EXPLORING THE INTEGRATION AND IMPACT OF GOOGLE SITES IN TEACHING AND LEARNING: A STRUCTURED SCOPING REVIEW

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Abstract. The growing prevalence of digital tools in educational environments has led educators to investigate innovative platforms such as Google Sites. The objective of this structured scoping literature review is to examine the extent and influence of Google Sites in educational settings, thereby addressing a substantial gap in the comprehension of its practical applications and advantages. A thorough search and analysis of academic literature are the foundation of the study, which aims to identify the primary themes, trends, and outcomes that are linked to the use of Google Sites in education. Methodologically, a comprehensive search of final, indexed articles from reliable databases Scopus and Web of Science published between 2020 and 2024 was carried out. This was followed by a stringent selection and appraisal process to include studies that satisfied predetermined criteria. The PRISMA framework informs the study's flow. Out of 316 initial records, the final review included 15 studies that covered a wide range of educational settings, from primary to higher education. The findings were divided into two themes which are digital pedagogy and online teaching strategies and impact of Google Sites towards student learning and digital literacy. The review concludes that Google Sites is a valuable tool for educators, offering a versatile and user-friendly environment that supports various pedagogical approaches. Future research should focus on longitudinal studies to further elucidate the long-term benefits and potential challenges associated with its integration into educational practice.
Keywords: *Google Sites, impact, integration, scoping review*

Introduction

The integration of digital tools in educational environments has seen exponential growth, driven by the need for innovative teaching methods and enhanced learning experiences. Among these digital tools, Google Sites has emerged as a versatile platform that offers a multitude of applications in educational settings. As a part of Google Workspace, Google Sites allows users to create websites with ease, making it an attractive option for educators aiming to foster interactive and collaborative learning environments (Zagato et al., 2024; Lai and Jen, 2015). This scoping review seeks to explore the integration and impact of Google Sites in educational contexts, highlighting its potential to transform traditional pedagogical approaches. Google Sites is designed to be user-friendly, enabling educators with varying levels of technical expertise to create and manage websites efficiently. This ease of use is crucial in educational settings where time and resources are often limited. The platform supports the integration of various multimedia elements, including text, images, videos, and interactive components, which can enrich the learning experience and cater to diverse learning styles (Bueno et al., 2022; Ramasundrum and Sathasivam, 2022). Furthermore, Google Sites seamlessly integrates with other Google Workspace tools such as Google Docs, Sheets, Slides, and Drive, providing a cohesive ecosystem for managing educational content and activities (Malikah et al., 2022). The adoption of Google Sites in education

can be viewed through multiple lenses, including its role in facilitating collaborative learning, enhancing student engagement, and supporting administrative functions (Malikah et al., 2022; Akcil et al., 2021). Collaborative learning is a pedagogical approach that emphasizes student interaction and cooperation to achieve educational goals. Google Sites facilitates this by allowing students to work together on projects, share resources, and provide feedback in real-time. The platform's collaborative features promote active learning and help students develop critical skills such as communication, teamwork, and problem-solving.

Student engagement is another critical factor in the effectiveness of educational technologies. Engaged students are more likely to participate in learning activities, retain information, and achieve better academic outcomes (Fuertes et al., 2023; Hanaysha et al., 2023). Google Sites can enhance student engagement by providing interactive and visually appealing content, enabling personalized learning experiences, and fostering a sense of ownership and responsibility (Nurkhin and Rohman, 2023). For instance, students can use Google Sites to create digital portfolios, showcase their work, and reflect on their learning journey. This not only motivates students but also allows educators to track progress and provide targeted feedback. From an administrative perspective, Google Sites offers significant benefits in terms of organization and communication. Educators can use the platform to create class websites, share announcements, distribute materials, and manage schedules. The consolidation of information streamlines administrative duties and guarantees that students and parents can easily obtain current and pertinent information (Tambunan and Siagian, 2022). In addition, Google Sites can facilitate professional development by serving as a platform for educators to exchange best practices, resources, and training materials (Nurkhin and Rohman, 2023). Despite its advantages, the use of Google Sites in education is not without challenges. Issues related to accessibility, privacy, and digital equity need to be addressed to ensure that all students can benefit from the platform (Kirillova et al., 2021). Accessibility features must be robust to accommodate students with disabilities, and privacy concerns must be managed to protect sensitive information (Jayasiri et al., 2022). Furthermore, educators must be aware of the digital divide to guarantee that students from all backgrounds have access to the requisite technology and internet connectivity. This scoping review is designed to offer a thorough examination of the current literature regarding the utilisation of Google Sites in education, to identify the primary themes, advantages, and obstacles. This review will provide valuable insights for educators, administrators, and policymakers who are interested in effectively integrating Google Sites into their educational practices by synthesising current research. Additionally, the results will identify gaps in literature and propose areas for future research, thereby contributing to the ongoing conversation regarding digital transformation in education.

