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Development of interactive learning media based on the google sites website for science subjects in elementary schools

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Abstract

This study aims to develop interactive Google Sites-based learning media for Natural and Social Sciences (IPAS) subjects in elementary schools, and to test the feasibility and effectiveness of the media through trials with students and teachers. The research method used is descriptive quantitative with stages of media development, instrument development, and data collection through questionnaires. The research subjects consisted of 32 fourth-grade students and 20 elementary school teachers. The developed media was designed to be interactive, easily accessible through various devices, and in accordance with the characteristics of 21st-century learning. The results of the response test showed that the Google Sites learning media received very positive responses. More than 95% of students agreed or strongly agreed with the appearance, content, and ease of use of the media. Teacher assessments also showed a high level of feasibility with an average score between 4.4 and 4.8 on a scale of 5 on all aspects, such as visual design, navigation, content structure, and technical functionality. These findings indicate that Google Sites-based learning media is very suitable for use as an innovative alternative in digital-based thematic learning, especially on cultural diversity material in elementary schools.

Keywords: *Interactive Learning Media; Google Sites; Digital Learning; Cultural Diversity; Elementary School Education; 21st-Century Learning*

INTRODUCTION

Education in the 21st century is seen as grounded in science and technology. Current scientific developments require educators to apply technology in the learning process with the goal of deepening students' understanding, making learning easier, more enjoyable, and more meaningful. This aligns with the Merdeka curriculum, which emphasizes contextual, deep learning. This aligns with the opinion of (Sa'idatum Munirah, 2024) The role of teachers in facilitating the use of technology in learning is intended to ensure flexible learning, making it more meaningful with the aid of technology. Learning occurs through activities carried out well and consciously, involving interactions between teachers, students, and learning resources to achieve specific goals.(Eka Pratiwi et al., 2024)

According to Pujiani (Ayu, 2020; Kamila et al., 2023) By utilizing technology in the learning process, students can more easily understand lessons and develop the technological skills necessary for the future. Technological developments, especially in the realm of websites, have undergone significant evolution since the advent of the internet. In the past, websites consisted only of simple text and a few images with a simple layout. However, over time, web technology has advanced and brought new innovations. Various studies have shown that the use of technology in learning can increase student interest and understanding. Furthermore, implementing technology in learning can increase the effectiveness and efficiency of the teaching and learning process (Mukti et al., 2024);(Setiawan Febrian Rifqi Rendra & Nita Sekreningsih, 2023)

The results of the needs analysis related to the problems that have occurred in learning in elementary schools obtained that students still have difficulty understanding the existing learning materials, because the concepts of science and science are abstract, which require reasoning and understanding, books in schools are sometimes not detailed enough; learning activities are less interesting and less interactive, the teaching methods used are still conventional, where students only focus on delivering theory without any interactive activities, so that they lose interest and motivation, quickly feel bored and tired in learning in class; and the lack of access to adequate materials and facilities greatly affects the effectiveness of learning, so that it is also less than optimal in understanding the material. (Salsabila & Aslam, 2022). The learning theory applied in science education must be based on the fact that the science curriculum not only reflects knowledge, but also understands the characteristics of children and the process of acquiring this knowledge. (Mukti et al., 2024). So learning is less interactive which can lead to a lack of student enthusiasm in learning.

The learning theory applied in science education must be based on the fact that the science curriculum not only reflects knowledge, but also understands the characteristics of children and the process of acquiring this knowledge (Amar Salahuddin et al., 2023). Science teaching methods should be designed to stimulate students' curiosity, encourage exploration, and develop critical thinking skills. With this approach, students not only memorize information but also learn how to discover, understand, and apply knowledge effectively.

