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# Development of Website-Based Learning Media to Improve the Learning Outcomes of Fifth Grade Students

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**Abstract:** The rapid advancement of technology has accelerated the digitalization of learning, including the use of website-based learning media such as Google Sites. These media support audio-visual learning, increase student engagement, and have the potential to improve learning outcomes. Although SDN 07 Sedoya has received Chromebooks and tablets, their use has not been optimal due to limited teacher skills and knowledge. Therefore, this study aimed to develop website-based learning media and evaluate its feasibility, practicality, and effectiveness in improving fifth-grade students' Indonesian language learning outcomes. The study employed the ADDIE development model and involved 25 fifth-grade students at SDN 07 Sedoya. Data were collected using questionnaires and learning outcome tests. The results indicated that the developed media were highly feasible, with validation scores of 96% for material, 95% for language, and 81% for media aspects. The practicality evaluation yielded a score of 4.0, indicating that the media were practical to use. Furthermore, the paired-samples *t*-test produced a significance value of 0.00 ($p < 0.05$), demonstrating that the website-based learning media significantly improved students' learning outcomes. These findings suggest that the developed website-based learning media are feasible, practical, and effective for Indonesian language learning in elementary schools.

**Keywords:** Learning Outcomes; Learning Media; Website

## Introduction

The use of technology has become a necessity in today's educational world. The integration of technology has transformed education from traditional practices toward the digitalization of learning. Besides offering the possibility of improving the quality of education, digitalization also helps broaden access to information and develop skills in using technology and information media (Almaskur et al., 2024). The form of digitalization is not merely reflected in the use of technological devices such as laptops and projectors, but also in the development of platforms and applications as learning media primarily designed for students and learning activities (Patmasari et al., 2023).

Learning media are generally used as tools, facilities, or intermediaries for delivering information in order to improve the effectiveness of the learning process and students' learning motivation. Good academic achievement is generally attained by students who tend to have a high level of learning motivation, and vice versa (Aprianto et al., 2023). Therefore, teachers should be more creative in designing or creating learning media that can stimulate students' motivation and are tailored to their needs.

One of the learning technology variants that can be utilized is website-based media such as Google Sites. Website-based media are designed using specific skills through software that utilizes internet technology, including websites, online applications, and other digital resources, to support the learning process (Simonson et al., 2019; Yunita et al., 2020). Website-based media have several advantages, including the ability to be designed attractively in the form of images, text, audio, animation, video, or a combination of all these elements interconnected with one another. This can enrich students' learning experiences and prevent boredom during learning activities (Ahsin et al., 2024).

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Besides functioning as a tool for delivering information, website-based media can also train students' skills in operating technological devices. Learning through website-based media can be conducted independently, without pressure, and adjusted to each individual's learning pace and approach.

On the other hand, learning media are beneficial in helping students easily understand learning concepts and explore various new skills and capabilities. The context of use and teachers' abilities need to be considered when selecting learning media so that learning objectives can be achieved effectively. Inappropriate selection of learning media may obscure the information intended to be conveyed to students (Miftah et al., 2022). The quality of learning media can be observed through the interactions that occur between teachers and students. Thus, its impact on learning is highly positive, creating an active, communicative, and interactive classroom atmosphere.

In reality, the use of technology in the education sector is still relatively limited, especially in regency areas such as Sanggau Regency. For example, one of the schools, SDN 07 Sedoya, has not fully implemented digitalization. In fact, internet access and the availability of technological devices at the school are quite supportive but remain underutilized. Based on findings, the frequency of using technological devices in the learning process within a two-week period was only around one to two times. The limited competence of users, particularly most teachers at the school, has become the main reason for the lack of technology implementation. In fact, teachers' ability to operate technology is currently one of the key factors for successful and efficient learning process management (Matalka et al., 2024).

Despite these limitations, continuous efforts have been made to increase the frequency of using learning media in classroom activities. In practice, the media commonly used by teachers are videos and images obtained from YouTube and Canva. Their use is mainly based on practicality and time efficiency. In reality, students show greater enthusiasm and motivation when learning activities utilize digital media compared to conventional learning methods. Further investigation revealed that the majority of students in the class have audio-visual learning styles. Under such conditions, teachers' creativity needs to be improved so they can independently develop learning media that align with students' needs. Teachers also need to consider training students in mastering technological devices.

Based on the prepared lesson plans, Indonesian language materials are often delivered through the lecture method. In fact, there is nothing wrong with using this method; however, its excessive implementation and the lack of variation in other methods may lead to one-way communication, causing students to become passive. Learning activities usually begin with students listening to the information delivered and continue with answering questions in textbooks. As a result, the learning process becomes less engaging for students. The impact is not only reduced learning effectiveness but also the formation of students' habits of merely receiving information from teachers. More concerningly, if this continues, it may become the root cause of a generation that lacks critical thinking skills.

