Proceeding – CAMIC

Cirebon Annual Multidisciplinary International Conference (CAMIC 2024)

Transformation of Web-Based Learning: A Case Study in Junior and Senior High School

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Abstract*— *Web-based learning has great potential to simplify complex material to be more easily understood. However, the implementation of web-based learning also has a number of challenges, one of which is the limited technological infrastructure and the adaptability of students and teachers to the use of digital media. The purpose of this study is to determine the effectiveness that occurs in the learning process after the implementation of websites such as Google Sites and microsites. This research uses ADDIE research method. However, this study did not reach the implementation stage. The subjects of this study consisted of students with 3 different schools with details, namely 5 10th grade students of MAN 1 Cirebon Regency, 5 10th grade students of SMA 6 Cirebon, and 4 9th grade students of SMP Negeri 16 Cirebon. This research instrument uses open interviews with several students. Based on the results of open interviews with several students with 3 different schools that web-based learning using Google Sites and microsite is considered very interesting and fun by students, because it has an interactive display. The use of Google Sites and microsites in mathematics learning has shown effective results in improving student engagement and the quality of the learning process. Flexible access to materials allows students to learn independently. Students benefit from the easy access to information, performing.

Keywords: ***Google Site; Microsite; mathematic; technology; website.***

I. INTRODUCTION

In the rapidly developing digital era, education faces demands to adapt to technology as a major part of the learning process [1]. One of the increasingly popular innovations is website-based learning. This provides various conveniences in accessing materials and supports more flexible learning [2]. However, the implementation of website-based learning also has several challenges [3]. Limitations of technological infrastructure such as uneven internet access where some areas have limited internet access and digital devices, as well as the adaptability of students and teachers to the use of digital media [4]. Google sites is a platform developed by Google to be used as a learning media, designed to make it easier for students to access information related to learning materials through various devices such as smartphones, tablets and computers [5]. Microsite is an interactive learning website that can increase learning motivation and foster high curiosity [6]. Google Sites and microsites are interactive learning platforms that make it easier for students to access learning materials through various devices and can increase student motivation and curiosity [7]. Website-based media not only facilitates access to learning materials and makes learning more interactive and interesting, but also allows students to independently repeat the material at

any time as needed and supports collaboration between students, teachers, and parents in the learning process [8].

In mathematics learning, which is often considered difficult by students, website-based learning has great potential to simplify complex materials to be easier to understand [9] Website-based learning media such as Google sites and microsites allow teachers to present materials visually by utilizing interesting images, videos, and animations [10]. In addition, there are various interactive features such as online quizzes and discussion forums that can increase student participation and involvement in the learning process [11]. However, in the implementation of website-based learning there are also several challenges [12]. Limitations of technological infrastructure such as uneven internet access where some areas have limited internet access and digital devices, as well as the adaptability of students and teachers to the use of digital media [13]. In this case, the effectiveness of website-based learning is an important topic for further research.

Based on the definitions above, website-based platforms such as Google Sites and Microsites allow easy access to content and support more flexible and interactive learning. Allowing students to learn anytime and anywhere, without depending on time or place. With digital technology, learning becomes easier for students to access various sources such as videos, images, and interactive materials. Platforms such as Google Sites and Microsites also allow teachers to present materials visually by utilizing multimedia elements, which are very useful in explaining complex concepts, especially in mathematics. Despite its many benefits, web-based learning also faces several challenges. One of the main challenges is limited technological infrastructure, such as the number of digital devices that can be accessed by students and uneven internet access in some areas. The effectiveness of web-based learning will be greatly impaired, and students who do not have access to technology will have difficulty following the lessons.

Based on the description above, researchers are interested in conducting research on how effective the application of website-based learning media using Google Sites and Microsites is. The purpose of this study is to find out the effectiveness that occurs in the learning process after the application of websites such as Google Sites and Microsites. With the title of the research Website-Based Learning Transformation Case Study: Junior High and Senior High Schools.

II. METHOD

This study uses the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) research method. The ADDIE research method is used to design and develop effective and efficient interactive multimedia [14]. The stages of ADDIE in this study are: (1) Analysis: Analyzing problems in learning, thus necessitating the creation of learning media that aligns with the needs and learning characteristics of students; (2) Design Stage: The stage for designing the Google Sites and microsite platforms tailored to the needs of students; (3) Development Stage: The stage for realizing the design prepared in the design stage into a tangible product or tool that can be used in learning; (4) Implementation Stage: Although this study did not reach the implementation stage, researchers can explain the planned implementation, including how the platform would be used in the classroom; (5) Evaluation Stage: The process of assessing whether the developed web-based learning media is successful, in line with the initial development expectations or not [15].

