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Design and Evaluation of Google Sites–Based Learning Media to Teach Biographical Text Identification

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ABSTRACT

Effective learning in the digital era requires instructional media that are interactive, accessible, and aligned with student learning preferences. In Indonesian language instruction, particularly in teaching biographical texts, conventional methods often fail to engage students. This study aims to develop and evaluate Google Sites–based learning media for improving students' ability to identify biographical texts. This research employed a Research and Development (R&D) approach using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The study involved 24 tenth-grade students at MAN 1 Pesisir Selatan. Instruments included needs and curriculum analysis questionnaires, expert validation forms, practicality questionnaires, objective tests (pretest-posttest), and field notes. Media validity was assessed by experts in media, language, and pedagogy, while practicality and effectiveness were evaluated through user feedback and statistical testing. The media was rated highly valid, with expert scores of 86.15% (media), 95% (language), and 96.36% (pedagogy). Practicality assessments yielded scores of 94.67% (teachers) and 90.47% (students), indicating high usability and engagement. A paired sample t-test showed a significant improvement in student performance ($p < 0.001$) from pretest to posttest, confirming the media's effectiveness. The findings demonstrate that Google Sites-based media is a valid, practical, and effective tool for teaching biographical texts. It supports digital literacy and offers a scalable solution for blended and remote learning. The media serves as a promising alternative to traditional resources, fostering greater comprehension and learner autonomy in secondary education.

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1. INTRODUCTION

Learning is a crucial process aimed at developing the potential of every individual. In the context of education, effectiveness does not only depend on the learning content but also on the methods and media used to deliver that content. Arianti et al. (202o) emphasize that effective learning

occurs when essential components—students, educators, motivation, teaching materials, media, and learning conditions—are integrated. Similarly, learning and instruction are inseparable; while learning refers to a process of behavioral change through experience (Setiawan, 2017), instruction involves organized interactions between teachers, students, and resources in a structured environment (Djamaluddin & Wardana, 2019). Thus, the ability of teachers to design and implement relevant media becomes critical in ensuring optimal learning outcomes.

Instructional media play a strategic role in facilitating interaction, improving engagement, and enabling students to internalize content more effectively. The use of media supports cognitive, affective, and psychomotor development through observation, exploration, and collaborative learning (Syarifuddin & Utari, 2022). In line with Mayer's (2009) Cognitive Theory of Multimedia Learning, students learn better when verbal and visual materials are combined effectively. Therefore, teachers must not only deliver content but also adapt instructional resources to align with students' needs, characteristics, and motivation (Fakhriyah, 2021; Batubara, 2020).

In Indonesian language education, instruction in biographical texts holds a vital role at the SMA/MA level. Biographical texts introduce students to the life stories of influential figures while fostering literacy skills, value internalization, and the ability to express ideas in structured writing (Dipurnomo & Rahayu, 2022). Previous studies have highlighted the importance of teaching text structures, linguistic features, and the contextual relevance of biographies (Suherli et al., 2017; Hamidi, 2018). However, conventional print-based materials are often less engaging for digital-native students, limiting opportunities for interactive exploration and critical engagement with the content. This suggests the need for digital innovations to make biographical text instruction more adaptive and motivating.

Technological advances provide opportunities for reimagining instructional practices. As part of digital learning tools, Google Sites offers accessibility, collaboration, and multimedia integration—features that align well with digital literacy goals (Munir, 2017; Winangi, 2021). Research indicates that Google Sites can support flexible, self-paced, and collaborative learning (Harsanto, 2014; Rasapta et al., 2022; Irawan et al., 2023). Recent studies have explored its use for resource sharing and interactive learning activities (Firmansyah & Atiqoh, 2024). Yet, despite growing attention, limited research has investigated its role in supporting Indonesian language instruction, particularly in the context of biographical text learning at the secondary level (Nurdianto, 2020; Nugroho & Hendrastomo, 2021; Malia & Hardianto, 2022; Kamilah et al., 2022).