Based on the description above, there needs to be an update in learning that is easy to use, interactive, packaged in an attractive way and becomes something new for students by utilizing technology (Sadiah et al., 2024)(Salsabila & Aslam, 2022). Website-based learning media can be a solution to this problem in learning. Currently, many digital platforms can be used to create websites, one of which is Google Sites. Google Sites is one of Google's products that serves as a website creation tool. Google Sites can be used to create websites for both personal and group use. For new users (laymen), Google Sites is very easy to manage and use because its menus and features are easy to understand and familiar.

RESEARCH METHODS

The method used in this research is research and development (R&D). This method aims to develop a new product or refine an existing one, and its results can be accounted for through a process of research, planning, production, and testing the feasibility or effectiveness of the resulting product so that it can function effectively in the wider community (Winarni, 2018; Salsabila & Aslam, 2022). This research will produce a product in the form of a website-based learning medium using Google Sites for fifth-grade science lessons. This product will facilitate students and teachers with new, innovative, and engaging media. This learning medium takes the form of a website that integrates various learning activities and information into one website.

Researchers used the ADDIE development model for research design. ADDIE is an indirect approach that interconnects its components: analysis, design, development, implementation, and evaluation (Rayanto &Sugianti, 2020). The subjects in this study consisted of 20 teachers and 32 students from several elementary schools that had used Google Sites in their learning. Data collection techniques are the most important step in conducting research, as the primary goal of the study is to obtain data. (Sugiono, 2016:308). The research instrument to obtain data from the research is by using a questionnaire.

The data collection instruments used were closed and open questionnaires. For students, the questionnaire used a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), covering aspects such as attractiveness of the display, ease of understanding the material, and the impression of learning using Google Sites. Meanwhile, for teachers, the questionnaire included 16 assessment indicators that

measured aspects of size and display, home page design, content design, and technical feasibility of web media, also using a 1 to 5 assessment scale (1 = Very Poor to 5 = Very Good). In addition, there was an open-ended column for providing comments or suggestions on the media used.

Data collection was conducted online using a Google Form, which was distributed to teachers and students after they used Google Sites in thematic learning about Indonesian cultural diversity. The data obtained were analyzed using descriptive statistics, namely by calculating the frequency, percentage, and average value of each assessment indicator. Data from open-ended questionnaires were analyzed qualitatively to support and enrich the interpretation of the quantitative results. The results of this analysis were then presented in narrative and tabular form to provide a comprehensive picture of teacher and student responses to the developed learning media.

RESULTS AND DISCUSSION

Google Sites-based learning media was successfully developed using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) approach. This process includes:

The first stage of the research was the analysis stage. This stage involved a preliminary study, including questionnaires, observations, and literature reviews. The goal was to gather information that would then be incorporated into a teacher needs analysis and a situational and environmental analysis. Analysis is the initial stage, involving environmental and situational analysis. Next, material analysis was conducted to align with core competencies and curriculum indicators. The next step was tool analysis and media creation, including a website, part of Google's Google Sites product, accessible at the following link: https://sites.google.com/.

Design Stage. The second stage is product design or planning. In this stage, researchers begin designing the media and materials that will be developed into Google Sites media. This begins with creating the design by determining the background concept, creating a storyboard to simplify the concept that will be created in the media, the layout concept, the content of the material and other supporting images. Development Stage. In this third stage, the design that has been designed will then be processed and uploaded into Google Sites media. The following Google Sites media product results are presented in the image below:

Figure 1
Main Page View

Figure 2
Menu buttons

Figure 3
Attendance Menu

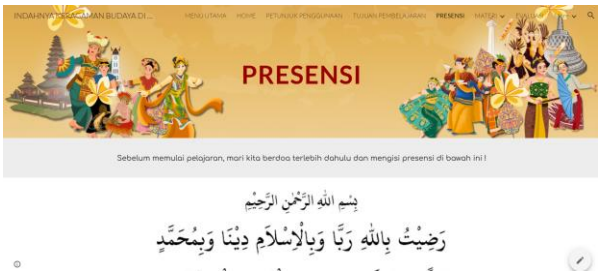

Figure 4
Learning Objectives

Figure 5
Material Menu

Figure 6
Evaluation and Response Menu

This Google Sites web-based learning media can be visited via the following link: https://sites.google.com/view/keragamanbudayaku/menu-utama.