The subjects of this study involved only 14 students from three schools. The research instrument used was open interviews designed to collect data on students' responses and experiences regarding the developed web-based learning materials. The research procedure included conducting open interviews with students from three schools to obtain qualitative data related to their needs, experiences, and views on website-based learning. The data collected were then analyzed qualitatively to evaluate the suitability of the developed learning media to students' needs and its potential use in supporting the learning process.

III. RESULTS AND DISCUSSION

Table 1. Results of Three Case Studies on the Implementation of Microsite and Google Sites

Aspects	Case Study 1	Case Study 2	Case Study 3
Results	Improved learning, but there are access challenges.	Students feel the learning is effective and enjoyable.	Positive response, more interactive learning experience.
Challenges	Lack of access and deep interaction.	Dependence on stable internet access.	Accessibility remains important, but no specific challenges mentioned.
Positive Impact	Increased motivation to learn.	Easy access to information and ability to review material.	Enhanced understanding of material and learning flexibility.
Recommendations	Need for additional interactive media.	Focus on internet accessibility.	Maintain the use of microsites and develop interactive features.

The use of Google Sites and microsites in mathematics education has shown positive results in three different case studies. In general, these studies highlight how these platforms can enhance students' learning experiences by providing easier and more interactive access to learning materials. Students felt more engaged and motivated in their learning when using microsites, which offered various features such as online

quizzes, educational videos, and discussion forums. These features not only made learning more engaging but also allowed students to better understand the material.

ADDIE Stages up to Development:

1. Analysis
   In this stage, a needs analysis was conducted to understand what students and teachers needed in mathematics education. The analysis revealed that students needed interactive, engaging, and easily accessible learning media. Additionally, teachers required tools that could effectively present materials and enhance student motivation. Challenges such as uneven internet access also emerged as a key concern.
2. Design
   Based on the analysis, a microsite and Google Sites were designed, incorporating various interactive features like online quizzes, educational videos, and discussion forums. The site's layout was designed to be user-friendly and attractive, considering factors like color, layout, and navigation that would appeal to students. Each feature was designed to support the learning objectives.