Moreover, the learning needs of students in the digital era demand instructional processes that are interactive, flexible, and technology-driven. Today's generation tends to learn quickly, visually, and collaboratively through digital media. However, Indonesian language instruction—particularly in teaching biographical texts—still relies heavily on conventional methods and printed textbooks. Such approaches often result in low student engagement, limited motivation, and restricted opportunities for learners to explore information from diverse sources independently. In fact, biographical text instruction should not only introduce prominent figures but also foster the internalization of values, ideas, and inspirations that can strengthen students' critical literacy in the midst of today's global information flow.

At the same time, digital platforms such as Google Sites have not yet been systematically integrated into Indonesian language instruction. While some studies have highlighted its potential to support online and collaborative learning, most remain general in scope and do not specifically address the development of skills in comprehending and identifying biographical texts. Yet, Google Sites offers distinct advantages as a web-based medium that can accommodate various learning resources (texts, images, videos, and interactive quizzes) in one integrated space. Through such an

approach, teachers can design richer learning experiences, while students benefit from flexible access to materials, opportunities for collaboration, and the development of digital literacy skills essential for the twenty-first century. Despite the emerging educational uses of Google Sites, few studies have addressed its specific integration into Indonesian language instruction for biographical texts at the high school level. Previous works tend to focus on general digital literacy, collaborative learning, or resource distribution, without deeply investigating how Google Sites can foster text-identification skills and comprehension of biographical structures.

This study uniquely addresses that gap by developing and implementing a Google Sites–based instructional medium for teaching biographical texts in SMA/MA. Its novelty lies in three aspects. First, it applies multimedia learning principles (Mayer, 2009) to design interactive biographical text learning experiences. Second, it emphasizes digital literacy by engaging students in searching, evaluating, and presenting information responsibly (Winangi, 2021). Third, it offers a practical model for teachers to adopt digital platforms to enhance engagement, collaboration, and student-centered learning in language classrooms. By doing so, this research contributes both theoretically and practically to Indonesian language pedagogy, offering an innovative pathway for integrating web-based platforms into textual instruction while enriching students' literacy and digital competencies.

2. METHODS

2.1 Research Method

This study employs a Research and Development (R&D) approach, utilizing the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) as its framework. This model provides a systematic and structured process for developing Google Sites-based instructional media. Both quantitative and qualitative data were collected and analyzed to comprehensively evaluate the product's validity, practicality, and effectiveness.

2.2 Research Design

A Pre-Experimental One-Group Pretest-Posttest design was adopted to assess the preliminary effectiveness of the developed media. In this design, a single group of participants (O_1) is administered a pretest to establish a baseline of their knowledge. This is followed by the treatment (X), which is the implementation of the Google Sites-based instructional media. Finally, a posttest (O_2) is conducted to measure the outcome after the intervention. The design can be schematized as: $O_1 – X – O_2$.

It is important to acknowledge the primary limitation of this design: the lack of a control group. While it can indicate a change in the dependent variable, the absence of a comparable untreated group makes it difficult to conclusively attribute the observed effects solely to the intervention, as external factors such as history, maturation, or testing effects could be alternative explanations. This design was chosen for this initial development stage to provide preliminary evidence of the media's potential effectiveness before proceeding to a more robust, quasi-experimental study in the future.

2.3 Participants and Ethical Considerations

The study was conducted with 24 tenth-grade students (approximate average age: 15-16 years) from a public high school in the Pesisir Selatan region, Indonesia. The participants came from a mixed socioeconomic and academic background, representative of the student population in the district. The sampling technique used was purposive sampling. The selection was justified statistically based on the results of a normality and homogeneity test administered to several potential classes. Class X was

chosen as it exhibited the smallest standard deviation and a homogenous average score (82.54), indicating the most internally consistent group, which is suitable for a one-group study where controlling for extreme variance is crucial.

Prior to the study, ethical approval was obtained from the school principal. Furthermore, informed consent was secured from all participants and their parents or guardians. The consent forms detailed the research objectives, procedures, potential risks, and benefits. Participants were assured of their right to withdraw at any time without penalty. All data were treated with strict confidentiality; participant identities were anonymized using coded identifiers throughout data analysis and reporting to protect their privacy.