Google Sites represents a powerful tool for enhancing educational practices through its ease of use, collaborative features, and integration with other digital tools. As educational institutions continue to navigate the complexities of digital learning environments, understanding the impact and potential of platforms like Google Sites is essential. This scoping review will serve as a foundational resource for exploring the integration and impact of Google Sites in educational settings, paving the way for more informed and effective use of digital technologies in education.

Literature review

The integration of digital tools in educational settings has transformed the landscape of teaching and learning. Among these tools, Google Sites stands out as a versatile platform that facilitates the creation of interactive and collaborative learning environments. This literature review explores the various implementations of Google Sites across different educational levels and disciplines, emphasizing its impact on student engagement, motivation, and academic performance. Drawing from multiple studies, this review aims to provide a comprehensive understanding of how Google Sites can enhance educational practices and outcomes. The utilisation of Google Sites in primary and secondary education has been successful in promoting student learning and supporting a variety of subjects. Noviarni et al. (2023) conducted a study in Riau, Indonesia, where Google Sites was integrated into mathematics instruction with a contextual approach that included Islamic values. The study involved junior high school students learning topics such as number patterns, circles, and statistics. The findings indicated that the experimental groups using Google Sites achieved higher posttest scores compared to control groups, demonstrating the platform's effectiveness in improving academic performance. Similarly, Marini et al. (2023) explored the use of Google Sites to increase student interest in social science education. Using the ADDIE model for development and pre-experimental designs for testing, the study concluded that Google Sites significantly enhanced student engagement and interest in the subject. In the realm of primary education Paños-Castro et al., (2022) examined the digital competencies of teachers in the Basque Country, Spain, during the COVID-19 pandemic. The study found that teachers heavily relied on Google Sites and other digital tools to adapt to remote teaching. Despite challenges related to ICT training, the use of Google Sites facilitated the reorganization and redesign of teaching materials, highlighting its adaptability and utility in primary education settings.

The COVID-19 pandemic posed significant challenges to the continuation of laboratory and practical courses, which are critical components of many educational programs. Jeyarajaguru (2023) addressed this issue by creating a simplified virtual curation lab using Google Sites for biochemistry laboratory courses. This approach enabled the integration of various Google applications, such as Docs, Sheets, and Forms, to create an interactive and collaborative online learning environment. The study found that the virtual lab maintained educational continuity and enhanced the learning experience during the pandemic. In a similar vein, Reskiyati et al. (2023) developed Google Sites-assisted learning media for teaching complex scientific concepts like vibration, waves, and sound. The study used a 4-D model for development and qualitative and quantitative data collection methods. The results indicated that the Google Sites-assisted media met the criteria for validity, practicality, and effectiveness, further validating the platform's utility in enhancing practical and laboratory courses. Higher education has also benefited from the integration of Google Sites, particularly in terms of enhancing student engagement and motivation. Nguyen (2022) conducted a study involving a Google Sites-based project (GBP) in a foreign language classroom. The quasi-experimental study with 185 students found that the GBP increased critical reflection, learning motivation, and academic performance. Students highly valued the importance of GBP in fostering a more engaging and reflective learning environment. Additionally, Anh and Truong (2023) explored the use of mobile e-portfolios on Google Sites to enhance project-based learning in physics education. The study involved 119 students in the experimental group and 124 in the control group. The findings showed that the experimental group using Google Sites had significantly higher test scores and

engagement levels compared to the control group. This underscores the platform's potential to support project-based learning and improve educational outcomes in higher education.

