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Development of digital teaching materials in English subject at senior high school

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ABSTRACT

The use of digital teaching materials continues to evolve with advancements in information technology. This study aims to identify students' needs, design digital teaching materials using Google Sites, assess their validity, measure practicality, and test effectiveness. The Research and Development (RnD) method was used, integrating three development models: ADDIE, 4D, and Dick and Carey. The resulting stages included define, design, development, implementation, evaluation, and dissemination. The research was conducted at SMA Negeri 1 Sinjai, involving 30 students, one subject teacher, and two expert validators (media and content). Data were collected through questionnaires and learning tests. The digital teaching material developed is an online learning website based on Google Sites, designed to be interactive, responsive, and user-friendly. The results showed that the digital teaching materials were rated as highly valid and very practical, based on student and teacher feedback, and effective, as indicated by student activity observations and post-test results. This digital teaching material is designed to serve as an innovative alternative, supporting a more interactive and meaningful learning process.

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ABSTRAK

Pemanfaatan bahan ajar digital dalam proses pembelajaran terus berkembang seiring kemajuan teknologi informasi. Penelitian ini bertujuan untuk mengidentifikasi kebutuhan siswa terhadap bahan ajar digital, merancang bahan ajar digital berbasis google sites, menilai tingkat validitas, mengukur kepraktisan, dan menguji keefektifan bahan ajar tersebut. Pendekatan yang digunakan adalah metode Research and Development (RnD), dengan menggabungkan tiga model pengembangan yaitu ADDIE, 4D, dan Dick and Carey. Tahapan yang dihasilkan meliputi define, design, development, implementation, evaluation, dan disseminate. Penelitian dilaksanakan di SMA Negeri 1 Sinjai dengan melibatkan 30 siswa, 1 guru mata pelajaran, serta 2 validator (ahli media dan materi). Pengumpulan data menggunakan angket dan tes belajar. Bahan ajar digital yang dikembangkan dalam penelitian ini berupa sebuah situs pembelajaran berbasis google sites yang dapat diakses secara daring oleh siswa maupun guru. Situs ini dirancang dengan pendekatan yang interaktif, responsif, dan mudah digunakan. Hasil penelitian menunjukkan bahan ajar digital pada kategori sangat valid serta kategori sangat praktis berdasarkan respons siswa dan respons guru, dan kategori efektif pada observasi aktivitas siswa dan ketuntasan posttest. Pengembangan bahan ajar digital ini diharapkan dapat menjadi alternatif inovatif dalam mendukung proses pembelajaran yang interaktif dan bermakna.

Kata Kunci: *bahan ajar digital; bahasa Inggris; Google Sites; hasil belajar*

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INTRODUCTION

The development of digital technology has had a significant impact on various sectors of life, including education. Digitalization has driven a paradigm shift in learning from conventional models to technology-based learning that is more flexible, interactive, and personalized. This transformation not only creates new opportunities in the learning process but also demands adaptation from all elements of education, especially teachers and students. Digitalization of education has become a crucial element in the transformation of education systems around the world (Mulyono, et., 2025).

In the era of Industry 4.0 and Society 5.0, digital technology has become a key instrument in accelerating the teaching and learning process. Spatial and temporal limitations no longer bind education. The presence of various digital platforms allows learning to take place online, with features that support interaction, collaboration, and real-time assessment. This opens up opportunities for the application of learning models that are more adaptive to students' needs and relevant to global challenges. Technology can assist the learning process in schools, both as a medium and a learning resource for teachers and students (Nurhikmah, et al., 2021).

The importance of mastering technology in the field of education has been emphasized in various national policies. The Director General of Teachers and Education Personnel Regulation No. 2626/B/HK.04.01/2023 states that mastering information technology is an integral part of pedagogical competence that teachers must possess. In addition, the Ministry of Education, Culture, Research, and Technology Regulation No. 16 of 2022 also mandates the utilization of technology as a strategy in learning to realize a quality, contextual, and participatory learning process. These policies demonstrate that the integration of technology in education is not just an option, but a necessity to achieve optimal learning outcomes.

One of the essential components in the learning process is teaching materials. Teaching materials are all forms of content used by educators to help students achieve learning objectives. According to the National Center for Competency-Based Training, teaching materials include all materials that support the learning process, whether written or unwritten. Nunan in his book “Teaching English to Young Learners”, states that "teaching materials are all resources and tools used by educators to support and enhance the learning process, from traditional textbooks to interactive digital content." Meanwhile, effective teaching materials should be developed based on the curriculum and consider the characteristics and needs of students (Nuzalifa, 2021).