After the product is developed, the next stage is user response testing. Data from the development of Google Sites-based learning media for elementary school science lessons can be seen based on the results of user response testing given to students and teachers at the elementary school after using the media.

This user response test was conducted to determine the extent to which the learning media developed based on the Google Sites website can be effectively utilized by both students and teachers. This Google Sites-based learning media is tailored to the characteristics of 21st-century learning resources, including interactivity and digitalization.

The initial step in this media response test was to determine the trial subjects where this trial was conducted on 32 4th grade students and 20 teachers who were relevant to the learning material and familiar with interactive learning media based on the Google Sites website. Furthermore, the interactive learning media based on the Google Sites website that had been developed was in accordance with the indicators of digital learning media, namely (1) interactive (2) multimedia (3) responsive to various devices (4) ease of navigation and user interface (user friendly) (5) can be accessed anytime and anywhere and (6) supports automatic evaluation and feedback. After that, an assessment instrument was prepared in the form of a questionnaire containing questions that measure important aspects according to the indicators of digital learning media. This questionnaire and questionnaire were made in the form of a Google form that was distributed online to students and teachers. The 1-5 scale assessment used in the user response test was the Likert scale, which is commonly used to measure user perceptions, attitudes, or satisfaction with a media or service. Then, a trial was conducted by asking users to access and use the media within a certain time. After use, users were asked to fill out the prepared questionnaire. Data collected from questionnaires or observations is then analyzed quantitatively or qualitatively to determine the effectiveness, engagement, and usefulness of the media. The results of this analysis can serve as a basis for further media improvements or development.

Based on a response test conducted with 32 fourth-grade students using a Google Form, the following data from the student response questionnaire relates to the use of Google Sites website-based learning media in elementary school science (IPAS) materials.

Table 1
Media Response Test by Students

Statement	Strongly Agree	Agree	Disagree
I enjoy learning using Google Sites.	21.9%	75.0%	3.1%
The site's layout is engaging and motivates me to learn.	34.4%	62.5%	3.1%
I easily understand the material on cultural	18.8%	78.1%	3.1%

diversity on the site.			
The images and illustrations on the site help me grasp the content.	25.0%	71.9%	3.1%
The videos and other media on the site are easy to understand and support the material.	15.6%	84.4%	0.0%
I can read the text clearly.	28.1%	71.9%	0.0%
The order of the material on Google Sites is easy to understand.	25.0%	71.9%	3.1%
I understand how to use Google Sites to learn.	12.5%	81.2%	6.2%
The practice questions and assignments on the site align with the material being studied.	15.6%	81.2%	3.1%
The language used on the site is easy for me to understand.	18.8%	78.1%	3.1%
Learning using Google Sites is enjoyable.	18.8%	78.1%	3.1%
After learning from Google Sites, I have a greater appreciation for cultural diversity in Indonesia.	15.6%	81.2%	3.1%

Based on the results of the questionnaire analysis given to 32 students, it can be concluded that the Google Sites website-based learning media received a very positive response from the majority of respondents. Most students stated that they agreed or strongly agreed with all the statements asked, with the percentage of agreement reaching more than 95% in almost all aspects assessed. Statements that received the most positive responses included ease of understanding the material, an attractive site appearance, and supporting media such as images and videos that assist the learning process. No students stated that they disagreed with statements regarding text readability and video support for the material, indicating that technically and visually, Google Sites is very adequate for use in learning.

Although a small percentage of students (6.2%) stated they did not fully understand how to use Google Sites, this indicates that some students still need some technical assistance. Nevertheless, the majority of students reported enjoying learning using this platform and gaining a greater appreciation for Indonesian cultural diversity after participating in the learning process.

