



# Efforts to Improve Students' Communication Skills and Technological Literacy by Developing Google Sites Learning Media on Virus Material at Grade X

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**Abstract:** This research aims to develop Google Sites learning media on the subject of class X viruses to improve the communication skills and technological literacy of State High School students in Samarinda. The type of research used is Research and Development (R&D) with the Sugiyono development model. Data collection techniques using questionnaires, interviews and tests. The data analysis technique used is quantitative and qualitative data analysis. The subjects in this research were 3 expert validators, namely media, language and materials experts, 1 educational practitioner who was a biology subject teacher and class discussing viruses. The validation results from 3 expert validators obtained a score of 81.97% in the very feasible category. The practicality assessment by the teacher received a score of 97.8% in the very practical category and the assessment by students obtained a score of 85.1% in the very practical category. The use of Google Sites learning media has a significant influence on student learning outcomes with the calculated t value obtained ( $0.00 < 0.05$ ) with a score gain index of 0.77 in the high category which shows that Google Sites learning media is effective in increasing students' understanding of learning materials. The results of the communication skills assessment questionnaire obtained a score of 81% in the very good category and technological literacy skills received a score of 86% in the very good category.

**Keywords:** Communication skills; Google sites; Learning media; Media development; Technological literacy; Viruses

## Introduction

The field of education is a major part of building a nation's civilization. Through the world of education, we will give birth to future superior generations who will have careers in various fields of work. 21st century learning competencies focus on improving human resources to face competitiveness and keep up with rapid developments in the world of work (Khasanah et al., 2019; Puspa et al., 2023). The world of work in the era of society 5.0 will be human-centered and technology-

based (Mourtzis et al., 2022; Tavares et al., 2022). Apart from technological skills, communication skills in the era of society 5.0 are also very necessary to build networks and interactions between people to achieve certain goals (Alojaiman, 2023; Aquilani et al., 2020; Maddikunta et al., 2022; Roblek et al., 2020).

Technological literacy skills and communication skills are part of 21st century learning implemented in schools (González-pérez et al., 2022; Hursen et al., 2023; Liesa-Orús et al., 2020). However, in reality in the field, from observations made at 10 schools in Samarinda, it

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was found that 100% of biology teachers still used Power Points in teaching and then students listened to the teacher's explanation. So there is no visible business activity to develop students' technological literacy skills in schools. According to Helaludin (2019), Yangari et al. (2021), Yang et al. (2021), and Radovan et al. (2024), activities in schools that can be used as an effort to develop students' technological literacy skills are by implementing blended learning which is technology-based learning in schools.

The subject of viruses is part of biology learning with complex, abstract material and complicated concepts. This can affect students' ability to understand the material, cause boredom and will have an impact on their learning outcomes. From the results of observations and interviews, most students do not actively communicate in learning. This is caused by a lack of understanding of virus material. Students who have weak insight and ability towards the subject matter ultimately do not have the courage to communicate it (Rizaliati, 2022). According to Muhammad et al. (2020) Mulyadi et al. (2023), and Haryana et al. (2022) learning media that can visualize material can make it easier for teachers to explain material and can explain abstract concepts. Therefore, there is a need for interesting and interactive learning media using technology as a learning media.

Websites are one of the media that can be used in the technology-based learning process. Websites are media that are easy to operate and have features that help student learning (Bodzin et al., 2007; Ismail et al., 2022). In the observations made, 80% of teachers had never used websites in learning because the teachers had not yet mastered them, had not yet studied them, had never created them and considered websites too complicated to prepare. Google sites is a platform for creating learning websites without having to use coding. Some of the advantages of using Google Sites learning media are that it is easy to access and can be used for free (Liou, 2011). Google sites have features that can present material, images, video and audio (Adzkiya et al., 2021; Corpuz, 2023). Several studies on the use of website-based learning media show that the use of website-based learning media can focus students' attention because it can display visualizations on cellular respiration material, and photosynthesis (Bodzin et al., 2007). According to Jones et al. (2003) the use of websites as a medium is very useful for studying the morphology of very small adenoviruses and can increase students' conceptual knowledge of cell and molecular material (Lee et al., 2013).