English is a compulsory subject at the high school level, which emphasizes mastery of the four main skills: listening, speaking, reading, and writing. The goal of English language learning is to equip students with the communication competencies needed to face global challenges. To achieve this goal, innovative, interactive, and engaging teaching materials are required to enhance students' motivation and learning effectiveness. Well-designed teaching materials help students understand the material more deeply and improve learning outcomes (Pattaufi & Arnidah, 2019). Supporting this, other research emphasizes that the integration of e-learning tools in English teaching can significantly enhance student engagement, autonomy, and skill acquisition (Aliyeva, 2023). That study highlights that using digital platforms in high school settings not only modernizes the teaching approach but also fosters students’ communicative competence in more dynamic and learner-centered environments.

The use of teaching materials at SMA Negeri 1 Sinjai is still dominated by conventional models that are static and less responsive to the times. Textbooks remain the main source of learning, even though this type of teaching material has limitations in terms of visual appeal, content depth, and the ability to interact dynamically with students. This impacts students' learning motivation and their limited ability to explore the material in depth.

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The results of the learning evaluation at SMA Negeri 1 Sinjai indicate that only about 58% of students achieve the Learning Outcome Criteria, which suggests obstacles in the process of material comprehension. Interviews with English teachers revealed that the leading cause of this low achievement is the limitation of the teaching materials used, which are still confined to textbooks without the support of digital media. In addition, a survey conducted with 30 students from grade X showed that 78% of them have difficulty understanding the material if they only rely on textbooks, and the majority of students stated that they are more interested in materials in digital formats, such as learning videos, interactive quizzes, and animations. Interestingly, all respondents reported having Android devices that could be useful for accessing digital teaching materials, thus indicating the readiness of infrastructure at the student level.

This condition indicates an urgent need to develop innovative, interactive, and appropriate digital teaching materials that align with the characteristics of the digital native generation. In this regard, constructivist theory can serve as a foundation in the development of digital teaching materials. This theory emphasizes that learning is an active process in which students construct their own knowledge through direct experience, exploration, interaction, and reflection (Pubian & Herpratiwi, 2022). Constructivism-oriented learning encourages students to become active and independent learners who are actively engaged in the process of searching for and constructing meaning.

This constructivist perspective aligns with Jerome Bruner's learning theory, which states that the learning process involves three main stages: acquiring new information, transforming that information to make it understandable, and evaluating the learning outcomes. Additionally, Bruner proposed three stages of representation in learning: the enactive stage (through direct action), the iconic stage (through images or visuals), and the symbolic stage (through symbols or language) (Sundari & Fauziati, 2021). These stages can be optimally facilitated through digital media that presents learning content in various formats, ranging from videos, audio, images, to interactive text.

One platform that can be effectively utilized for the development of digital teaching materials is Google Sites. This platform provides an easy-to-use interface for teachers to create interactive learning pages without requiring advanced technical skills. Google Sites allows the integration of various media such as text, images, videos, external links, as well as other Google documents like Google Docs, Google Slides, and Google Forms (Mukti & Anggreini, 2020). This platform is also free to access and compatible with various devices, making it an inclusive and adaptive choice in the context of digital learning. Supporting this, a research demonstrated that the use of Google Sites in English as a Second Language (ESL) learning, especially through a heutagogical approach, fosters learner autonomy and digital engagement by encouraging students to explore, create, collaborate, and reflect (Panah et al., 2022). The findings highlight the effectiveness of Google Sites as a tool to support independent, student-centered language learning in digital environments.

In the context of English language learning at SMA Negeri 1 Sinjai, the use of Google Sites as a medium for developing digital teaching materials is a strategic choice. This is based on the availability of Android devices among students, students' interest in digital-based learning, and the limitations of the existing conventional teaching materials. The development of Google Sites-based digital teaching materials is expected to enhance the effectiveness of English language learning by providing more contextual, interactive, and engaging content, while also supporting the achievement of 21st-century competencies.

Considering the urgency of needs, theoretical foundations, national education policies, and the readiness of digital infrastructure in schools, the development of digital teaching materials based on Google Sites for English subjects at SMA Negeri 1 Sinjai is a timely and relevant step. This innovation not only serves as a solution to the limitations of conventional teaching materials but also represents an effort to transform education toward a higher quality, more inclusive, and sustainable learning ecosystem. Therefore, the purpose of this study is to design, develop, and measure the effectiveness of using digital teaching materials based on Google Sites in English language learning at SMA Negeri 1 Sinjai, in order to enhance

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the quality of instruction and support the creation of a more interactive, flexible, and sustainable learning experience.