2.4 Instruments and Data Collection

Data were collected using the following instruments:

1. Questionnaires: Questionnaires were used to assess the validity and practicality of the instructional media.
2. Validity Questionnaire: Administered to three expert validators (a media expert, an instructional design expert, and a language expert). It used a 4-point Likert-type scale (1=Very Invalid, 2=Invalid, 3=Neutral, 4=Valid, 5=Highly Valid) to eliminate neutral responses and force a definitive opinion. The instrument assessed aspects of content, media design, and language appropriateness.
3. Practicality Questionnaire: Administered to both teachers and students after the implementation phase. It used a 5-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) to gauge perceptions of usability, visual appeal, and overall practicality. The internal consistency reliability of the student practicality questionnaire, as measured by Cronbach's alpha, was 0.87, indicating high reliability.
4. Objective Test (Pretest-Posttest): A multiple-choice test was developed to measure students' learning outcomes based on the specific competencies targeted by the instructional media. The test content covered key concepts from the learning materials hosted on the Google Site, including [the structure of narrative texts, language features, and character analysis].
5. Scoring Rubric: Each correct answer was scored 1 point, and each incorrect answer was scored 0. The total score was calculated as a percentage.
6. Learning Style Recapitulation Sheet: A simple inventory was used to categorize students' learning styles (e.g., visual, auditory, kinesthetic) for descriptive purposes within the sample.

2.5 Data Analysis Techniques

Data analysis was conducted in phases corresponding to the research objectives. Validity and Practicality Analysis: Data from expert and user questionnaires were analyzed by calculating the average score for each aspect and criterion. Effectiveness Analysis: To determine the media's effectiveness in improving learning outcomes, the pretest and posttest scores were statistically compared. The analysis followed these steps:

1. Prerequisite Tests: Before hypothesis testing, the data were checked for normality and homogeneity.
2. Normality Test: The Shapiro-Wilk test was employed to assess the normal distribution of the gain scores (posttest-pretest). A p-value > 0.05 was set as the threshold for assuming normality.
3. Homogeneity Test: The variance of the pretest and posttest scores was checked using Levene's Test, with a p-value > 0.05 indicating homogeneous variances.

4. Hypothesis Testing: A Paired Sample t-test was used to compare the mean pretest and posttest scores. The hypotheses tested were: (a) Null Hypothesis (H_0): There is no statistically significant difference between students' mean pretest and posttest scores after using the Google Sites-based instructional media. ($\mu_1 = \mu_2$); (b) Alternative Hypothesis (H_a): There is a statistically significant increase in students' mean posttest scores compared to their mean pretest scores after using the Google Sites-based instructional media. ($\mu_1 < \mu_2$); (c) The significance level (α) was set at 0.05.

3. FINDINGS AND DISCUSSION

3.1 Analysis Stage

The initial phase of this study involved conducting a needs analysis to identify challenges within the learning environment. This analysis was carried out using questionnaires distributed to students. The findings served as the basis for designing instructional media tailored to students' needs.

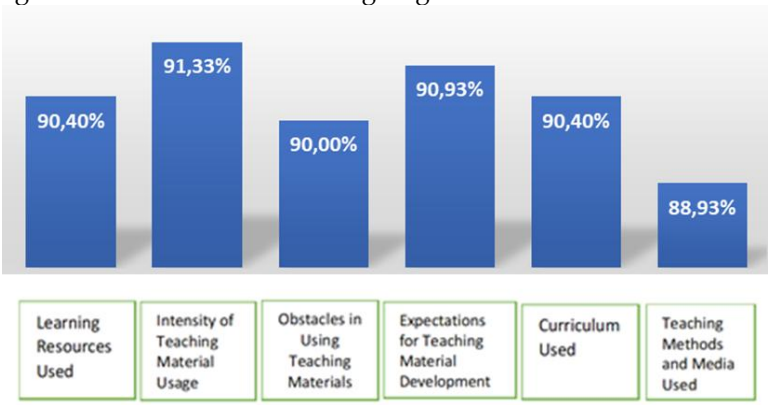

Figure 1. Histogram of Student Needs Analysis

Based on the analysis, it was concluded that students have a strong need for the development of learning resources and instructional media that are more interactive, digital, and efficient to facilitate their comprehension of biographical texts. They also expressed a preference for interactive exercises and technology-based methods that accommodate diverse learning styles, thereby making the learning process more effective and enjoyable. Google Sites was considered a practical platform for instruction, as it allows for the rapid dissemination of learning content accessible anytime and anywhere. Furthermore, Google Sites enhances the efficiency of the learning process while simultaneously familiarizing students with current technological developments (Putri et al., 2021).