Google Sites has proven to be a valuable tool in vocational and technical education, showcasing its adaptability in various educational settings. Uantrai et al. (2022) developed online lessons for teaching pulse and switching circuits to vocational certificate students using Google Sites. The study used the ADDIE model for lesson development and found that the platform improved learning outcomes and student satisfaction. The results indicated that students taught using Google Sites achieved higher learning gains and expressed high levels of satisfaction with the online lessons. Similarly, Allahawiah et al. (2023) investigated the impact of Google Sites and virtual classrooms on teaching computer skills courses in Jordan. The study involved 160 students and compared the academic achievements of those taught using Google Sites with a control group. The findings revealed that students in the experimental group outperformed their peers in traditional settings, highlighting the effectiveness of Google Sites in enhancing vocational and technical education. Although the numerous benefits of integrating Google Sites in educational settings, several challenges need to be addressed to maximize its potential. Paños-Castro et al. (2022) identified a lack of ICT training among primary school teachers as a significant barrier to the effective use of digital tools like Google Sites. This underscores the need for comprehensive training programs to equip teachers with the necessary skills to utilize these tools effectively. Moreover, Nguyen (2022) highlighted that while Google Sites-based projects can enhance learning outcomes, they also present challenges such as managing the implementation process and ensuring consistent student participation. The study recommended that innovation and creativity should be embedded in teaching approaches to overcome these challenges and maximize the benefits of using Google Sites in educational settings.

The integration of Google Sites in educational settings has proven to be a valuable tool for enhancing teaching and learning across various disciplines and educational levels. Studies by Noviarni et al. (2023), Marini et al. (2023), as well as Reskiyati et al. (2023) demonstrated the platform's effectiveness in improving academic performance and student engagement in primary and secondary education. In higher education, research by Anh and Truong (2023) as well as Nguyen (2022) highlighted the benefits of Google Sites in fostering critical reflection, learning motivation, and project-based learning. Furthermore, the platform's adaptability in vocational and technical education, as evidenced by studies like Allahawiah et al. (2023) as well as Uantrai et al. (2022), underscores its versatility in diverse educational contexts. Despite the challenges related to ICT training and implementation, the overall impact of Google Sites on educational practices and outcomes is overwhelmingly positive. As digital tools continue to evolve, the effective integration of platforms like Google Sites will play a crucial role in shaping the future of education. Therefore, the current scoping review was developed to answer the following research questions: (1) What are the digital pedagogies and strategies can be employed to effectively integrate Google Sites into learning environments? (2) What is the impact of Google Sites in improve students learning and digital literacy among students?

Materials and Methods

Review protocol

This Scoping Review adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. PRISMA is an established standard for conducting systematic literature reviews, aimed at ensuring transparency in reporting methodology, findings, and justifications (Page et al., 2021). The document search strategy was executed in three systematic stages: identification, screening, and eligibility. The selected papers were then subjected to several processes, including data extraction and analysis. Thematic synthesis was utilized to analyze the extracted data.

Identification

Three essential stages of the scoping review process were employed to pick a significant number of relevant papers for this investigation. The first step is to select keywords and search for similar terms using a thesaurus, dictionaries and previous research. After developing search strings for the Scopus and Web of Science databases (*Table 1*), all relevant terms were chosen. During the first step of the scoping review approach, both databases produced 316 papers for the current study project.

Table 1. *The search strings.*

Database	Searching string and searching terms
Web of Science	TS = (“Google Sites” OR “Google Tools”)
Scopus	TITLE-ABS-KEY (“Google Sites” OR “Google Tools”)

Screening

During the first phase, 316 papers were assessed using the researchers' inclusion and exclusion criteria (*Table 2*). The major selection criterion was research publications containing pertinent information. As a result, the study excluded items such as systematic reviews, reviews, meta-analyses, meta-syntheses, monographs, book chapters, and conference proceedings. Furthermore, the review only considered materials written in English. It is vital to note that the study lasted five years (2020-2024). Only articles in the fields of social science with final publication dates are considered. Overall, 243 publications were removed due to a specific criterion. Following that, duplicate papers were eliminated during the second step of screening. A total of 10 duplicate articles were eliminated, resulting in 63 articles at the end.

Table 2. *Inclusion and exclusion criteria.*

Criteria	Inclusion	Exclusion
Language	English	Non-English
Time line	2020-2024	<2019
Literature type	Journal (Article)	Conference, Book, Review
Subject Area	Social Science	Besides social science
Publication Stage	Final	In Press

Eligibility

The eligibility evaluation, which is the third phase, involved compiling 63 articles. In this phase, the titles and primary content of all articles were meticulously examined to guarantee that they satisfied the inclusion criteria and were pertinent to the research objectives of the ongoing study. Consequently, 48 papers were excluded due to their lack of full text access, lack of noteworthy title, lack of abstract relevant to the study’s

objective, and out of scope, as supported by empirical evidence. Lastly, 15 articles require further review. The search process is shown in *Figure 1*, which depicts the overall flow diagrams.