LITERATURE REVIEW

Development of Teaching Materials

The development of teaching materials is an essential component in the educational system because it directly contributes to the quality and success of the learning process. According to the Kamus Besar Bahasa Indonesia (KBBI), the term development is explained as a series of processes or methods aimed at expanding, improving, or advancing something. Sugiyono in his book titled *"Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D"* states that development is an effort undertaken to redesign, update, design, or create products, whether they are existing or newly developed. In line with this view, Rayanto in his book "Penelitian pengembangan model ad*die dan r2d2: teori & praktek"* defines the development of teaching materials as activities that include writing, producing, and creating learning resources that can take the form of hardware, software, or audio-visual media. Therefore, the development of teaching materials can be understood as a systematic process designed to produce learning products that function effectively in supporting teaching and learning activities. Thus, the development of teaching materials plays a very strategic role in ensuring the optimal achievement of learning objectives.

In the context of Senior High Schools (SMA), the development of teaching materials is particularly important due to the increasing complexity of subjects and the need to cultivate Higher-Order Thinking Skills (HOTS) among students. The Center for Curriculum and Books of the Ministry of Education and Culture states that teaching materials should support student-centered learning and encourage the exploration of their potential. HOTS-based e-module developed with the assistance of Flipbook Marker serves as an interactive and valid alternative teaching material, effectively facilitating the development of students' higher-order thinking skills while also enhancing their engagement and understanding during the learning process (Puspitasari et al., 2020).

Kurniawan and Kuswandi in their *"Pengembangan e-modul sebagai media literasi digital pada pembelajaran abad 21"* book states that there are four principles for developing teaching materials:

1. Relevance principle, this principle emphasizes that the material in teaching materials should align with the basic competencies, learning objectives, and the needs of the students. The material presented should directly relate to the topic being studied and be relevant to the students' life context.
2. Consistency principle, this principle refers to the alignment between each component of the teaching materials, such as the objectives, content, methods, and evaluation. For example, if the learning objective targets writing skills, then the material and exercises provided should support that skill.
3. Suffeciency principle, the material presented must help students achieve the expected competencies. It should neither be too little, which would be insufficient for understanding, nor too much, as it may confuse or overload the students.
4. Readability and Appeal Principle, teaching materials should be written in language that is easily understood by students according to their age level. Additionally, the presentation should be attractive, both in terms of visual design, illustrations, and content organization.

The findings from the previous studies strengthen the foundation of the digital teaching material development carried out in this research. Both studies demonstrated that digital teaching materials validated by experts and developed using systematic approaches are proven to be valid, practical, and effective in supporting the learning process (Aminudin et al., 2021; Denisa et al., 2023; Hadiapurwa et al., 2021). This aligns with the approach used in the present study, which involves the development of Google Sites-based digital teaching materials for English subjects at the senior high school level. Thus, previous

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research provides both theoretical and empirical support that digital teaching innovations, such as those developed in this study, have strong potential to enhance the quality of learning and improve student outcomes.

Teaching Materials

Teaching materials are defined as content that supports the smooth flow of the learning process. According to Kosasih in his *"Pengembangan Bahan Ajar"* books states that teaching materials facilitate communication between teachers and students in delivering the content. Furthermore, Kurniawan and Kuswandi in their *"Pengembangan e-modul sebagai media literasi digital pada pembelajaran abad 21"* book states that teaching materials play a crucial role in enhancing the effectiveness of learning, both individually and in groups. Kosasih also states that teaching materials are designed by considering the needs of students and implemented according to the applicable curriculum. In addition to understanding their function, there are several benefits expected from teaching materials, including:

1. Teaching materials provide real, hands-on experiences to students during the learning process.
2. Teaching materials present content that cannot be observed directly, thus helping students understand more complex concepts.
3. Teaching materials broaden students' thinking horizons in class by providing various knowledge and activities that support language skills.
4. Teaching materials also contribute to solving educational problems, especially in the areas of language, literature, and literacy

Teaching materials can be divided into two main types: printed and non-printed materials. According to Kurniawan and Kuswandi in their *"Pengembangan e-modul sebagai media literasi digital pada pembelajaran abad 21"* book, printed materials refer to teaching materials in the form of physical media, such as paper, which can be directly used by students. This type of teaching material has the advantage of providing information directly and can be accessed physically by students without the need for specific technological tools.