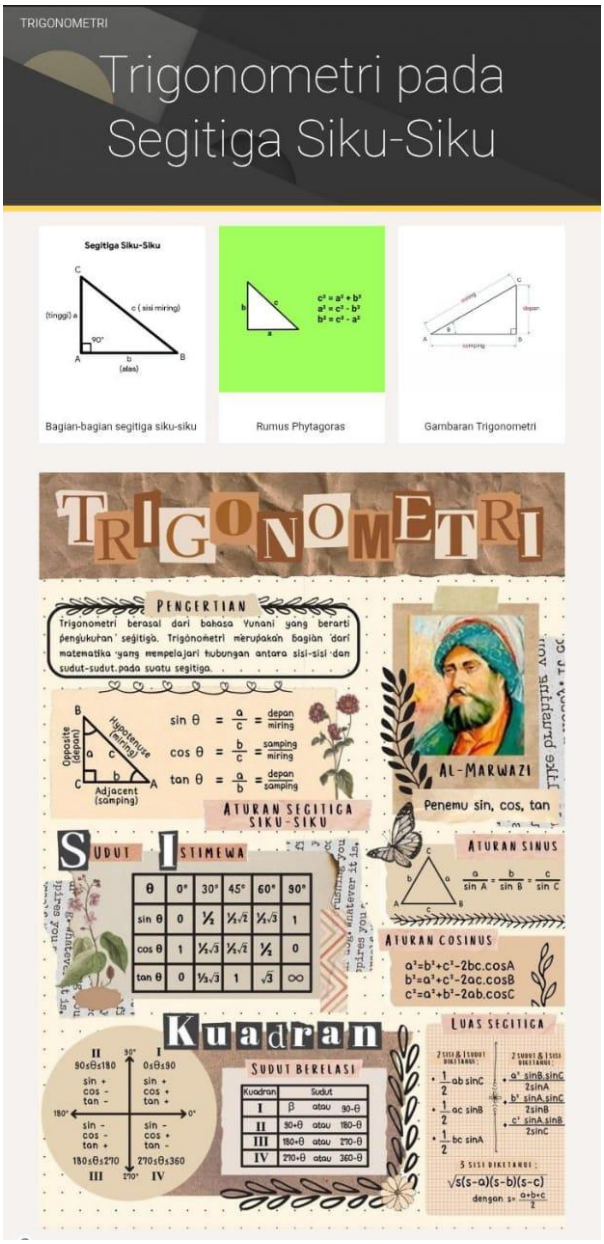

Figure 1. Design Web Case Study 1

Figure 2. Design Web Case Study 2

Figure 3. Design Web Case Study 3

3. Development
   In this stage, the design created in the Design phase is implemented. The microsite and Google Sites are developed by adding learning materials, videos, quizzes, and discussion forums, which are uploaded and integrated. The materials are organized using a gradual approach, starting from basic concepts to applications, to support deep student understanding. Initial testing is carried out by involving teachers and a group of students to ensure that all features function well and meet the needs.

Case Study 1 shows that the use of Google Sites can help improve student learning. Students feel more engaged in the learning process, but the challenges faced include limited access and shallow interaction. This indicates that although this platform is effective, additional media are still needed to support further interaction between students and the material. This study emphasizes the importance of providing adequate resources so that students can delve deeper into the material. A study by [16] indicates that limited internet access in certain areas can hinder the effectiveness of technology-based learning. This aligns with the findings from Case Study 1, which shows that while Google Sites is effective, limited access can reduce student interaction with the material. Additionally, [12] also note that deep interaction between students and the material is crucial for enhancing understanding, supporting the finding that additional media are needed to facilitate further interaction.

Case Study 2 states that web-based learning using Google Sites is considered effective and enjoyable by students. They benefit from easy access to various information, an attractive interface, and the ability to review materials. However, the success of using this media heavily depends on stable internet access. This highlights the importance of having adequate technology infrastructure to support web-based learning. Recommendations from this study suggest that the government and schools pay attention to accessibility, especially in providing solutions for students with limited internet access. Research by [13] emphasizes the importance of adequate technology infrastructure to support web-based learning. These findings align with Case Study 2, which shows that stable internet access is key to the successful use of Google Sites. Furthermore, [17] also notes that an attractive interface and easy access to information can enhance the learning experience, which is consistent with the positive experiences of students in Case Study 2.

Case Study 3 provides a more optimistic view, where the implementation of microsites in the learning process receives very positive feedback from students. Interactive features such as online quizzes, educational videos, and discussion forums make the learning experience deeper and more enjoyable. The ease of accessing the microsite through various devices, such as mobile phones and laptops, allows students to learn anytime and anywhere. This indicates that technological innovation can be an effective solution to improve the quality of education. This aligns with research by [18] which shows that web-based learning can positively influence student learning outcomes, despite the challenges in its implementation.

Overall, these three case studies demonstrate that the use of microsites in mathematics learning has great potential to enhance student engagement and understanding of the material. However, to maximize its benefits, it is important to address the existing challenges, particularly in terms of accessibility. With proper attention to these aspects, the use of technology in education can continue to evolve and provide a significant positive impact for students.

IV. CONCLUSIONS

This study shows that the implementation of website-based learning using platforms such as Google Sites and microsites can improve the effectiveness and learning experience of students, especially in mathematics subjects that are often considered difficult. Interactive features such as online quizzes, learning videos, and discussion forums can increase student motivation, engagement, and understanding of the material. Website-based learning also provides flexibility for students to access materials

anytime and anywhere, supporting independent learning. However, the main challenge faced is the limited access to stable internet, especially in areas with limited technological infrastructure, which can hinder the effectiveness of using this platform. To maximize its benefits, attention is needed from the government and schools to ensure equal access to technology for all students. Overall, despite the challenges in its implementation, website-based learning has proven effective in improving the quality of education, especially when supported by adequate infrastructure and interactive features that facilitate collaboration between students, teachers, and parents.

For future research, it is recommended to expand the scope of the study by involving more schools and students from diverse backgrounds, as well as extending the research to the implementation and long-term evaluation stages. The development of more diverse interactive features, such as simulations or educational games, can enhance student engagement. Additionally, attention should be given to improving technological infrastructure, such as stable internet access, and providing training for teachers and students in using web-based learning platforms. Comparative studies with other platforms, exploration of social and psychological impacts, and integration with the national curriculum can also be research focuses. Collaboration with the educational technology industry and the use of data analytics can help develop more advanced platforms tailored to student needs.

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