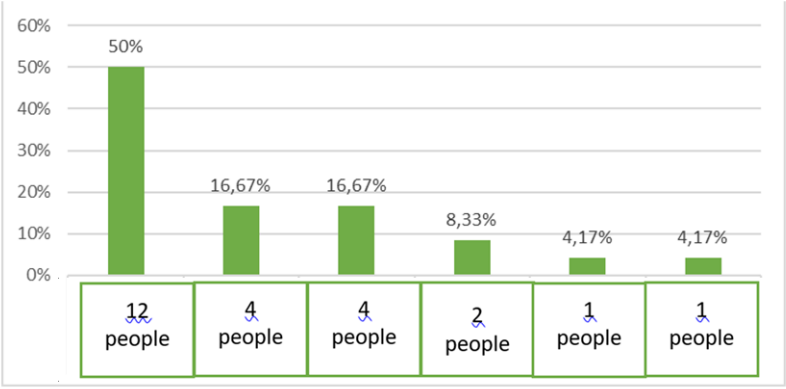

Figure 2. Histogram of Learning Styles in Class X

The histogram indicates that 12 students (50%) in Class X are visual learners. This dominant visual learning style aligns well with the design of the Google Sites–based instructional media, which features visual elements such as images, videos, e-modules, assignment submission links, and interactive quizzes using the Quizziz platform.

3.2 Design Stage

The design phase followed the analysis stage and involved creating a conceptual framework or prototype of the Google Sites–based instructional media.

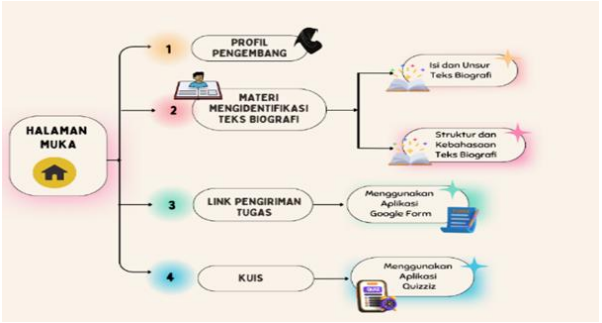

Figure 3. Prototype of Google Sites–Based Instructional Media

This phase also entailed determining the necessary components for developing the media, such as relevant references and supporting materials, to ensure that the content aligns with the Indonesian language curriculum. Supporting elements included text materials, visual assets, videos, and quizzes. Furthermore, this stage included the development of the learning objectives and content standards (CP), instructional modules, student worksheets (LKPD), and validation and practicality instruments.

Three types of validation instruments were developed and subsequently reviewed: (1) media expert validation, (2) language expert validation, and (3) instructional expert validation. All instruments were pre-validated for their appropriateness. The media expert questionnaire was validated by Dr. Mutiara Felicita Amsal, S.Pd.I., M.Pd., a faculty member in Educational Technology at Universitas Negeri Padang. The language and instructional validation instruments were validated by Dr. Ridha Hasnul Ulya, S.Pd., M.Pd., a lecturer in Indonesian Language and Literature Education at Universitas Negeri Padang. In addition to validation tools, practicality questionnaires were prepared

to assess the ease of use of the developed media from both teacher and student perspectives. Dr. Ridha Hasnul Ulya also validated these questionnaires.

Steps in developing the website were as follows: create a learning website using Google Sites; choose a class-themed template; assign a title, class name, and logo to the homepage; add custom pages such as Home, Profile, Materials, Assignment Submission, and Quizzes; design the homepage; populate the Profile menu with the developer's information, photo, and research site location (Google Maps); fill the Materials section with the title "Indonesian Language Materials for Grade X Phase E"; create a section on "Content and Elements of Biography Texts", which outlines learning objectives; include a section on "Structure and Language Features", featuring an e-module created with Bookcreator and designed using Canva for the cover and background; design the "Assignment Submission Link" section using Google Forms; and develop the Quiz section, which includes questions on the content and language features of biographical texts, created using the Quizziz platform.