Digital teaching materials refer to learning content that is organized in an electronic format to support the educational process and can be accessed through devices such as computers, tablets, or smartphones. Kosasih in his *"Pengembangan Bahan Ajar"* books states that these materials often combine various types of multimedia, such as animations, videos, audio, images, and text, to enhance the understanding of the content. Digital teaching materials incorporate several types of media, including animations, videos, audio, images, and text, to manage the presentation of the learning process (Sunarti & Rusilowati, 2020).

Google Sites

Google Sites is one of Google's products that provides a platform for easily creating and managing websites online. One of the main benefits of using Google Sites in education is the convenience it offers to both students and teachers in accessing lesson-related information (Japrizal et al., 2021). The platform offers features that strongly support the learning process, such as integration with Google Docs, Google Sheets, Google Forms, Google Calendar, and other tools that facilitate collaboration and content delivery (Japrizal et al., 2021). Google Sites has a simple and intuitive interface, making it accessible without requiring advanced technical skills. Websites created with Google Sites can be accessed via various devices—such as laptops, tablets, or smartphones—as long as the device is connected to the internet. This ease of access makes Google Sites a highly useful tool in supporting digital-based learning and enhancing the interactivity between students and instructional materials.

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Based on the previous research at Marist School during the 2022-2023 academic year states that there is no significant differences were found in the assessments given by teachers, subject matter experts, and students regarding the developed teaching materials (Landingin et al., 2023). This indicates that the teaching materials created were well-received and successfully achieved the established learning objectives. Another study developed web-based learning media using Google Sites to teach the topic of temperature and heat in physics indicate that the learning media developed using Google Sites has good quality and is suitable for use in teaching (Meiliyadi et al., 2025). That study highlights the potential of web-based technology in enhancing the effectiveness of physics learning and helping students understand related concepts. Furthermore, another research reported that the use of Google Sites-based electronic modules significantly improves students' digital literacy skills and enhances their ability to use technology effectively (Ernest, 2023).

In the context of high school education, the use of Google Sites can be effectively integrated into the development of teaching materials. Teachers can create interactive and visually engaging digital content, such as learning modules, quizzes, videos, and downloadable resources, all within a single platform. This not only supports the creation of innovative and student-centered learning environments but also allows for easier content updates and distribution. Google Sites facilitates the development of teaching materials that are more accessible, relevant, and aligned with the digital literacy needs of high school students.

METHODS

This study employs a Research and Development (R&D) approach to develop instructional materials based on Google Sites for English language learning. The approach integrates elements from several instructional design models, namely ADDIE, 4D, and the Dick and Carey model. The researcher chose to synthesize the ADDIE, 4D, and Dick and Carey development models because each has its own strengths and complements the others. The ADDIE model provides a systematic and flexible framework for instructional development, ranging from analysis to evaluation. The 4D model focuses on the development of educational products, with the disseminate stage emphasizing the distribution of development outcomes.The Dick & Carey model offers a more detailed approach to instructional design, including goal analysis and comprehensive evaluation.

By combining ADDIE, 4D, and Dick & Carey, the researcher can create a development model that is more systematic, flexible, and evaluation-based, thereby making it more effective in improving the quality of learning. The synthesis resulted in six stages, namely: Define, Design, Development, Implementation, Evaluation, and Dissemination. The following is a detailed explanation of each phase.

Define

The first phase begins with a needs analysis and the identification of learning objectives to be achieved. In this stage, an analysis of student characteristics and the learning context is also conducted to gather relevant information about learners' conditions and needs. The main goal of this phase is to gain a thorough understanding of what is required in the learning process and how the instructional materials can be tailored to suit student characteristics.

The analysis of student characteristics was conducted by observing the learning activities of students at SMA Negeri 1 Sinjai and identifying the difficulties they faced in learning English, including topics that students found challenging to master. The observation focused on Grade X and revealed that the only learning resource used was the textbook or printed learning package. The teacher had not yet developed any electronic teaching materials. Meanwhile, the students demonstrated strong characteristics in utilizing

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technology. This situation was considered less effective for the learning process, leading the researcher to see the need for digital teaching materials using Google Sites.

Design

This phase involves the planning and design of instructional activities based on the needs identified in the previous stage. The design process includes the development of teaching instruments, determination of appropriate assessment strategies, and the design of instructional materials using Google Sites. The purpose of this stage is to create an interactive learning experience aligned with the predetermined learning objectives.

Development

In the development phase, the instructional materials using Google Sites are created according to the design blueprint. These materials are then validated by media experts and content experts to ensure their quality and feasibility. The validation process is conducted through questionnaires distributed to the experts, aiming to assess the extent to which the developed materials meet instructional standards and needs. This phase also includes the production, refinement, and revision of the teaching materials to ensure the final product is effective and student-centered.