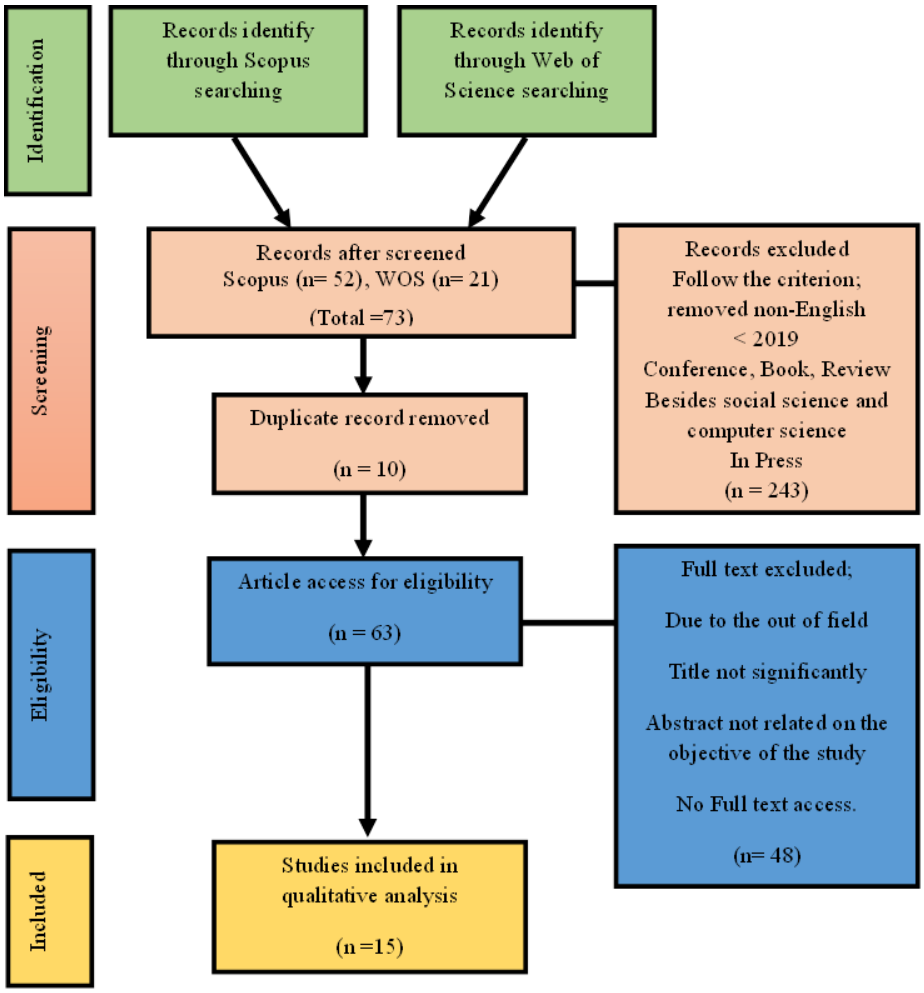

Figure 1. *Flow diagram of the searching process.*
Source: Mustafa et al. (2022); Moher et al. (2010).

Results and Discussion

Background of selected studies

Among the 15 studies included in these reviews, three were conducted in Indonesia, two in Vietnam and India. The rest were predominantly carried out in developed countries, such as New Zealand, United States, Spain, South Africa, Jordan, Hong Kong, Taiwan, and Germany (1 study). This study was conducted between 2020 to 2024, with studies distributed as follows: 2020 (2 studies), 2021 (2 studies), 2022 (5 studies), 2023 (4 studies), and 2024 (2 studies). Eight studies were conducted in school setting, while seven studies examined at the higher education setting. *Table 3* contains details of the selected studies which is related to how Google Sites are implemented in the field of education.

