GOOGLE SITES-BASED LEARNING MEDIA IN NATURAL SCIENCE LESSONS IN ELEMENTARY SCHOOL : A LITERATURE STUDY

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ABSTRACT

The writing of this article aims to review various journal articles on the development of learning media based on Google Sites in learning Natural Sciences in elementary schools. The method used in writing the article is a literature study of articles that have been published in the period between 2020 and 2025. The results of the study state that there is feasibility in learning science at the elementary school level using Google Sites-based learning media. Validity assessments from media experts and material experts are on average in the "very valid" category (above 90%), and teacher and learner responses indicate a high level of practicality and effectiveness. In addition, there were several articles that had a significant increase in learning outcomes as indicated by N-Gain values in moderate to high levels. Google Sites is proven as a learning media that can successfully improve the quality of science learning in elementary schools.

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1.   INTRODUCTION

In the 21st century, science and technology (science and technology) is developing very quickly and entering various sectors, including the education sector (Hardianti & Alyani, 2023a). The impact of this rapid development of science and technology requires the education sector to carry out digital transformation as a form of adjustment. Digital transformation is a substantial thing in the world of education today. Because, with this digital transformation can improve the quality and potential that exists in education itself (Nafeesa & Mulyani, 2023a). With the existing challenges, the world of education must continue to adapt to improve the quality and relevance of learning in subjects found in elementary schools amid the current development of science and technology.

At the elementary school level, Natural Science subjects are part of the main foundation in shaping students' understanding that is continuous with the context of human life (Salsabila & Aslam, 2022a). The formation of understanding in science learning needs to be done with interactive and meaningful learning strategies so that students are able to think critically and can be developed to be more meaningful for life and the environment. The integration of digital technology in science learning can improve the understanding of complex concepts for students (Fatimah et al., 2024a). Science learning integrated with digital technology through visualisation, simulation, and direct interaction will be more meaningful than conventional learning. The role of technology is vital because it can support science learning concepts that are abstract and complex.

The utilisation of technology such as digital learning applications in teaching science can create a more meaningful learning experience (Mukti et al., 2024a). Digital-based learning applications or resources can be accessed easily, thus supporting learning without space and time constraints. However, the easy access in

gathering learning resources is not accompanied by an increase in students' absorption of the subject matter (Utami, 2023a). The synergy between technology with strategies, methods, and assistance from teachers needs to be established so that technology does not only function as an information provider, but presents interactive and contextual material. One form of technology utilisation is learning media that is based on the needs of students.

Gagne and Briggs (1974) stated: "learning media is a tool used to convey the content of learning materials that can stimulate students in participating in the learning process" (Daniyati et al., 2023a). Good learning media is able to increase interest and potential through a meaningful learning process by adjusting the characteristics possessed by students. Learning media designed need to utilise developing technology to remain relevant to current conditions (Kansa et al., 2024a). Technology-based learning media should be arranged systematically, interestingly, and present contextual material, as well as being innovative and creative to improve quality and achieve optimal learning objectives.

Technology-based learning media that are creative and innovative are increasingly numerous and varied, one of which is Google's product, Google Sites. Google Sites is a Google-made platform for creating sites that are used for personal, group, and even organisational purposes. Besides being able to be used by anyone, the convenience of Google Sites can be used flexibly, so you only need to open a link (website address) without the need for other additional applications. Google Sites also has features that are integrated with various products, such as Youtube, Google Docs, Google Sheets, Google Drive, Google Form, and many others. With the many features contained in Google Sites, this allows the incorporation of various types of content such as text, links, images, videos, presentations, and others (Tsani et al., 2025a).

By utilising Google Sites as a technology-based learning medium, learners have the flexibility to choose how to learn according to their own learning styles (Faizah & Fathurrahman, 2024a). Learners' diverse learning styles can also be facilitated in Google Sites through textual reading or watching images and videos. It is not only learners who have flexibility in its use, teachers also have flexibility in content preparation due to the availability of various features. The advantages of Google Sites have succeeded in encouraging interactivity in the learning process and enriching students' understanding (Rahmawati & Mintohari, 2024a). In line with the needs of science learning in elementary schools, Google Sites can encourage students' understanding of abstract concepts that are difficult to understand.

