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Use of Google Sites as A Web-Based Learning Media in Physics Learning for High School Teachers in Langsa City

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Abstract

Differentiated learning is a key component of the Merdeka Curriculum, which emphasizes the need for media that supports students in learning according to their individual characteristics and pace. As a result, teachers must develop suitable learning media. Platforms like Google Sites offer a free and accessible way for teachers to create materials and assessments that students can access anytime. Therefore, teacher training in using Google Sites to create web-based learning media is essential to support differentiated learning in the Merdeka Curriculum. The training was held at Muhammadiyah High School in Langsa City and was attended by 25 Physics teachers who were members of the Langsa City Physics Teachers Organization (MGMP). The effectiveness of the training was measured using a participant response questionnaire with a total of 14 statements, which included indicators of knowledge, skills, attitudes, and perceptions. The results of the training showed that teachers were satisfied, and there was an increase in teachers' knowledge, skills, and attitudes in using Google Sites as a web-based physics learning media. Teachers expressed optimism about using Google Sites as a tool that can facilitate student learning according to individual preferences.

Keywords: Learning Media; Learning Website; Google Sites; Physics Teacher

1. INTRODUCTION

The development of education in Indonesia is always subject to curriculum renewal. The Ministry of Education, Culture, Research, and Technology (Kemendikburistek) issued a prototype curriculum in 2021, which will be refined in 2022 to become an independent learning curriculum (Sugiri & Priatmoko, 2020). This curriculum is the result of an evaluation of the 2013 curriculum (K-13).

The presence of this independent learning curriculum aims to answer the challenges of education in the era of the Industrial Revolution 4.0, including the adoption of new learning methods such as project-based learning, blended learning, and more personalized adaptive learning. Teachers must be able to effectively integrate technology to enhance the learning experience and ensure students can develop 21st-century skills such as

problem-solving, creativity, collaboration, and communication (Hattarina et al., 2022; Manalu et al., 2022).

“Merdeka Belajar” is one of the programs initiated by the Minister of Education and Culture, Nadiem Makarim, who wants to create a pleasant learning environment where the learning process considers the variations that exist among students. Therefore, the Merdeka curriculum emphasizes the importance of using a differentiated learning approach. Differentiated learning is a system whose learning process pays close attention to the diversity of students, starting from their readiness, interests, learning styles, and abilities to the needs of the students (Aprima & Sari, 2022). In the differentiated learning process, the teacher's duties include several essential aspects. They need to design learning activities that can accommodate individual differences in students in terms of abilities, interests, learning styles, and other needs (Fauzia, R., & Ramadan, Z. H., 2023). Based on this, in order for the physics learning process to run well, teachers need to prepare various kinds of digital media in the learning platform so that students have a place to learn anytime and anywhere, according to their respective learning speeds. A web platform that allows students to learn anytime is Google Sites (<https://sites.google.com/>), which can be easily developed as a learning media tool. Google Sites, as a free website creation platform, has emerged as a beneficial choice for developing web-based online learning materials that students can access

through various devices (Nalasari et al., 2021; Maskar et al., 2021). Because of its intuitive design, which enables users to create websites without the need for programming knowledge, Google Sites is a useful tool for education (Johdi, H. et al., 2024). Teachers can create well-organized and aesthetically pleasing learning environments by customizing their sites to meet unique teaching needs with the help of the configurable templates. Furthermore, teachers can immediately insert different types of content into their Google Sites, enhancing the educational experience, because Google Sites works effectively with other Google Workspace features (Bangun, R. H. et al., 2022). With the existence of web-based learning media developed by teachers, it is hoped that students can learn anytime and anywhere at their own pace so that the principle of implementing the Merdeka curriculum, namely the implementation of differentiated learning, can be realized.

However, the results of interviews conducted with several teachers at Langsa City High School showed that no teachers were able to create their learning media. Teachers only use existing learning media to teach in the classroom, so the differentiated learning process cannot be implemented. This is due to the lack of information and experience among teachers in developing their own digital technology-based learning media. Therefore, there needs to be training in creating web-based learning media for teachers by utilizing Google Sites so that it can become a learning platform for students in the current implementation of

the Merdeka curriculum.

2. LITERATURE REVIEW

Web-based learning media represents an innovative integration of internet technologies into educational practice, advancing pedagogical approaches through the use of digital tools (Batubara, 2018). Rather than merely presenting instructional content on a website, web-based learning requires a holistic framework that fosters effective online educational experiences, including differentiated instruction. Such frameworks must be intentionally designed to replicate the rich, interactive nature of traditional classroom environments, offering comprehensive instructional materials, virtual discussion forums, assignments, and systems for continuous assessment to monitor and support student learning. The inherent flexibility of web-based learning environments enables students to select content and activities suited to their unique needs and abilities, thereby fostering differentiated learning to accommodate diverse learning styles and varying levels of conceptual understanding (Synekop, 2020).