Table 3*. The characteristic of selected studies.*

No	Author name	Year	Journal	Countries	Participants
1	Kucera et al. (2022)	2022	Movimento	New Zealand	Primary education pupils
2	Jeyarajaguru (2023)	2023	Journal of Educators Online	India	Second-year B. Tech Biotechnology students
3	Hikmawati et al. (2024)	2024	Jurnal Ilmiah Profesi Pendidikan	Indonesia	Middle school students
4	Hall (2022)	2022	Unifying online and face-to-face modalities	USA	Higher education students
5	Paños-Castro et al. (2022)	2022	COVID and ICT in primary education	Spain	Primary education pupils
6	West and Malatji (2021)	2021	Technology Integration in Higher Education	South Africa	Higher education students
7	Allahawiah et al. (2023)	2023	International Journal of Emerging Technologies in Learning	Jordan	University students
8	Anh and Truong (2023)	2023	Mobile E-Portfolios on Google Sites	Vietnam	Teachers and students using mobile e-portfolios for teaching and learning.
9	Kwong and Churchill (2023)	2023	Computers & Education	Hong Kong	Eight IB MYP 2 students (aged 12–13) in a longitudinal study.
10	Lacaste et al. (2022)	2022	PLOS ONE	Taiwan	Multicultural graduate classroom students .
11	Parmar et al. (2020)	2020	Indian Journal of Forensic Medicine & Toxicology	India	138 undergraduate medical students (84 male, 54 female).
12	Setyansah and Suprapto (2020)	2020	Journal of Physics: Conference Series	Indonesia	22 students from the Mathematics Education Study Program at Universitas PGRI Madiun.
13	Von Kotzebue et al. (2022)	2022	Multimodal Technol. Interact.	Germany	School students in a study on digital escape rooms.
14	Thuan and Hanh (2024)	2024	Akademika	Vietnam	Teachers and students using Google Workspace for Education.
15	Khasanah and Muflihah (2021)	2021	Journal of Education and Learning Mathematics Research	Indonesia	Students of class VIII SMP Muhammadiyah 4 Singosari

The developed themes

Thematic analysis of 15 selected papers revealed two major themes: (1) Digital Pedagogy and Online Teaching Strategies, and (2) Google Sites' Impact on Student Learning and Digital Literacy. These two topics provided answers to the two research questions in this review: (1) What digital pedagogies and strategies can be used to integrate Google Sites into learning environments effectively. (2) How effectively is Google Sites improving student learning and digital literacy? The selected investigations' findings are explained in table below.

Digital pedagogy and online teaching strategies

Table 4 provides a clear overview of various research studies, highlighting their objectives, methodologies, findings, and suggestions for future research, focusing on the effective integration of Google Sites in educational environments.

***Table 4**. Analysis for the digital pedagogy and online teaching strategies theme.*

No	Author (year)	Objectives	Methodologies	Strategies	Conclusion & future research

1	Khasanah and Muflihah (2021)	To describe learning management using Google Sites on relations and functions during pandemic conditions	Descriptive qualitative methods (interview, observation, documentation)	Online learning management using Google Sites involves planning, organizing, implementing, and monitoring stages, leading to increased student attendance and participation	Google Sites can effectively increase student engagement in online learning environments. Future research could explore its impact on different subjects and age groups
2	Jeyarajaguru (2023)	To create and implement a virtual curation lab for a Principles of Biochemistry laboratory course using Google Sites	Case study	Virtual curation lab using Google Sites integrates various digital resources like videos, simulations, and documents, leading to improved student engagement and understanding of lab procedures	Google Sites is a versatile tool for creating virtual labs. Further research could investigate its application in other scientific disciplines and larger sample sizes
3	Kucera et al. (2022)	To teach online physical education using Google Sites during social distancing	Mixed methods (survey, observation)	Google Sites was used to organize and present physical education activities and resources, making the content more accessible and engaging for students	Google Sites can effectively support the delivery of practical subjects online. Future studies could assess long-term impacts on physical fitness and student motivation
4	West and Malatji (2021)	To explore technology integration in higher education	Literature review	Google Sites facilitates collaborative learning and resource sharing among students and teachers, enhancing the overall learning experience	Google Sites promotes collaboration and resource sharing in higher education. Future research could explore its effectiveness in different educational contexts and technological integrations
5	Paños-Castro et al. (2022)	To examine the impact of COVID-19 on primary education ICT usage	Survey	Google Sites was used to support online teaching by providing a platform for sharing educational resources and maintaining communication with students	Google Sites is an effective tool for maintaining educational continuity during disruptions. Future research could focus on optimizing its use for younger students and integrating with other educational technologies
6	Hall (2022)	To design blended courses unifying online and face-to-face modalities	Problem-centered design approach	The use of Google Sites helped in organizing course materials and providing a unified platform for both online and face-to-face interactions	Google Sites can bridge the gap between online and face-to-face learning. Further studies could investigate its impact on different learning outcomes and disciplines
7	Hikmawati et al. (2024)	To analyze the practicality of Google Sites-based teaching materials	Practicality analysis	Google Sites was found to be practical and effective in delivering teaching materials, enhancing both teacher and student experiences	The practicality of Google Sites makes it a valuable tool for education. Future research could explore its effectiveness across different educational levels and subjects
8	Allahawiah et al. (2023)	To investigate the impact of using Google Sites on students' achievement in computer skills course	Experimental study (ANOVA)	The study found significant improvement in students' achievement when Google Sites was used compared to traditional methods	Google Sites enhances students' learning outcomes. Future research should explore its application in other skill-based courses