Although the use of Google Sites as a learning medium has been widely developed, studies that specifically analyze the effectiveness of Google Sites in teaching science at the elementary school level remain limited. Most existing research primarily focuses on media development or descriptions of its use, without empirically evaluating the effectiveness of Google Sites in learning and its impact on students' learning outcomes. Therefore, a comprehensive study is needed to examine the extent to which the development of Google Sites can have a real impact on science learning in elementary schools and on students themselves. Based on this condition, this article aims to analyze the development of Google Sites as a learning medium for science subjects in elementary schools and the resulting impacts. The findings of this study are expected to contribute to the development of Google Sites-based learning media for science subjects in elementary education, particularly in demonstrating its real impacts on students, such as learning outcomes, motivation, and overall effectiveness.

2.   RESEARCH METHODS

The method in writing this article uses a literature study research type and uses the Systematic Literature Review (SLR) approach to study the development of Google Sites-based learning media in Natural Science learning in Elementary Schools. The SLR method was chosen because it is able to provide a deep and systematic understanding of relevant research results within a certain period of time. Mardalis (1999) stated: "Literature studies can be carried out by searching for and collecting references consisting of several previous studies to draw conclusions" (Hartanto & Dani, 2020a). The literature study method is also used as a systematic assessment, identification, evaluation, and interpretation of research with a particular phenomenon topic. Various research sources can be searched through books, journal articles, seminars, proceedings, websites, and other internet sources.

In writing this article, the researcher searched for and collected various journal articles from Google Scholar. The journal articles searched for were with the keywords "Google Sites", "Natural Science", and "Elementary School". The articles collected were journal articles that had been published between 2020 and 2025. This time span was chosen to ensure that the articles analyzed were the results of the latest research and were relevant to the use of digital technology in science learning in the current era of digital transformation. Articles included in this study must meet the inclusion criteria, namely articles that have gone through a peer-reviewed process, are available in full text, focus on the development of Google Sites in science learning at the Elementary School level, and are written in Indonesian.

Conversely, articles excluded from this study were articles that discussed media other than Google Sites, did not focus on science subjects, were not relevant to the Elementary School level, or were not available in full version. The articles obtained were then analyzed thematically by examining the research objectives, media development methods, findings, and the impact of Google Sites development on learning and students. In this process, researchers also paid attention to the extent to which Google Sites media contributed to improving conceptual understanding, learning motivation, and the effectiveness of science learning in general. Overall, 9 articles that met the criteria were reviewed in depth to provide a comprehensive picture of the effectiveness and potential of Google Sites-based learning media in science learning in Elementary Schools.

3. RESULTS AND DISCUSSION

The results of the literature and review of various journal articles that have been selected show the relevance of the research results to the research focus of this article. This review is carried out based on the data and analyses presented in each article, so that it can be seen how Google Sites learning media can be said to be feasible in science lessons. Testing its feasibility through validation by media experts and material experts with several aspects of assessment that must be assessed. Aspects of assessment in media validation include, form and characteristics, use of language and content, display quality, programming, and media usefulness. While the aspects of assessment on material validation include, presentation of content, suitability of material, effectiveness, language, and sentence structure. In addition, the responses submitted by students and education on the application of media are also part of testing a medium. Media development that has been carried out by several previous researchers shows mixed results and assessments, can be seen from tables 1 and 2 below:

Table 1. Media and Material Validation Results

Number	Researcher	Media Validation (%)	Material Validation (%)	Criteria
1	Napitu et al. (2023)	80.83	-	Valid
2	Tsani et al. (2025)	91.66	95.45	Very valid
3	Aurellia et al. (2023)	96.6	98	Very valid
4	Salsabila & Aslam (2022)	81	79	Very valid and valid
5	Ghozali et al. (2024)	95.2	-	Very valid
6	Nafeesa & Mulyani (2023)	100	88	Very valid
7	Rahmawati & Mintohari (2024)	97.5	92.5	Very valid
8	Arini et al. (2024)	96	94	Very valid
9	Hardianti & Alyani (2023)	97	98	Very valid