Students' open opinions also demonstrated high enthusiasm for this medium. Many students stated that they liked the appearance and content of Google Sites because it made the learning process more enjoyable and easier to understand. Several suggestions were made regarding the hope that the medium would include more animations or other interactive elements. Overall, Google Sites learning media was deemed effective,

engaging, and able to increase students' motivation and understanding of the material presented.

Based on questionnaire data completed by 20 teachers from various elementary schools, the Google Sites website-based learning media for science and science subjects in elementary schools received very high ratings across almost all indicators. The highest average score, 4.80, was given for the site's accessibility indicator and the ease of Google Sites functionality without additional applications, indicating that the site is highly responsive and practical for use in learning contexts.

The content was also rated very positively, with an average score of 4.75 for indicators such as the integration of text, images, and visual displays that support student understanding. This demonstrates that the media is not only technically sound but also strong in terms of content and communication.

Indicators for homepage design and visual aesthetics also scored highly, indicating that Google Sites' appearance is attractive, harmonious, and appropriate to the cultural theme. Navigation and layout were also quite good, with scores ranging from 4.60 to 4.70, reinforcing the conclusion that the site is user-friendly for both teachers and students. Overall, teachers found this learning tool highly suitable and effective for use as part of a thematic learning process based on cultural diversity.

Table 2
Media Response Test by Teachers

No	Assessment Indicators	5	4	3–1	Average
1	The Google Sites display is proportional and comfortable to view on various devices (PC, tablet, smartphone).	13	7	0	4,65
2	The placement of site elements (header, content, sidebar, footer) is consistent and neat.	13	7	0	4,65
3	The layout supports accessibility and easy navigation.	14	6	0	4,7
4	The home page displays titles, subheadings, and visuals relevant to the theme of cultural diversity.	15	5	0	4,75
5	The visual design (images, colors, icons) is harmonious and reflects cultural values.	14	6	0	4,7
6	The fonts used are proportional, attractive, and easy to read.	13	7	0	4,65
7	The main navigation is easily recognized and accessible.	16	3	1	4,6
8	The text is informative, communicative, and appropriate to the theme of cultural diversity.	15	5	0	4,75
9	The use of images and illustrations reinforces the meaning of the material.	20	5	0	6
10	Videos or interactive media are relevant and enhance	12	7	1	4,4

	understanding.				
11	Visual variation (fonts, colors, spacing) is used appropriately, not excessively.	14	6	0	4,7
12	The content structure is logical and organized (introduction, body, conclusion).	12	7	1	4,4
13	The site is easily accessible without interruption (loads quickly, no errors).	16	4	0	4,8
14	Google Sites functions well without the need for additional applications.	16	4	0	4,8
15	The display is attractive, dynamic, and appropriate to the characteristics of learners.	15	5	0	4,75
16	The site supports user interactivity (comments, quizzes, external links) when needed.	13	7	0	4,65

CONCLUSION

Based on the results of a study conducted on student and teacher perceptions of the development of Google Sites-based learning media for elementary school science lessons, it can be concluded that this media received a very positive response from both user groups. A total of 32 students indicated a high level of enjoyment and understanding of the material presented through the site, with the majority stating "agree" or "strongly agree" on all assessed indicators. This indicates that Google Sites is visually appealing, easily accessible, and supports a fun and meaningful learning process.

Meanwhile, the results of the assessment by 20 teachers showed that all indicators, including those related to the media's appearance, content, and technical feasibility, received high average scores, ranging from 4.4 to 4.8 on a scale of 5. Not a single teacher gave this media a low rating. This indicates that Google Sites is considered highly suitable and effective for use in thematic learning, particularly for cultural diversity. Therefore, Google Sites, a website-based interactive learning media, can be a relevant and solution-oriented alternative for delivering innovative digital learning, aligned with the characteristics of 21st-century learning and the Independent Curriculum.

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