Referring to the background that has been described, the researcher is interested in developing Google Sites learning media on the topic of class X viruses to improve the communication skills and

technological literacy of high school students in Samarinda.

## Method

This research is research and development or Research and Development (R&D), which is a type of research to develop or validate products used in education and learning (Sugiyono, 2021). The data obtained from this development research is qualitative data and quantitative data. Data collection techniques in this research used validation questionnaires, response questionnaires and tests. The validation questionnaire and responses were then calculated in percentages and substituted into qualitative criteria. Meanwhile, the results of the test method will be used for the t test.

## Result and Discussion

This development research uses the Research and Development (R&D) research and development method (Sugiyono, 2020). The initial step of this method is to identify problems and potential with the following results, 100% of teachers still use PowerPoint in the learning process. In the current era, students are more interested in reading material through gadgets than through books. Students absorb knowledge that is shared more quickly in audio-visual form. , 80% of teachers have never used websites in learning due to lack of knowledge and weak understanding of the process of creating websites as well as lacking IT skills, 80% of teachers think that students like to learn in groups, but during discussions there are students who are less active, 90% of teachers feel the need to implement web-based learning in schools because according to them websites are one of the media that can facilitate interaction between teachers and students, they want to try new things, can broaden their insight and attract students' attention, they think they can simplify the learning process and are needed to keep up with current technological developments and improve students' technological literacy skills.

According to teachers, ideal websites are websites that are interesting and creative, easy to use, easy to understand, contain photos or videos that can make students' understanding easier and contain practice questions. 90% of teachers are willing if their school is used as a research object in developing web-based media because they want to increase their insight and knowledge of new learning media, improve their abilities regarding technology-based learning, think that web-based learning media can be applied in their school and there are several teachers who are interested in create and need a tutor in creating this Google sites

media. The results of these observations are then analyzed and used as a basis and consideration in creating website designs. Next, data is collected in the form of learning objectives, learning outcomes, materials, photos, videos, teaching modules and questions related to the material. Next is the product design process, namely making flowcharts and story boards, then validating the design by 3 experts, namely media, material and language experts. Then the design is revised and continues with product manufacturing.

Making products using hardware and software devices. The software devices used are Asus laptop, mouse and smartphone, while the software devices used are YouTube, Google Search, Google Drive, Google Forms, Google Doc, Google Sites platform and QR code generator application. After the product is finished, the product is tested limited to 20 students of SMAN 11 Samarinda, then after the assessment is carried out revisions will be made according to comments from teachers and students, after that the product is tested more widely in the same school but using more students, namely 30 student. After there were no comments or suggestions, the results of the development product were obtained as follows.

Home Page



Figure 1. Appearance of the google learning media home page

CP and TP Menus



Figure 2. CP and TP menu appearance on google media sites

Material Menu



Figure 3. Material menu appearance on google learning media sites

Task Menu



Figure 4. Task menu appearance on google sites learning media

Learning Activities Menu



Figure 5. Display of the learning activities menu on google sites learning media



## Guide Menu



**Figure 6.** Guide page on google sites learning media

In this research and development, feasibility tests, practicality tests and effectiveness tests were carried out. The following are the results of the feasibility test assessment obtained from the validation of 3 validators, namely 75% from media experts with conclusions worthy of trial with slight revisions, 80% from language experts with conclusions worthy of trial with slight revisions, and 90.7% from material experts with conclusions worth a trial without revision. The practicality test was carried out on teachers and students at school. Media is said to be very practical if it meets an average score of 81% -90% (Rofiqoh et al., 2020). The results of the practicality test assessment from teachers and students in the wider test are as follows. In the results of the teacher's assessment, the technical aspect obtained an assessment of 100% with very practical criteria, in the material aspect a score of 91.1% was obtained in the very practical category, in the presentation aspect an assessment was obtained of 100% in the very practical category, in the usefulness aspect an assessment was obtained. 100% in the very practical category. Based on the assessment above, the average teacher practicality rating was 97.8% in the very practical category. Meanwhile, students' assessments obtained an assessment of the media quality aspect of 84.1% in the very practical category, in the ease aspect they obtained an assessment of 85% in the very practical category, in the interest aspect they received an assessment of 86.2% in the very practical category. Based on the assessment above, the average student practicality assessment was 85.1% in the very practical category.