The digital teaching materials created using Google Sites, along with the research instruments, were then validated by expert validators. Both the digital teaching materials and the research instruments were validated by two validators, serving as media and content experts. The validation process was carried out using a validation instrument arranged in the form of a Likert scale, 1 (disagree) to 4 (strongly agree). The scores obtained from each validator were then summed and calculated as a percentage of the maximum possible score. This percentage in **Table 1** was used to determine the validity level of the teaching materials

Table 1. Validity Criteria of Google Sites-Based Teaching Materials

Criteria	Level of Validity
80.01%-100%	Very Valid
60.01%-80.00%	Valid
40.00%-60.00%	Less Valid
20.00%-40.00%	Invalid
00.00-20.00%	Very Invalid

Sources: Adhaningrum, 2020

Implementation

At this stage, the validated instructional materials are implemented in a real classroom setting. A trial is conducted with tenth-grade students at SMA Negeri 1 Sinjai to examine the effectiveness of Google Sites-based materials in the teaching and learning process. During the trial, data are collected through questionnaires completed by both students and teachers to evaluate the practicality of the materials. The gathered data are used to determine the extent to which the materials enhance student comprehension and meet the intended learning outcomes.

The implementation stage was carried out in Grade 10 at SMA Negeri 1 Sinjai, involving a total of 30 students. The learning process used the digital teaching materials developed through Google Sites for the English subject. The trial was conducted to assess the practicality and effectiveness of the Google Sites-

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based teaching materials. During this trial, the researcher also observed student activities during the lesson, student responses, teacher responses, and the implementation of the teaching materials. After the Google Sites-based learning session was completed, students were given a questionnaire to gather their responses to the digital teaching materials that had been applied. The purpose of this questionnaire was to evaluate the practicality of the developed teaching materials.

Evaluation

In this phase, the overall quality of the developed product—Google Sites-based instructional materials—is assessed. Activities include collecting data from teacher and student responses, post-test results, and measuring the product's effectiveness based on feedback from teachers, students, and student learning outcomes. Based on this evaluation, necessary revisions or improvements are made to enhance the effectiveness of the instructional materials.

Dissemination

The final phase involves disseminating the instructional materials and ensuring that students have access to and can effectively use the developed Google Sites-based content. The step taken in this stage is the distribution of the digital teaching materials via Google Sites for use in schools. However, in this study, the distribution stage was limited to English teachers at the school.

RESULTS AND DISCUSSION

The process of developing digital teaching materials using Google Sites for English Language subjects is outlined using the modified stages of ADDIE, 4D, and Dick and Carey as follows.

Define

The analysis of student characteristics at SMA Negeri 1 Sinjai revealed that class X students primarily relied on textbooks, with no electronic teaching materials developed by the teacher, despite students showing strong technological proficiency. Observations indicated that students struggled particularly with analytical exposition and narrative texts. To address these issues and enhance learning effectiveness, the researcher identified the need for digital teaching materials using Google Sites. The development of these materials was aligned with the Merdeka Curriculum, which emphasizes learning outcomes and the flow of learning objectives, ensuring that the materials meet curriculum standards and support student understanding within the appropriate learning context.

Design

The learning materials are taken from the official textbook for Grade 10 of senior high school and other sources. The digital instructional materials on Google Sites explain content related to analytical exposition texts and narrative texts. The material includes identifying the context, main ideas, and detailed information from the texts; identifying the purpose, text structure, and language features of the texts; and composing texts. The selection of instructional materials was carried out by identifying the suitability of digital materials with the selected topics, namely analytical exposition texts and narrative texts. Google Sites-based digital materials were chosen because, based on initial and final analysis, nearly all students have access to gadgets. In addition, students typically use either personal internet connections or the school's Wi-Fi

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network. This is a potential that can be utilized in the learning process. The analysis of the learning content also showed that students are currently studying analytical exposition and narrative texts, making these digital materials an appropriate choice.

A digital teaching material was developed based on the Google Sites platform. This product was designed to provide interactive, flexible, and student-centered learning content that aligns with the digital literacy needs of high school students. In addition to the teaching material, supporting research instruments were also prepared to evaluate its feasibility and effectiveness. The digital instructional material developed using Google Sites, along with the research instruments, were validated by two expert validators. The results of the validation are as follows in **Table 2**.