3.3 Development Stage

3.3.1 Media Expert Validation

Dr. Mutiara Felicita Amsal assessed the media using six criteria: video, duration, audio, procedure, animation, and color. The total score was 56, yielding an average validity of 86.15%, categorized as "Highly Valid".

Table 1. Media Expert Responses

No	Evaluation Aspect	Score	Max Score	Percentage	Category
1	Display	29	35	82.86%	Highly Valid
2	Programming	27	30	90.00%	Highly Valid
	Total	56	65	**86.15%**	Highly Valid

The media validation assessment, conducted by Dr. Mutiara Felicita Amsal, yielded a total score of 56 out of a possible 65, resulting in a high validity percentage of 86.15%, categorized as "Highly Valid". The evaluation was broken down into two key aspects: 'Display' (82.86%) and 'Programming' (90.00%). The high scores across both aspects indicate that the expert deemed the technical and aesthetic construction of the Google Sites media to be of superior quality. The Display score (82.86%) pertains to the integration and quality of multimedia elements such as video, animation, color scheme, and audio. This score suggests the media is visually cohesive, engaging, and employs multimedia principles effectively to support learning without causing cognitive overload. The even higher score in Programming (90.00%) reflects the platform's functionality, navigation, and procedural clarity. This indicates the site is well-structured, intuitive to use, and operates without technical flaws, which is critical for ensuring seamless student access and interaction. The overall validation score of 86.15% confirms that the media is not only technically sound but also appropriately designed from a media design perspective to facilitate the learning process.

3.3.2 Language Expert Validation

Validated by Dr. Ridha Hasnul Ulya, the total score was 38, with a validity percentage of 95%, also falling under the "Highly Valid" category. This exceptionally high score signifies that the language used throughout the instructional media is precise, appropriate for the target grade level (tenth-grade students), and free from grammatical, spelling, or syntactic errors. The expert's validation ensures the clarity of instructions, the accuracy of all textual content (including in modules,

worksheets, and quizzes), and the overall communicative effectiveness. This is a crucial aspect of validity, as ambiguous or incorrect language can directly hinder comprehension and learning, regardless of the media's technical or visual quality. A score of 95% places the media in the highest echelon of linguistic quality for educational materials.

3.3.3 Instructional Expert Validation

Yosi Haryani, M.Pd., evaluated the media from an instructional perspective. The total score was 53, with an average validity of 96.36%, categorized as "Highly Valid".

Table 2. Instructional Expert Responses

No	Evaluation Aspect	Score	Max Score	Percentage	Category
1.	Content Accuracy	24	25	96.00%	Highly Valid
2.	Feasibility	29	30	96.67%	Highly Valid
	Total	53	55	**96.36%**	Highly Valid

The instructional validation, completed by Yosi Haryani, M.Pd., achieved the highest validity score of 96.36%. This was further detailed into 'Content Accuracy' (96.00%) and 'Instructional Feasibility' (96.67%). This component of validation is the most critical, as it directly assesses the pedagogical soundness of the media. The Content Accuracy score (96.00%) verifies that the material on biographical texts is factually correct, complete, and aligned with the mandated curriculum and learning objectives. The marginally higher score for Instructional Feasibility (96.67%) indicates that the expert found the media to be an excellent tool for teaching and learning. This encompasses the logical sequencing of information, the appropriateness of learning activities and quizzes for assessing comprehension, and the overall ability of the media to facilitate the achievement of desired learning outcomes. The combined score of 96.36% provides overwhelming evidence that the Google Sites media is not just a technological tool but a robust, pedagogically-driven instructional resource

3.3.4 Media Practicality

The overall practicality score of 90.47% places the developed media in the "Highly Practical" category, as assessed by students in the biographical text learning process. This figure is derived from detailed evaluations of the three indicators above.