Table 2. Student and Teacher Responses

Number	Researcher	Student Response (%)	Teacher Response (%)
1	Napitu et al. (2023)	85.7	-
2	Tsani et al. (2025)	91.66	96.87
3	Aurellia et al. (2023)	93	94
4	Salsabila & Aslam (2022)	92	96
5	Ghozali et al. (2024)	-	-
6	Nafeesa & Mulyani (2023)	94.05	98.6
7	Rahmawati & Mintohari (2024)	93.3	97.5
8	Arini et al. (2024)	94	-
9	Hardianti & Alyani (2023)	94	-

From the results of the review of several articles, it is obtained that the validity of Google Sites learning media in science lessons in elementary schools is considered very feasible by experts. The average obtained is the validity of media experts with a value of 92.86% and the validity of material experts, namely 92.13%. In addition, the level of feasibility through the student response questionnaire obtained an average result of 90.13%. While the level of feasibility through the teacher response questionnaire obtained an average result of 96.59%. This proves that Google Sites learning media is considered very feasible to be applied to science lessons in elementary schools. This media development uses the ADDIE development model, the model chosen because the media development process becomes more systematic and measurable (Ghozali et al., 2024).

One of the important findings of this study shows that the development of Google Sites learning media in Elementary School Science subjects tends to focus on concrete and visual materials, especially biology topics such as human skeletal structure, plant parts, and changes in the form of objects. This tendency indicates that Google Sites has advantages in conveying concepts that require strong visualization. Features such as embedding images, videos, animations, and interactive quizzes allow students to understand abstract materials more easily. This visual advantage greatly supports the characteristics of science learning which relies heavily on observation and visual representation. In addition, the presentation of multimedia in Google Sites allows teachers to package materials in a more interesting and enjoyable way, so that it can increase student attention and involvement during learning. This finding also shows that a visual-based approach through digital media can be a solution to the limitations of concrete teaching aids that are often not available in the school environment.

This Google Sites learning media is not only considered feasible in science lessons in elementary schools, but also able to provide a positive increase in student learning outcomes. This is shown in research by Rizky Hardianti and Fitri Alyani (2023), developing Google Sites e-modules on learning the human skeleton to get N-Gain reaching 0.74 with high criteria that can improve learning outcomes. The results of the study are in line with the findings of Riduan Suma Jumadi Tsani et al. (2025) who developed similar media for learning plant body parts in class IV, which showed an increase in student understanding with an N-Gain of 0.742 in the high category.

Apart from its effectiveness, Google Sites learning media is also considered flexible and practical in use. Aurellia F.P et al. (2023) developed ethno-science-based Google Sites media that integrates local content in IPAS learning. Her research shows that Google Sites media not only improves learning outcomes with completeness reaching 85%, but also builds student learning independence. This is reinforced by Julia F. Rahmawati and Mintohari (2024) who found that the use of interactive multimedia for Google Sites-based learning for learning changes in the form of objects succeeded in providing an increase in learning outcomes of up to 95.23% after implementation, with a practicality value of more than 93% from both teachers and students.

The development of Google Sites media not only has an impact on increasing cognitive understanding and encouraging the growth of learning independence, but also provides flexibility for teachers in presenting various types of content that can be adjusted to students' learning styles—both visual, auditory, and kinesthetic. This shows that this media is in line with the differentiated learning approach emphasized in the Independent Curriculum, thus contributing to the creation of a more adaptive and meaningful learning process. In practice, Google Sites allows students to access materials anytime and anywhere, thus supporting the principle of independent learning. The variety of features available also allows for personalization of materials according to the interests and needs of each student. Thus, this media not only functions as a means of conveying information, but also as a tool to strengthen learning autonomy and increase students' intrinsic motivation.

4.   CONCLUSION

Based on the results of a literature study conducted on various studies, Google Sites media for learning is very feasible, effective, and practical when applied to science lessons in elementary schools. Google Sites media received high validation from experts, as well as positive responses from students and teachers. In addition to improving the understanding of abstract science concepts, this media is also able to encourage a significant increase in student learning outcomes. The flexibility of Google Sites' features allows it to channel knowledge to be more meaningful and interactive, as well as facilitating the various learning styles of students. The integration of learning media with Google Sites can be a concrete and real solution to improve the quality of science lessons in the digital era.

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