Impact of Google Sites towards student learning and digital literacy

Table 5 provides a concise summary of the objectives, methodologies, findings, and conclusions of a variety of studies that evaluate the influence of Google Sites on the development of students' digital literacy. In each study, positive results are demonstrated and potential areas for future research are suggested.

***Table 5**. Analysis for the impact of Google sites towards student learning and digital literacy theme.*

No	Author (year)	Objectives	Methodologies	Strategies	Conclusion & future research
1	Parmar et al. (2020)	To develop a web-based teaching module via Google Sites and evaluate students' performance and perceptions.	Web-based teaching module, Pre-test and Post-test, Feedback analysis	Students scored significantly higher in the post-test. Positive feedback from both students and faculty.	Web-based teaching via Google Sites is useful for enhancing teaching and revision. Future research could explore additional topics and long-term impacts on learning outcomes.
2	Setyansah amd Suprapto (2020)	To create an Android-based tutorial to improve students' digital literacy in mathematics programming.	Research and Development (R&D), Plomp model (Initial investigation, Design, Realization, Testing, Evaluation)	The media tutorial is considered feasible with high validity and effectiveness. Improved digital literacy skills in aspects such as technology use and online safety.	The developed tutorial media is effective in honing digital literacy. Future research could focus on expanding the tutorial content and testing with a larger student population.
3	Anh and Truong (2023)	To explore the use of mobile e-portfolios on Google Sites in enhancing students' digital literacy and learning outcomes.	Quasi-experimental design with two groups: experimental and control, Surveys	Significantly enhanced student interest and learning outcomes. Higher test scores in the experimental group compared to the control group.	Mobile e-portfolios on Google Sites are effective in promoting digital literacy. Future studies could investigate the impact on different educational levels and subjects.
4	Kwong and Churchill (2023)	To apply the Activity Theory framework to analyze the use of ePortfolios in student learning.	Activity Theory framework, Qualitative analysis	ePortfolios on Google Sites facilitated reflective learning and improved digital literacy. Positive impact on students' ability to organize and present their work.	ePortfolios are beneficial for developing digital literacy. Future research could examine longitudinal effects and integration with other digital tools.
5	Lacaste et al. (2022)	To investigate blended and collaborative learning using Google Sites in a multicultural graduate classroom.	Blended learning approach, Collaborative learning, Surveys	Enhanced digital literacy and collaboration among students. Improved engagement and learning outcomes.	Google Sites support blended and collaborative learning effectively. Future research could explore its application in other multicultural and educational settings.
6	Von Kotzebue et al. (2022)	To evaluate the use of digital escape rooms on Google Sites as game-based learning environments.	Game-based learning, Digital escape rooms, Qualitative and quantitative analysis	Increased digital literacy and problem-solving skills. Positive feedback on engagement and learning experience.	Digital escape rooms on Google Sites are effective for engaging students and enhancing digital literacy. Future research could explore diverse game designs and subjects.
7	Thuan and Hanh (2024)	To explore the benefits of applying Google Workspace for Education (GWE) in improving learning skills and engagement.	Surveys, Semi-structured interviews	Enhanced digital literacy, improved learning efficiency, and better engagement with learning materials.	GWE tools are beneficial for enhancing digital literacy. Future research could focus on long-term impacts and applications in various educational contexts.