Table 3. Media Practicality

No	Evaluation Aspect	Total Score	Max Score	Practicality Score	Category
1	Ease of Use	1067	1200	88.92%	Highly Practical
2	Attractiveness	1096	1200	91.33%	Highly Practical
3	Efficiency	1094	1200	91.17%	Highly Practical
	Total	3257	3600	**90.47%**	Highly Practical

The practicality assessment, based on responses from all 24 students, yielded an overall score of 90.47%, categorizing the media as "Highly Practical." The analysis of three sub-aspects—Ease of Use (88.92%), Attractiveness (91.33%), and Efficiency (91.17%)—revealed consistently high scores. Practicality measures the usability and perceived value of the media from the end-user's (students') perspective. The high score for Ease of Use (88.92%) demonstrates that students found the platform intuitive and easy to navigate without requiring extensive technical guidance. This is a key determinant for successful implementation, as complicated interfaces can become a barrier to learning.

The score for Attractiveness (91.33%) indicates that the students were engaged by the visual design, layout, and multimedia elements, which is essential for maintaining motivation and interest in the learning material. Finally, the high rating for efficiency (91.17%) signifies that the students believed the media enabled them to learn the material effectively within a reasonable timeframe, without unnecessary friction. The convergence of these three high scores (all above 88%) strongly suggests that the media was not only accepted by students but was also considered an enjoyable and effective tool for learning, thereby fulfilling the crucial criterion of practicality for widespread educational adoption.

3.4 Implementation Phase

The implementation phase was carried out in Class X at Pesisir Selatan, involving 24 students (12 male, 12 female), selected based on standard deviation analysis. Questionnaire data collected during this phase contributed to the comprehensive evaluation and future refinement of the instructional media.

3.4.1 Normality Test

Table 4. Normality Test of Posttest Scores

Statistical Value	A	Lo	Lt	Conclusion
Posttest (N = 24)	0.05	0.1321	0.1808	Normal

Based on the table, since Lo < Lt, it can be concluded that the posttest scores are normally distributed. As presented in Table 4, the observed Lilliefors value (L_0) for the posttest scores was 0.1321. This value is less than the critical Lilliefors value (L_t) at $\alpha = 0.05$ for N=24, which is 0.1808 ($L_0 = 0.1321 < L_t = 0.1808$). Therefore, H_0 is accepted, confirming that the sample is derived from a population that is normally distributed. The fulfillment of the normality assumption is a fundamental prerequisite for employing parametric tests like the paired sample t-test. A normal distribution of the posttest scores indicates that the students' responses to the treatment (Google Sites media) were not skewed by extreme outliers or anomalous data patterns. This satisfies a core assumption of the t-test, thereby strengthening the internal validity of the subsequent hypothesis test conclusions. The robustness of the t-test is further supported when this assumption is met, particularly with smaller sample sizes.

3.4.2 Homogeneity Test

Levene's Test was used to assess the equality of variances between the pretest and posttest scores.

Table 5. Homogeneity Test of Pretest and Posttest Scores

Levene Statistic	df1	df2	Sig.	Conclusion
2.286	1	46	0.137	Homogeneous

The result of Levene's Test (Table 5) yielded a Sig. (p-value) of 0.137. Since this significance value is greater than $\alpha = 0.05$ (0.137 > 0.05), H_0 is accepted. This indicates that the variances between the pretest and posttest scores are homogeneous. Homogeneity of variances signifies that the degree of dispersion or spread of the scores is equivalent between the two testing periods (before and after the treatment). This is a critical finding for this study as it demonstrates that the intervention did not create disproportionate instability or variability in student performance. The treatment effect appears to be consistent across the sample group. Meeting this assumption reduces the likelihood that a significant t-test result is an artifact of vastly differing variances, thereby allowing for a more reliable interpretation of the t-test outcome.

3.4.3 Hypothesis Testing (Paired Sample t-test)

A paired sample t-test was conducted using IBM SPSS Statistics 25 to compare students' pretest and posttest scores and to evaluate the effectiveness of the Google Sites–based instructional media.

