienced difficulties in terms of infrastructure, the class teacher was tasked with collecting data and then the school provided assistance in the form of providing internet data. Apart from that, don't forget to provide motivation in the form of videos that students can directly access via the forum on Google Classroom.

Many efforts have been made by teachers for students in dealing with learning using Google Classroom. One of the efforts made by teachers is using video learning. From learning using videos, students can better understand the content of the learning material that has been delivered [46], [47]. Apart from that, teachers also monitor each student's progress in understanding learning through Google Classroom. Apart from the efforts of school principals and teachers, students are also making efforts to deal with online learning. Students at State 4 Salatiga junior high school have several efforts when dealing with and understanding learning material using Google Classroom.

The effort that many students make is to search for material they don't yet understand via Google, YouTube and several other book sources. This really helps students in increasing students' understanding of the material presented by the teacher. Motivation to learn science at State 4 Salatiga junior high school. Motivation to learn is an impulse that arises from within the student and from outside the student. Encouragement from within students includes willingness, desire, encouragement to learn and hopes for students' ideals. Meanwhile, encouragement from outside of students includes a conducive learning environment, interesting learning activities and efforts from the teacher in the learning process.

This study has several limitations that need to be noted. First, the sample size used was relatively small, namely only 50 students from grades 7 and 8 at the Negeri 4 Salatiga junior high school, so the findings may not be fully representative of the wider population. Second, this research relies on questionnaire and interview methods which may be limited to the subjectivity of respondents and does not delve deeper into other aspects that can influence student learning motivation. For future research, it is recommended to expand the research sample to various schools and different grade levels to obtain more comprehensive results. In addition, more diverse research methods such as direct observation and case studies can be used to gain a deeper understanding of the factors that influence Google Classroom use and motivation to learn science. Further research could also explore the long-term impact of e-learning use on students' academic achievement and life skills.

## 4. CONCLUSION

Based on the results of internal research, online-based learning proficiency problems and insufficient explanations of scientific material contribute to student disengagement and lack of interest. Externally, inadequate family support and limited direct interaction between teachers and students in online learning environments further hinder effective engagement. To address these challenges, future research should focus on increasing students' technical proficiency, improving pedagogical approaches to online content delivery, strengthening family engagement, and promoting interactive learning strategies to encourage greater student engagement and participation. For future research, it is recommended to expand the research sample to various schools and different grade levels to obtain more comprehensive results. In addition, more diverse research methods such as direct observation and case studies can be used to gain a deeper understanding of the factors that influence Google Classroom use and motivation to learn science. Further research could also explore the long-term impact of e-learning use on students' academic achievement and life skills.

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