Based on the data above, there was an increase in all aspects, namely aspects of media quality, convenience and interest. There was a significant increase in aspects of convenience and interest. This happened after the learning media was revised according to comments and suggestions from students. Students' responses to media quality have several

aspects, namely the quality of photos and videos, color and design, text format and fonts used. When creating a design you need to pay attention to several principles, namely unity, balance, proportion, rhythm and dominance. In a design, color combinations are also very important and must be paid attention to. Likewise in choosing a font because writing is a medium for conveying information that can be read and understood easily by paying attention to visual clarity by choosing the appropriate size, type, contrast and space between letters (Anggraeni et al., 2023; Yusa et al., 2023).

Students' responses to the ease of media include ease of operation, ease of understanding instructions for use, ease of understanding language and ease of studying material on Google Sites learning media. The increase in responses on the convenience aspect was not as high as on the interest aspect, because students believed that they understood the material well enough but still needed a little explanation from the teacher so that their understanding could be better. Learning activities will be more meaningful if the communication process is able to arouse students' interest and make it easier to understand the material presented by the teacher, assisted by the development of interactive learning media. One aspect that needs to be considered in making learning media is ease of operation because it will be related to the ease of the ongoing learning process, the ease of the learning process will certainly provide motivation for students (Atikah et al., 2021; Erfan et al., 2020; Nafi'a et al., 2020).

The response to the interest aspect is much increased. This shows that the Google Sites learning media developed is overall interesting. Students are enthusiastic and enthusiastic in participating in learning using Google sites. And students think that the Google Sites learning media on viral material is very fun and not boring. Based on the results of assessments from teachers and students as well as the explanation above, it can be concluded that Google Sites learning media on viral material is very practical. The effectiveness of learning media has also increased as evidenced by testing with the t test at the wider product trial stage showing the influence of Google Sites learning media on the effectiveness of learning in the treatment class. This can be proven by  $t_{count} 0.00 < 0.05$  which states that the Google Sites learning media influences student learning outcomes. This is supported by an increase in the n gain value in the control class, an n gain of 0.24 was obtained, in the wider trial class an n gain of 0.77 was obtained. Google Sites learning media can also have an impact on the effectiveness of learning in treatment classes which can be proven by the N-gain score of 0.77 which is in the high category. The results of this research are in line with Japrizal et al. (2021) in their research results which concluded that the Google Sites learning media was

effective on student learning outcomes at SMK Negeri 6 Bungo for the 2020/2021 academic year. Research conducted by Vekli et al. (2023) regarding the use of the web in biology learning shows that web-based biology learning is quite effective in improving students' academic abilities.

Based on the data analysis above, it can be seen that there was an increase in the N gain value when a wider trial was carried out and it can be concluded that the Google Sites learning media is increasingly effective in improving student learning outcomes. During the wider testing phase, students thought that the images presented on the Google Sites learning media were very suitable for the virus learning material. During the learning process, students were very enthusiastic about the images presented in the Google Sites learning media, especially regarding the harmful role of viruses, because the images and videos presented were very close to the actual situation and could be seen visually. The use of audio-visual media can help students understand abstract material to make it more real (Vekli et al., 2023). Positive comments from students will certainly have a big influence on their interest in learning so that learning outcomes also increase.

Apart from measuring the effectiveness of student learning outcomes using pretest and posttest, researchers also used questionnaires given to students via Google Form to measure the extent of students' communication and literacy skills after the learning process was carried out using Google Sites learning media in limited trial and wider trial classes. Data collection on communication skills is carried out by giving questionnaires directly to the sample (Sarini, 2019) and measuring technological literacy skills can use a questionnaire distributed to the sample (Ningrum et al., 2020). Students' communication skills have improved. In the control class, students' communication abilities were 69.9%, while in the wider trial, students' communication abilities increased to 80.4%. There was an increase in students' communication skills from the control level, limited trial stage and wider trial stage after revisions were made to the Google Sites learning media.