Table 6. Paired Sample t-test Results

Paired Differences	T	df	Sig. (2-tailed)
Mean: -13.64446	-15.723	23	0.000
Std. Deviation: 4.25125			
Std. Error Mean: 0.86778			
95% CI: [-15.43960, -11.84931]			

The results indicate a statistically significant difference between pretest and posttest scores (p = 0.000), demonstrating the effectiveness of the developed media in improving students' ability to identify biographical texts. The paired sample t-test (Table 6) resulted in a t-statistic of -15.723 with degrees of freedom (df) = 23 and a Sig. (2-tailed) value of 0.000. This significance value is far less than $\alpha = 0.05$ (0.000 < 0.001). The 95% confidence interval (CI) for the mean difference was [-15.44, -11.85]. A p-value < 0.001 provides overwhelming evidence to reject H_0 (which states there is no mean difference between pretest and posttest scores). With a confidence level exceeding 99.9%, it is conclusively demonstrated that a highly statistically significant difference exists in student scores before and after the implementation of the instructional media. Although not explicitly calculated, the effect size can be inferred as large. The exceptionally high t-statistic (-15.723) and a confidence interval that does not include zero (the range from -15.44 to -11.85 does not contain 0) strongly indicate a large effect size. This implies that the observed improvement is not merely statistically significant but also substantial and meaningful in practical, educational terms.

The mean difference of -13.64 (calculated as Pretest-Posttest) is interpreted as an average score increase of 13.64 points following the intervention. This represents a considerable gain in the students' ability to identify and analyze biographical texts. The confidence interval of [-15.44, -11.85] provides an estimated range for the true mean difference within the population. We can state with 95% confidence that implementing this Google Sites-based media would improve student scores by between 11.85 to 15.44 points on average if applied to the broader population. The narrow range of this interval, which is entirely situated in the negative zone (due to the Pretest-Posttest calculation), reinforces the precision of the estimate and the consistent, positive effect of the treatment. This sequence of statistical analyses forms a robust and compelling argument. The prerequisites of normality and homogeneity were satisfied, establishing a reliable foundation for the t-test. The t-test itself yielded a highly significant result (p < .001) with an inferred large effect size. This conclusively demonstrates that the developed Google Sites-based instructional media was highly effective in producing a substantial improvement in student learning outcomes.

3.5 Evaluation Phase

The evaluation stage was conducted to assess the overall quality, effectiveness, and feasibility of the Google Sites–based interactive learning media developed for teaching biographical texts. This stage involved analyzing data from the validation and practicality results as well as learning outcomes from the implementation phase. The findings showed that the media was categorized as "highly valid" by media, language, and instructional experts, and "highly practical" based on student responses. Additionally, statistical analysis of pretest and posttest results demonstrated a significant improvement in student learning outcomes. These results confirm that the developed media

effectively support students' understanding of biographical texts and meet instructional needs, thus proving suitable for broader classroom application.

Discussion

The results of this study demonstrate that the Google Sites-based instructional media developed for teaching biographical texts is highly valid, practical, and effective. This finding is consistent with previous research by Salsabila and Aslam (2022), which highlighted the capacity of Google Sites to present material in an interactive and accessible manner, thereby enhancing conceptual understanding. The significant improvement in posttest scores, supported by strong expert validation and highly positive student practicality responses, provides a multi-faceted confirmation of the media's quality (Adzkiya and Suryaman, 2021).

The validity of the media, as assessed by experts, underscores the platform's strength in integrating diverse instructional elements (videos, images, e-modules, quizzes) into a coherent and pedagogically sound package. This aligns with the work of Taufik and Doyan (2022), who found that the structured, content-rich nature of Google Sites-based media effectively supports conceptual mastery. Furthermore, the high practicality score (90.47%) indicates that the media was not perceived as a technical hurdle but as a user-friendly and engaging tool. This finding echoes Utami's (2023) research, which noted that such platforms facilitate flexible, self-directed learning by allowing students to access and engage with materials anytime and anywhere, thus breaking free from the temporal constraints of the traditional classroom.

The core of this study's contribution lies in its evidence of effectiveness. The statistically significant increase in learning outcomes ($p < .001$) confirms that the media directly supported skill acquisition. This success can be theorized through several interconnected mechanisms. Firstly, the media's design was particularly beneficial for the dominant cohort of visual learners (50% of the class). According to Cognitive Load Theory (Sweller, 1988), learning is optimized when information is presented in a way that reduces extraneous cognitive load. The use of well-designed visual aids, infographics, and embedded videos on the Google Site likely helped students process information more efficiently by dual-coding verbal and visual information (Mayer, 2009), making abstract concepts related to text structure and language features more concrete and memorable.