Zulkarnaini's (2018) research demonstrated that web-based learning significantly enhances students' conceptual comprehension in topics such as thermodynamics when compared to conventional instructional approaches, while also eliciting favorable responses from students. This evidence highlights the potential of web-based media as a suitable and effective alternative for online education. One platform that has gained

traction in educational contexts is Google Sites, a versatile web development tool provided by Google. Google Sites is particularly advantageous due to its user-friendly interface that allows educators to integrate resources from various Google services without requiring extensive programming skills (Thomas et al., 2022; Jusriati et al., 2021; Ramadannisa et al., 2021). Additionally, its accessibility across multiple devices, free availability, and the absence of time and location constraints make it a viable option for broad educational use (Murtadlo et al., 2023; Amalia et al., 2022; Taufik & Doyan, 2022; Putri et al., 2021).

Empirical studies have further demonstrated the efficacy of Google Sites in the context of physics education, showing substantial improvements in student engagement and comprehension (Septianti & Firdaus, 2024; Khaeruman et al., 2024). The interactive learning media developed using Google Sites have been found to significantly enhance the understanding of complex physics concepts, such as wave phenomena, measurement techniques, and particle dynamics (Munawirah et al., 2024). Moreover, incorporating QR codes into Google Sites has proven effective in increasing interactivity and engagement, with user satisfaction rates reported at 88.9% (Prihatiningtyas et al., 2022). The integration of QR codes not only facilitates easier access to learning content but also supports differentiated instruction by enabling more personalized learning pathways, which align with the unique needs and comprehension levels of individual students.

It is imperative for educators to actively engage in the development of customized learning media using Google Sites to better address the diverse educational needs of their students. Leveraging the flexibility of Google Sites, educators can design and adapt learning materials and activities that cater to varying levels of student ability and learning preferences, thereby cultivating a more individualized and effective educational experience. Differentiated instruction within this framework empowers students by providing them with the autonomy to choose materials, activities, or assessments that align with their own pace and preferred learning modalities, ultimately enhancing the personalization and efficacy of their learning journey.

3. IMPLEMENTATION METHOD

The absence of learning media that supports differentiated learning in the Merdeka Curriculum can significantly hinder efforts to improve the effectiveness of education, especially in physics learning. Web-based learning media such as Google Sites is highly suitable for facilitating physics education in the Merdeka Curriculum because it can present various interactive media formats such as videos, animations, simulations, and images, which help students to better understand abstract physics concepts (Danin, V. J., & Kamaludin, A., 2023). The *Merdeka* Curriculum emphasizes a

learning approach that allows each student to develop according to their respective characteristics. However, with learning media that supports this learning, teachers will be able to provide learning experiences that are appropriate to the individual needs of each student (Maulisa, A et al., 2024). With adequate learning media, teachers can more easily compile learning materials that can be adjusted to the ability level and learning style of each student, thus creating an inclusive learning environment and supporting diversity in the classroom (Mahzum, E et al., 2023). Therefore, teachers need to be trained in creating web-based learning media that supports the Merdeka Curriculum, ensuring that each student can learn to their fullest potential. The following are the stages and steps for training in the use of Google Sites as a web-based learning platform:

1. Introducing Google Sites as an application that can create learning websites
 2. Distributing a manual book on how to create web-based learning media using Google Sites
 3. Presentation and tutorial on creating web-based learning media using Google Sites
 4. Practice creating web-based learning media using Google Sites
 5. Evaluation of Training Activities
- For further details, the stages of the activities are illustrated in the flowchart shown in Figure 1.