Digital pedagogy and online teaching strategies

The advent of digital pedagogy has revolutionized the educational landscape, especially during the COVID-19 pandemic. This discussion analyzes the significant findings from recent studies focusing on the use of Google Sites as an educational tool, highlighting its impact on various aspects of online teaching and learning. Khasanah and Muflihah (2021) investigated the use of Google Sites for managing online learning during the pandemic, focusing on teaching relations and functions. Their descriptive qualitative study, which included interviews, observations, and documentation, revealed that Google Sites made it easier to plan, organise, implement, and monitor online learning. The authors reported a significant increase in student attendance and participation, indicating that Google Sites can improve student engagement in digital learning environments. This finding supports the need for robust online management systems to keep students interested and engaged in virtual classrooms. In a case study, Jeyarajaguru (2023) implemented a virtual curation lab for a Principles of Biochemistry laboratory course using Google Sites. This virtual lab integrated various digital resources such as videos, simulations, and documents, which significantly improved student engagement and understanding of laboratory procedures. The versatility of Google Sites in creating interactive and resource-rich virtual labs points to its potential application across other scientific disciplines. Future research could expand on this by exploring its effectiveness in larger and more diverse student populations.

Kucera et al. (2022) investigated the utilisation of Google Sites to instruct physical education during social distancing. The study discovered that the organisation and presentation of physical education activities via Google Sites made the content more accessible and engaging for students, as evidenced by a mixed-methods approach that included surveys and observations. This implies that Google Sites has the potential to facilitate the online delivery of practical subjects, which have historically been dependent on physical presence and activity. The impact of such digital interventions on student motivation and physical fitness could be further explored through long-term studies. West and Malatji (2021) conducted a literature review on technology integration in higher education, highlighting Google Sites as a tool that facilitates collaborative learning and resource sharing. Their findings indicate that Google Sites enhances the overall learning experience by promoting collaboration among students and teachers. This aligns with the broader trend of leveraging technology to foster interactive and collaborative learning environments in higher education. Future research could examine the effectiveness of Google Sites in different educational contexts and with other technological integrations. Paños-Castro et al. (2022) used a survey to investigate the impact of COVID-19 on primary education ICT usage, finding that Google Sites played a crucial role in supporting online teaching by providing a platform for resource sharing and communication. This highlights Google Sites' effectiveness in maintaining educational continuity during disruptions. Future studies could focus on optimizing its use for younger students and integrating it with other educational technologies to enhance its functionality. Hall (2022) employed a problem-centered design approach to design blended courses that unify online and face-to-face modalities using Google Sites. The study found that Google Sites helped organize course materials and provide a unified platform for both online and face-to-face interactions. This suggests that Google Sites can bridge the gap between different learning modalities, offering a cohesive learning experience. Further research could investigate its impact on various learning outcomes and disciplines.

Hikmawati et al. (2024) analyzed the practicality of Google Sites-based teaching materials through a practicality analysis, finding it effective in delivering teaching materials and enhancing both teacher and student experiences. This indicates that Google Sites is a practical tool for education, warranting further exploration of its effectiveness across different educational levels and subjects. Allahawiah et al. (2023) conducted an experimental study using ANOVA to investigate the impact of Google Sites on students' achievement in a computer skills course. The study found significant improvement in students' achievement compared to traditional methods, underscoring Google Sites' potential to enhance learning outcomes in skill-based courses. Future research should explore its application in other skill-based courses to validate these findings further. The analyzed studies collectively highlight Google Sites as a versatile and effective tool in digital pedagogy and online teaching strategies. Its applications range from enhancing student engagement and managing online learning to supporting practical subjects and fostering collaborative learning environments. Future research should continue exploring its potential across different educational contexts, disciplines, and age groups to maximize its benefits in digital education.

Impact of Google Sites towards student learning and digital literacy

The integration of Google Sites in educational settings has been explored extensively to understand its influence on student learning and digital literacy. This discussion synthesizes findings from various studies to highlight the significant impacts and future research directions in this area. One of the primary impacts of using Google Sites is the enhancement of student learning outcomes. Parmar et al. (2020) demonstrated that students who engaged with web-based teaching modules via Google Sites scored significantly higher in post-tests compared to pre-tests. This suggests that the structured and accessible nature of Google Sites facilitates better understanding and retention of educational content. Similarly, Anh and Truong (2023) found that mobile e-portfolios on Google Sites significantly enhanced student interest and learning outcomes, with the experimental group showing higher test scores than the control group. These findings indicate that Google Sites can be a powerful tool in improving academic performance. Digital literacy is a crucial skill in the modern educational landscape, and Google Sites has shown considerable effectiveness in fostering these skills. Setyansah and Suprapto (2020) developed an Android-based tutorial to improve digital literacy in mathematics programming, finding that the tutorial media was highly valid and effective in enhancing digital literacy skills, particularly in technology use and online safety. Similarly, Kwong and Churchill (2023) applied the Activity Theory framework to analyze e-Portfolios on Google Sites, revealing that these portfolios facilitated reflective learning and improved students' ability to organize and present their work. These studies underscore the role of Google Sites in developing essential digital competencies among students.