Secondly, the interactivity and immediate feedback provided by the integrated Quizizz platform played a crucial role. These interactive quizzes likely fostered active learning and provided students with immediate formative assessment. This instant feedback loop allows learners to identify and correct misunderstandings in real-time, reinforcing correct knowledge and guiding subsequent study efforts (Hattie & Timperley, 2007). This moves learning beyond a passive reception of information to an active process of engagement and correction, which is critical for deep understanding.

The implications of this study extend beyond the immediate context. The media's success suggests a viable model for supporting diverse learners and facilitating remote or blended instruction. The combination of text, audio, video, and interactive elements can cater to a variety of learning preferences beyond the visual, including auditory and kinesthetic learners who benefit from listening and doing, respectively. Furthermore, its web-based nature makes it an excellent tool for ensuring instructional continuity outside the classroom, whether for homework, flipped learning models, or in regions with intermittent school attendance (Japrizal & Irfan, 2021).

However, the scalability of such a solution must be considered thoughtfully. While Google Sites is free and relatively easy to use, its effective implementation presupposes a baseline level of technological infrastructure—namely, reliable internet connectivity and student access to digital

devices (Kurniawan & Sanjaya, 2022; Putri et al., 2021; Rosiyana, 2021; Uskenat & Yuliatun, 2023). In rural or low-resource contexts (rural constraints), these prerequisites can pose significant challenges, potentially exacerbating existing educational inequalities. Therefore, while the platform is highly scalable in well-resourced environments, its adoption in underserved areas must be part of a broader strategy that includes infrastructure development and digital literacy support (Saputra, Diandita, & Zulfiati, 2023).

Several limitations of this study must be acknowledged, which also provide clear directions for future research. The generalizability of the findings is constrained by the study's design: a pre-experimental one-group pretest-posttest conducted with a relatively small sample size (n=24) from a single school. The lack of a control group means that while we observed improvement, we cannot definitively rule out the influence of external factors (Octaria & Isroqmi, 2022). To build upon these promising preliminary results, future studies should: (a) Employ a quasi-experimental design with a control group (e.g., using traditional teaching methods) and a larger, more diverse sample across multiple schools to strengthen causal claims and generalizability; (b) Investigate the media's efficacy in teaching other text genres (e.g., expository, persuasive) and other subjects within the language curriculum to test its broader applicability; (c) Conduct longitudinal research to examine the long-term retention of knowledge gained through this platform compared to traditional methods; (d) Explore specific causal mechanisms by isolating and testing the individual contributions of various media components (e.g., videos vs. interactive quizzes) to learning gains.

This study reinforces the potential of Google Sites as a versatile and effective platform for developing digital learning media. It provides a validated, practical, and effective model for teaching biographical texts that aligns with modern pedagogical principles and the learning preferences of digital natives. By addressing its limitations in future work, this research can contribute significantly to the ongoing integration of technology in creating more engaging, effective, and accessible learning environments.

4. CONCLUSION

Based on the research and development conducted, it can be conclusively demonstrated that the Google Sites-based instructional media developed for teaching biographical texts to tenth-grade students is highly valid, highly practical, and effective. The media's validity was established through expert appraisal, achieving an average score of 86% across media, language, and instructional design criteria. Its practicality was confirmed by overwhelmingly positive student responses, with an overall practicality score of 90%, indicating excellent usability and engagement. Most significantly, its effectiveness was empirically proven by a statistically significant improvement in learning outcomes, with post-test gains yielding a paired sample t-test result of $t(23) = -15.7$, $p < .001$.

These findings lead to two primary recommendations. First, there is a strong rationale for the adoption and integration of such digital media into standard curriculum design and teacher training programs. Equipping educators with the skills to develop similar technology-enhanced tools is crucial for modernizing pedagogy. Second, this approach directly supports national educational imperatives by advancing digital literacy goals and promoting student-centered learning. The interactive, accessible nature of Google Sites-based media empowers students to direct their own learning, fostering independence and aligning instruction with the needs and habits of digital-native learners. While this study was limited to a single class and the topic of biographical texts, its results provide a robust proof-of-concept. Future efforts should focus on expanding the use of this media to other text

genres and subject areas, thereby further integrating digital fluency and innovative pedagogical practices into the broader educational ecosystem.

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