When using Google Sites learning media, students are given a platform to provide written questions, recitations and are trained to make written reports. Students' understanding of the material also increases by obtaining a high N gain value. The increase in students' understanding is because the Google Sites learning media presents many photos and videos which make it easier for students to visualize abstract virus material, such as the shape and structure of viruses, lytic and lysogenic cycles, which they can see pictures and videos on the Google Sites learning media. Google sites learning media can visualize material and can make it

easier for teachers to explain material and can explain abstract concepts (Muhammad et al., 2020). Apart from that, the attractive design of Google sites also motivates students to study and read the material on the websites.

This is in line with research conducted by Fitri et al. (2022) that there is an increase in reading interest from the application of website-based literacy media so that website-based media is effective in increasing students' reading interest. Students' interest in reading greatly influences their communication skills at school because a lack of interest in reading certainly makes students have weak insight into the subject matter and in the end do not have the courage to communicate it (Rizawati, 2022). Then learning using websites can increase the effectiveness of learning, some students respond positively to the use of media and are more active in learning activities (Ridwan et al., 2022). Learning media that students can see, touch and hear will make it easier for them to play an active role and understand the material in learning.

Apart from that, students' communication skills are also sharpened with the help of the role playing learning method which requires students to have the courage to appear in front of the class to play a role. Before appearing to play a role, of course students must really understand how the role they will perform and how the storyline fits with the material they have studied on the Google Sites learning media. The technological literacy ability of students in the control class was 75.8%, while in the wider trial it increased to 86.2%. In the trial stage using Google Sites learning media, all students used smartphones in the learning process starting from reading material, taking tests and collecting assignments, all of which were done using technology. When using Google Site learning media, all students utilize technology in the learning process in the classroom.

In the control class, students did not use smartphones or technology at all during learning. The learning process is carried out conventionally. Meanwhile, in the experimental class, all students use smartphones in the learning process and all students access Google Sites learning media to study material, work on questions and submit assignments. Efforts to increase technological literacy skills can be done by using technology during the learning process. The results of research conducted by Irvandy et al. (2023) show that website-based learning media can improve technological literacy skills and is suitable for use as a learning medium. Based on the results of the assessment and data analysis, it can be concluded that the development of Google Sites learning media using viral material can improve learning outcomes, communication skills and technological literacy for high school students in Samarinda.

## Conclusion

Google sites learning media design contains material equipped with photos and videos, evaluation using Google Forms and collecting assignments via Google Drive link. The feasibility of the Google sites learning media produced is very good with an average of 3 validators of 81.97% in the (very feasible) category. The practicality of the Google Sites learning media, the teacher's assessment showed a result of 97.8% (very practical) and the student assessment scored 85.1% (very practical). The effectiveness of the resulting Google Sites learning media can provide increased cognitive learning outcomes with a gain score index of 0.77 (high). The results of the communication skills questionnaire obtained a score of 80.4% (very good) and technological literacy skills of 86.2% (very good).

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## Author Contributions

In this paper, the author has contributed to several parts as follows: conceptualization by Khairunnisa; research methodology by Muh. Amir Masruhim; software by Khairunnisa; supervision by Muh. Amir Masruhim and Elsje T Maasawet; formal analysis by Khairunnisa; data source by Khairunnisa; data curation by Khairunnisa; preparation of the original draft by Khairunnisa; editing by Muh. Amir Masruhim, Elsje T. Maasawet, Abdul Hakim, Krishna P. Candra, and Lambang Subagiyo.

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## Conflicts of Interest

In this article the author emphasizes that there was no conflict of interest during the journal writing process. The author does not have the power to dictate the policies implemented by the schools studied. There was no data manipulation carried out by the author, and the school studied was only used as a source of information, and did not actively participate in writing up the research findings.

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