Table 2. Validation Results

No	Assesment Aspects	Percentage (%)	Criteria
1	Digital Instructional Material	91	Very Valid
2	Learning Content	78	Valid
3	Teaching Module	77	Valid
4	Student Response Questionnaire	74	Valid
5	Teacher Response Questionnaire	83	Very Valid
6	Observation Sheet for the Implementation of Materials	85	Very Valid
7	Observation Sheet of Student Activities	81	Very Valid
8	Learning Outcome Test	76	Valid
	Total Average	**81**	**Very Valid**

Source: Research Analysis, 2025

The data in **Table 2** shows the validation results of various components of the digital instructional materials. The overall average percentage is 81%, which falls under the "Very Valid" category. Specifically, the Digital Instructional Material received the highest validation score at 91%, indicating strong feasibility and quality. Other components such as the Teacher Response Questionnaire (83%), Observation Sheet for the Implementation of Materials (85%), and Observation Sheet of Student Activities (81%) were also rated "Very Valid." Meanwhile, the Learning Content (78%), Teaching Module (77%), Student Response Questionnaire (74%), and Learning Outcome Test (76%) were rated as "Valid." These results suggest that the developed instructional materials are generally of high quality and appropriate for implementation, though minor revisions may enhance their effectiveness further. It can be concluded that the instructional materials and instruments developed for this study are categorized as very valid overall and are therefore suitable for use in the teaching and learning process.

Development

The Google Sites digital teaching materials, along with the research instruments that have been created, were then validated by validators. These digital teaching materials and research instruments were validated by two lecturers from the Graduate Program of Universitas Negeri Makassar, serving as media experts and content experts. The activity in this stage involves analyzing the assessment results of the digital instructional materials developed using Google Sites. Two validators were involved in the evaluation process. The first validator provided a general assessment, stating that the materials could be used with minor revisions. The suggested improvements include adding the creator's profile to the Google Sites and including references for YouTube sources used. The second validator, serving as a subject matter expert,

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also concluded that the materials are suitable for use with minor revisions. One key recommendation was to use English consistently throughout the Google Sites content to help students expand their vocabulary and develop language familiarity through consistent exposure.

Implementation

The implementation stage was carried out in class X at SMA Negeri 1 Sinjai. The learning process used the Google Sites digital teaching materials created for the English subject. A trial was conducted to assess the practicality and effectiveness of the developed Google Sites teaching materials. During this trial, the researcher also observed student activities in the learning process, student responses, teacher responses, and the implementation of the teaching materials. After the Google Sites learning activity was completed, students were given a questionnaire to gather their responses to the digital teaching materials that had been applied. This questionnaire was intended to evaluate the practicality of the developed teaching materials. The results of the student response questionnaire analysis can be seen in **Table 3** and teacher response in the **Table 4**.

Table 3. Analysis of Student's Response Questionnaire Data

No	Statement	Positive Response Percentage (%)	Criteria
1	Achievement of Learning Objectives	100	Very good
2	Learning with Digital Teaching Material	96	Very good
3	Digital Teaching Material Content	100	Very good
4	Digital Teaching Material Buttons	100	Very good
5	Use of Digital Teaching Material	100	Very good
6	Accuracy of Digital Teaching Material Text	100	Very good
7	Support of Digital Teaching Material	100	Very good
8	Understanding in Solving Problems	93	Very good
9	Student Learning Interest	93	Very good
10	Novelty of Digital Teaching Material	90	Very good
	Total Average	**97,2**	**Very good**

Source : Research Analysis, 2025

Table 4. Analysis of teacher's Response Questionnaire Data

No	Statement	Positive Response Percentage (%)	Criteria
1	Achievement of Learning Objectives	100	Very good
2	Learning with Digital Teaching Material	100	Very good
3	Digital Teaching Material Content	100	Very good
4	Digital Teaching Material Buttons	100	Very good
5	Use of Digital Teaching Material	75	Very good
6	Accuracy of Digital Teaching Material Text	75	Very good
7	Support of Digital Teaching Material	75	Very good
8	Student Participation	100	Very good

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No	Statement	Positive Response Percentage (%)	Criteria
9	Student Understanding	75	Very good
10	Novelty of Digital Teaching Material	75	Very good
11	Digital Teaching Material Display	75	Very good
12	Alignment of Material with Curriculum	100	Very good
13	Digital Teaching Material Supports ICT-Based Learning	100	Very good
	Total Average	**88**	**Very Good**

Source: Research Analysis, 2025

Based on the analysis of students' responses during the trial implementation, the digital instructional material was positively received. Student responses regarding the appearance, content, presentation, text clarity, relevance, support tools, problem-solving comprehension, learning motivation, and innovation aspects of the material resulted in a positive response rate of 97.2%, which falls within the 81.00%-100% range, indicating an excellent level of practicality. Furthermore, teacher responses to all questionnaire items resulted in a positive response rate of 88%, also within the excellent range. Thus, it can be concluded that the Google Sites-based instructional material is practical and can be effectively integrated into classroom instruction.