Google Sites also plays a significant role in increasing student engagement and fostering collaboration. Lacaste et al. (2022) investigated the use of Google Sites in a blended and collaborative learning environment, finding that it enhanced digital literacy and collaboration among students. This collaborative approach not only improved engagement but also led to better learning outcomes. Additionally, Von Kotzebue et al. (2022) explored the use of digital escape rooms on Google Sites as game-based learning environments, reporting increased digital literacy and problem-solving skills alongside positive feedback on engagement and learning experience. These interactive and

collaborative tools within Google Sites create a dynamic learning environment that keeps students motivated and involved. The use of e-Portfolios on Google Sites promotes reflective and autonomous learning. Kwong and Churchill (2023) highlighted that e-Portfolios allowed students to reflect on their learning processes and outcomes, enhancing their digital literacy and organizational skills. This reflective practice is crucial for developing autonomous learners who can self-assess and direct their learning paths effectively. The integration of Google Sites in education significantly enhances student learning outcomes, digital literacy, engagement, and collaboration. However, there are areas for further exploration. Parmar et al. (2020) suggest future research could investigate additional topics and long-term impacts on learning outcomes. Setyansah and Suprapto (2020) recommend expanding tutorial content and testing with a larger student population. Anh and Truong (2023) as well as Lacaste et al. (2022) propose examining the impact of Google Sites on different educational levels, subjects, and multicultural settings. Pham and Hanh (2023) as well as Von Kotzebue et al. (2022) highlight the need to explore diverse game designs and the long-term impacts of Google Workspace for Education (GWE) tools in various contexts.

Conclusion

This structured scoping review comprehensively explored the integration and impact of Google Sites in educational settings, addressing key research questions related to digital pedagogies and the platform's influence on student learning and digital literacy. The review highlighted several digital pedagogies and strategies for effectively integrating Google Sites into learning environments. Key strategies include using Google Sites for organizing and presenting course materials, facilitating collaborative learning, and creating virtual labs. For instance, studies have shown that Google Sites can enhance online learning management by increasing student engagement and participation through structured and accessible digital environments. The platform's capability to integrate multimedia elements and support interactive components makes it particularly effective in creating engaging and resource-rich learning experiences. Moreover, Google Sites has proven beneficial in maintaining educational continuity during disruptions, such as the COVID-19 pandemic, by providing a centralized platform for resource sharing and communication. The review also found that Google Sites significantly improves student learning outcomes and digital literacy. The platform's user-friendly interface and integration with other Google Workspace tools facilitate better understanding, retention of educational content, and development of essential digital skills. Studies demonstrated that students using Google Sites scored higher in assessments, indicating enhanced academic performance. Additionally, the use of e-Portfolios and digital escape rooms on Google Sites has been shown to promote reflective learning, improve problem-solving skills, and foster collaborative learning environments. These tools not only engage students but also help them develop critical digital competencies necessary for the modern educational landscape.

While the review underscores the positive impact of Google Sites, it also highlights areas for further exploration. Future research should focus on longitudinal studies to assess the long-term benefits and potential challenges associated with Google Sites integration. Additionally, exploring its application across diverse educational contexts, subjects, and age groups will provide a more comprehensive understanding of its effectiveness. Addressing issues related to accessibility, privacy, and digital equity will

ensure that all students can benefit from this versatile educational tool. In conclusion, Google Sites represents a valuable digital platform that supports innovative teaching strategies and enhances student learning and digital literacy. Its integration into educational settings offers significant potential for transforming traditional pedagogical approaches and improving educational outcomes. As digital tools continue to evolve, understanding and leveraging platforms like Google Sites will be crucial in shaping the future of education.

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Conflict of interest

The authors declare that they have no conflicts of interest to report regarding the present study.

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