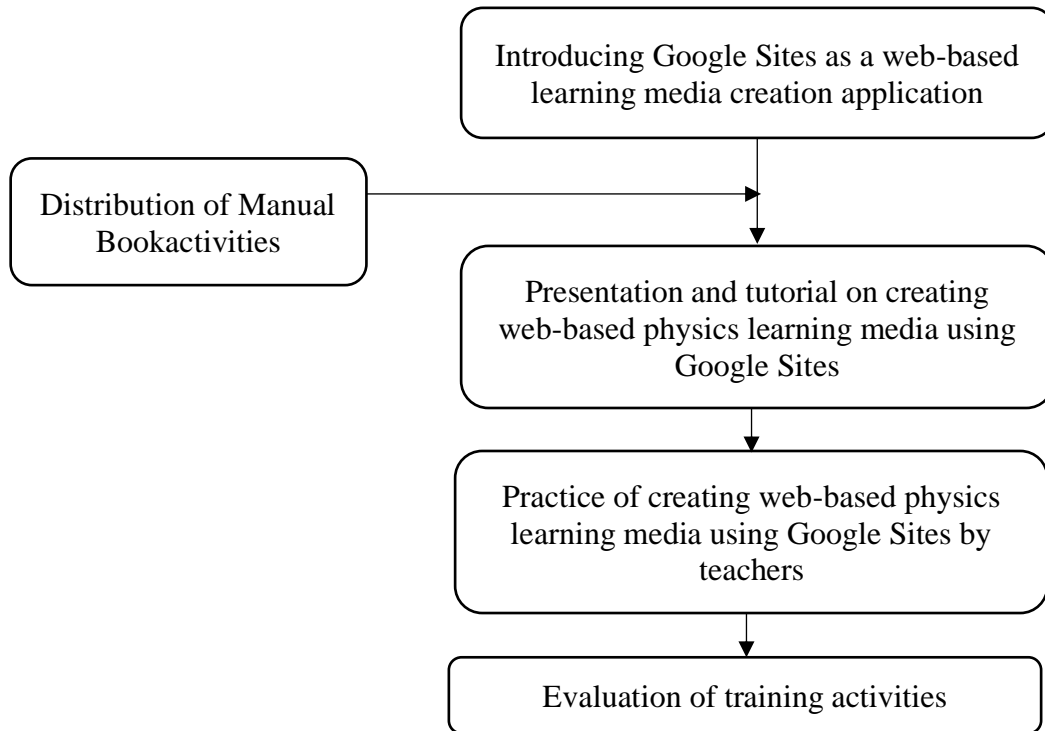


Figure 1. Flowchart of Stages of Training Activities for Creating Web-Based Learning Media

with the formula:

$$P = \frac{f}{n} \times 100\%$$

Where:

P = percentage score; f = total score obtained; n = maximum total score

The data resulting from the analysis are then interpreted with reference to Table 1 (Yuliana & Sugiyono, 2017).

The instrument used in this activity was a 3-item response questionnaire from training participants to measure the effectiveness of the training and teachers' perceptions of training activities with 11 statements consisting of 3 indicators, namely knowledge, skills, and attitudes. Data from training participants' responses uses percentage analysis techniques

Table 1. Table Interpretation of Training Effectiveness

Percentage (%)	Criteria
P > 80	Very High
60 < P < 80	High
40 < P < 60	Medium
20 < P < 40	Low
P < 40	Very Low

4. RESULT AND DISCUSSION

The teachers participating in the training gave a positive response to this training activity. The training activity began with an explanation of the importance of differentiated learning in implementing

the Merdeka curriculum. Then, it will explain Google Sites, which can be used as a web-based learning medium to facilitate students' learning according to their individual preferences (Figure 2).



Figure 2. The presenter provides an explanation Training “Utilizing Google Sites as a Physics Learning Website”

After the presentation of the material, the training activities continued with the teacher's direct practice in creating teaching materials using Google Sites (Figure 3). The presenter

accompanies participants directly in developing web-based teaching materials so that participants are free to ask questions according to their needs.



Figure 3. The presenter accompanies direct practice

This training was considered very useful for teachers and practical, with an average score of 94.3%. The results of the

response to the effectiveness of this training in detail per indicator can be seen in Figure 4.

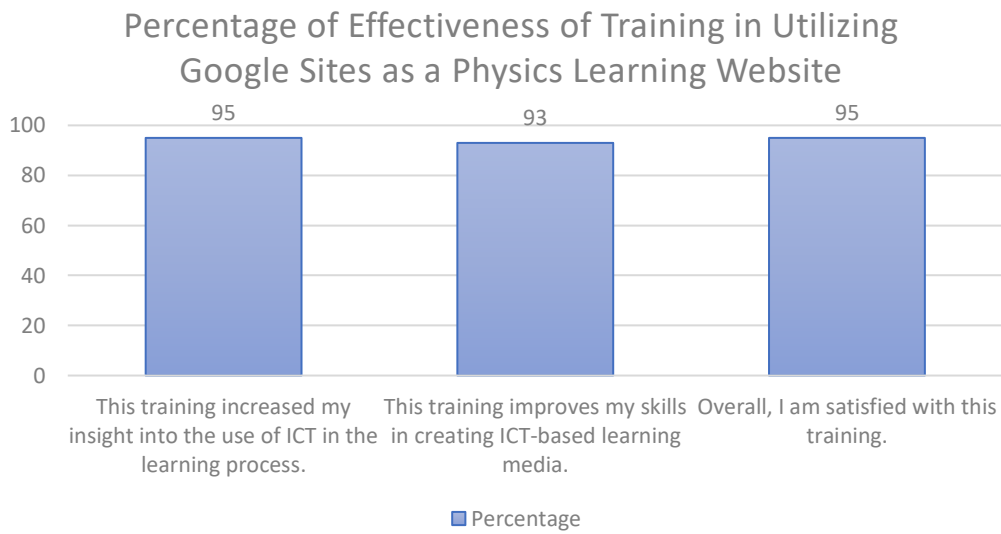


Figure 4. Percentage Graph of Effectiveness of Training in Utilizing Google Sites as a Physics Learning Website

This training is considered beneficial for teachers because teachers' insight into technology-based learning media is increasing. In addition, teachers feel that this training increases their skills in developing web-based learning media. In general, teachers are satisfied with this training activity. The results of

this training show an increase in teachers' perceptions of Google Sites-based Physics learning websites. The increase in knowledge and skills indicators is classified as good, while the attitude indicator is classified as very good, as seen in Figure 5.