Evaluation

The Google Sites digital teaching materials were evaluated based on student activity sheets and learning outcome tests. Student activities were observed by an observer during the learning process. The observation procedure involved the observer monitoring the class throughout the lesson using a pre-prepared student activity observation sheet. Based on the observation results during the trial, the average percentage of student activity was 91%, which falls within the 80.00%-100% interval, indicating a high level.

The results of the students' learning outcome tests showed that the majority of students achieved scores within the competent category, indicating a positive response to the use of the developed digital teaching material. Prior to the implementation of the Google Sites-based instructional material in Grade X at SMA Negeri 1 Sinjai, a pretest was conducted. Results showed that out of 30 students:7 students (23.3%) were categorized in the high-performance group, 18 students (60%) in the medium group, 5 students (16.7%) in the low-performance group. Following the implementation, a posttest was administered, which revealed: 7 students (23%) in the very high category, 20 students (67%) in the high category, 3 students (10%) in the medium category. These results indicate a significant improvement in students' learning outcomes. Therefore, it can be concluded that the Google Sites-based instructional material is effective in supporting English language learning.

Table 5. Description of Mastery in Learning Outcome Test Achievement

Interval	Frequency	Percentage (%)	Criteria
0-77	3	10%	Not Achieved
78-100	27	90%	Achieved

Source: Research Analysis, 2025

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Based on the data in **Table 5**, it can be seen that 90% of students (27 out of 30) successfully achieved the minimum mastery criteria in the learning outcome test, with scores ranging from 78 to 100. Meanwhile, only 10% of students (3 out of 30) scored below the mastery threshold, indicating that the majority of students were able to comprehend the material delivered through the digital teaching materials developed using Google Sites. This result demonstrates the effectiveness of the instructional product in supporting students' understanding and learning success.

Dissemination

After the validity test and the digital teaching materials have been trialed and revised, they are then distributed to the field. The steps taken in this stage involve the distribution of the Google Sites digital teaching materials to be used in schools. However, in this study, the distribution stage is limited to the English teachers at the school.

Based on the explanation above, this research is can be concluded as successfully developed digital teaching materials based on Google Sites for English subjects at SMA Negeri 1 Sinjai. The teaching materials were deemed highly valid based on validation by two experts, namely media and content experts. Additionally, the materials were considered very practical according to assessments from both students and the teacher, and effective in improving student learning activities and outcomes, as evidenced by observations during the learning process and post-test results. Therefore, these digital teaching materials can serve as an innovative alternative to support a more interactive, responsive, and meaningful learning process.

Discussion

This study conducted a needs analysis as an initial stage of developing digital teaching materials based on Google Sites in English language learning at SMA Negeri 1 Sinjai. This activity was carried out to ensure that the design and development stages of the teaching materials align with the actual needs and conditions of the students and the school environment. The identification of students' prior knowledge, learning styles, motivation levels, and challenges faced in the learning process was conducted during the needs analysis phase (Sirozi, 2024; Yoga & Ilmi, 2024). This stage also considers school infrastructure, technology availability, and support from educators. By thoroughly understanding both the students and the learning environment, a solid foundation for designing relevant, interesting, and effective learning materials can be built.

Student characteristics were analyzed by observing student learning activities at SMA Negeri 1 Sinjai and the difficulties they faced in the learning process. This is supported by previous research stating that meeting students' needs is the key to the success of the learning process. If students' needs are met effectively and efficiently, there is a high likelihood that the learning process will improve in the future (Thurm & Barzel, 2022). An analysis of students' needs indicates that the learning resources available at the school are limited to textbooks or lesson books. Additionally, there are no teachers at SMA Negeri 1 Sinjai who develop electronic teaching materials. This is certainly a problem that needs to be addressed. Considering that technological developments in the world of education have now developed rapidly, both teachers and students need to adapt (Hanipah, 2023; Husna et al., 2023).