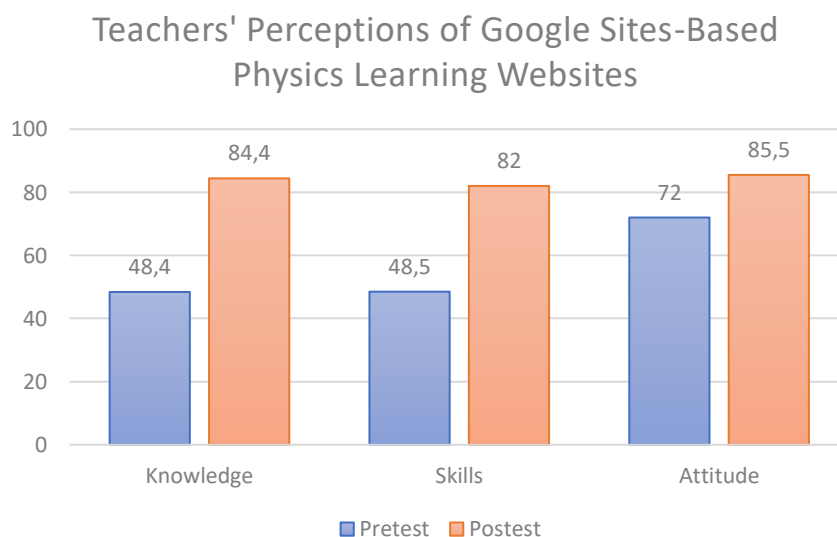


Figure 5. Pretest – Posttest Score of Teachers' Perceptions of Google Sites- Based Physics Learning Websites

The knowledge indicator increased by 36% because, in the training activities, teachers were explained the function of Google Sites, how to use Google Sites as a learning website, how to create a learning website using Google Sites, and how to share these Google Sites links with students. The information provided in scientific meetings such as counseling/training can develop insight and increase the knowledge of training participants (Farhan, A. et al., 2021; Arisandi P. et al., 2022), so from initially not knowing this website to knowing.

The skill indicator increased by 33.5%. This increase is lower than the knowledge indicator. This is because the training was only carried out for one day using a direct face-to-face method. More time means that teachers have less opportunity to explore the contents of Google sites to be developed into a learning website (Rahmadhanningsih S. et al., 2022). In addition, teachers' skills in using technology also greatly influence the improvement of teachers' skills in creating learning websites using Google Sites. The higher the teacher's ICT skills, the faster the teacher will be able to develop a learning website using Google Sites (Elisa, E. et al., 2023). Therefore, it is necessary to add training time for the material on utilizing Google Sites as a learning website so that teachers can produce a learning website that can be used as a technology-based physics teaching medium.

The attitude indicator increased by 13.5%. This increase is the lowest compared to other indicators because

teachers are optimistic and confident and believe that learning websites using Google Sites can have a positive impact on the physics learning process since the training has not started. Teachers believe that technology-based physics learning can facilitate students to learn anytime and anywhere based on their respective preferences (Nalasari et al., 2021; Maskar et al., 2021). Therefore, teachers have a positive attitude and desire to learn how to develop a learning website using Google Sites so that they can prepare learning media that are in accordance with the characteristics of their respective students. In this Merdeka curriculum, teachers are given the freedom to prepare learning devices according to student characteristics (Herliana, F. et al., 2023). After attending the training, this positive attitude increased from initially being good to very good. This shows that this training can further convince teachers that the learning website using Google Sites is easy to develop according to the needs of teachers to teach physics. Teachers have the freedom to determine what content will be presented on the website and how teachers will teach physics material using this website. Teachers believe that the hope of differentiated learning is facilitated by a learning website developed based on student characteristics (Arini et al. et al., 2024).

5. CLOSING

This training is helpful for teachers in creating web-based physics learning media by utilizing Google Sites.

Teachers' knowledge, skills, and attitudes towards the use of Google Sites as web-based physics learning media increased after participating in this training. Similar training can be carried out further with a more extended training period in Langsa City to improve teacher competence in this digital era so that teachers have better competence in implementing differentiated learning in physics learning.

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