On the other hand, with this technological advancement, students show good characteristics in utilizing technology. This situation is considered ineffective for student learning, so electronic teaching materials that can stimulate students' interest in learning English are needed. Based on this, the development of digital teaching materials using Google Sites was carried out in this study. This analysis aligns with previous research stating that Google Sites-based electronic modules can enhance students' literacy skills

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and develop their literacy abilities (Ernest, 2023). Contextual analysis of the learning process was conducted by analyzing learning outcomes (LO) and learning objective flow (LOF). The results of this analysis serve as a guideline for preparing materials in the Google Sites digital teaching materials.

This analysis is also in line with previous research stating that the curriculum is a tool to achieve objectives and serves as a guide in the implementation of learning in all types and levels of education (Mukhtar et al., 2022). The learning method used is contextual learning, which connects learning with real-world situations, so that students are more aware of the importance of learning English in their lives. There are several challenges faced, such as differences in learning styles, interests, and motivation levels among students (Almujab, 2023). Therefore, teaching materials that can facilitate the learning process according to students' prior knowledge are needed. Teachers need to understand students' prior knowledge before delivering the material in order to design effective learning according to students' needs. Prior knowledge helps students in the learning process because prior understanding is a key determinant of learning success (Ali, 2019; Glogger-Frey et al., 2018). To overcome this problem, it is important to develop teaching materials that accommodate students' learning styles, interests, and motivation.

In this study, the researcher chose to use digital teaching materials through Google Sites, which can integrate visual and audio elements in content presentation. Google Sites is a simple way for teachers to build online digital learning. In online learning, students can learn anywhere, anytime, and through continuous learning, they can improve their learning outcomes. Online learning allows students to access learning materials, communicate with teachers, and complete assignments using digital tools (Hasyim et al., 2024). Google Sites-based digital teaching materials can be a solution for teachers in integrating technology into learning to create a more effective learning experience that is relevant to the needs of the 21st century. This is in line with the expectations of 21st-century teachers, who are expected to prepare high-quality learning processes amid the fourth industrial revolution (Rais et al., 2021).

The design of digital learning materials for English lessons for 10th grade high school students was based on analytical expository texts and narrative texts. The teaching materials developed through the Google Sites platform were found to be valid because they could be used in the learning process. This is in line with several other studies that state that Google Sites-based teaching materials have high validity (Nurussalma et al., 2024; Syah et al., 2024). With this high validity, the use of Google Sites as a digital learning medium for English at SMA Negeri 1 Sinjay can be considered appropriate for integration into learning activities.

On the other hand, students and teachers responded positively to the development of Google Sites as a digital learning medium in English lessons. This is because the use of Google Sites as a learning medium is considered practical and effective for use in learning activities and has high appeal and utilization (Adzkiya & Suryaman, 2021; Aulia, 2021; Nalasari, 2021). The significant improvement in students' learning outcomes after using Google Sites-based materials indicates that this medium is effective in supporting learning activities. Other studies have also shown the effectiveness of Google Sites in an educational context.

The use of Google Sites-based learning media is considered valid, practical, and effective in supporting informatics learning, as well as a suitable digital teaching material for use in economics learning at the senior high school level (Firmansyah et al., 2023; Yanto et al., 2023). The technical and pedagogical advantages of Google Sites include ease of access, cross-media integration capabilities, support for active and independent learning, and improved student learning outcomes (Dewi, 2020; Wicaksono & Paksi, 2023). Based on the results and discussion in this study, it can be concluded that the use of Google Sites-based teaching materials is effective in supporting English learning at SMA Negeri 1 Sinjai.

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CONCLUSION

The need for digital teaching materials using Google Sites was identified based on the analysis of student characteristics, which revealed that the teaching materials used at school relied solely on textbooks, while most students demonstrated a good understanding of technology. This highlighted the necessity for digital teaching materials through Google Sites. Meanwhile, the analysis of the learning context was conducted by examining the learning outcomes and learning objectives flow, which are essential steps in determining the instructional content. Designing Google Sites-based teaching materials for the English subject was carried out by selecting a learning product that aligns with the content, organizing the teaching materials to be developed into the product, and designing the product itself.

Based on the trial results of the Google Sites digital teaching materials, it was found that the materials were valid, practical, and effective. The teaching materials and research instruments, after validation, were categorized as valid. These materials were then implemented in the learning process to evaluate their practicality and effectiveness. The materials were deemed practical, as shown by the positive responses from both students and teachers, along with the successful implementation of all three key aspects. The effectiveness of the teaching materials was confirmed by the student learning test results, with a high level of mastery and low non-mastery rate. Additionally, the student activity during the lesson was also significantly high.

AUTHOR'S NOTE

The author declares that there is no conflict of interest regarding the publication of this article. The author also affirms that the data and content of the article are free from plagiarism.

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