The frequent use of lecture methods and the minimal use of digital media in learning have caused prolonged boredom, which subsequently affects students' learning outcomes. Three out of five students stated that they were dissatisfied with their Indonesian language learning scores. They also considered the learning activities to be less challenging and rather boring. Meanwhile, from the learning outcomes of 25 students, only 28% were able to achieve the predetermined minimum mastery standard, while the remaining 72% had not yet achieved it. This indicates that, overall, students' Indonesian language learning outcomes were still relatively low. Generally, students experienced difficulties understanding materials related to reading comprehension and vocabulary meanings. During interviews, several students were observed struggling to express their opinions in Indonesian and were more accustomed to using their local language. This demonstrates that students' language skills, particularly their Indonesian vocabulary mastery, were still underdeveloped.

Learning outcomes are generally obtained through assessments conducted in the form of tests. Question instruments are typed and printed before being distributed to students. However, the process itself becomes a challenge for teachers. The challenges faced include the time needed to correct and calculate students' scores, considering that there are 25 students in the class, which certainly requires a considerable amount of time. In addition, limited printing facilities (printers) require teachers to queue when they wish to print question sheets. Besides waiting in line, teachers must also estimate the time needed for printing and the time required for students to complete the tests. Another challenge faced by teachers is the susceptibility to typing errors in the questions, making the assessment process less efficient.

As is known, SDN 07 Sedoya has received technological devices such as Chromebooks and tablets in sufficient quantities. However, during learning activities, many students still appear to lack the skills to operate laptops or Chromebooks because they rarely use

them. In learning activities, students stated that technological devices are generally used only for displaying videos or images, while independent use occurs only occasionally. With the availability of these devices, students should ideally be prepared and capable of using them independently.

Based on the results of the needs analysis questionnaire involving 23 respondents who were elementary school teachers, 21 teachers (91.3%) stated that they frequently used conventional media to deliver Indonesian language learning materials. In selecting learning media, all teachers considered the suitability of the media with learning objectives, the efficiency of media use in the learning process, and its compatibility with students' levels of thinking. Meanwhile, 16 teachers (69.6%) considered the costs involved when choosing media; 22 teachers (95.6%) selected media that were easy to obtain and use during learning activities and suited to users' skills. In terms of quality, 20 teachers (87%) preferred media with good quality that could support the effectiveness of media use.

Thus, it can be concluded that the use of conventional media in Indonesian language subjects is still commonly practiced by almost all teacher respondents. Only a few teachers use technology-based media in learning activities. Based on the results of the needs analysis questionnaire, it was found that the digital learning media needed for Indonesian language learning in the classroom are website-based media. Therefore, the development of technology-based learning media has become important to implement.

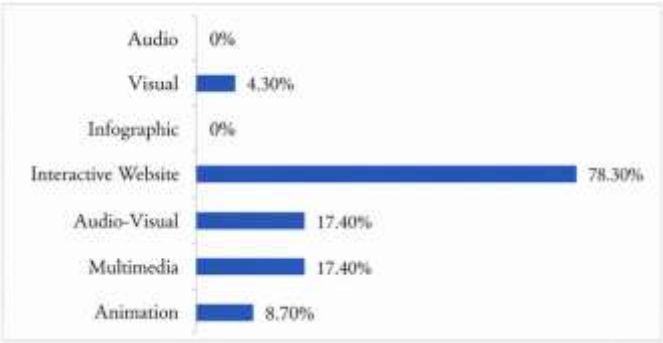


**Figure 1**. Learning Media Needed by Teachers

From the explanation above, at least four major problems can be identified, namely the low frequency of technology use in learning, the limited knowledge and skills of teachers in developing technology-based learning media, the low learning outcomes particularly in reading comprehension and vocabulary understanding in Indonesian language learning, and the inefficiency of learning assessments. Based on these problems, this study was conducted to develop website-based learning media with the aim of determining the feasibility, practicality, and effectiveness of the learning media in improving students' learning outcomes in Indonesian language subjects for fifth-grade students at SD Negeri 07 Sedoya.

Although numerous studies have developed Google Sites as learning media, most have primarily focused on improving learning motivation or validating the feasibility of the media. This study offers several novel contributions. First, it develops a Google Sites–based learning media specifically designed for fifth-grade Indonesian language learning, emphasizing reading comprehension and vocabulary mastery, which remain challenging competencies for elementary students. Second, the media is developed based on a comprehensive needs analysis involving both teachers and students in a rural elementary school with available but underutilized digital infrastructure. Third, the developed website integrates interactive learning materials, multimedia resources, self-paced learning activities, and technology-based assessments with automatic scoring and feedback, addressing both instructional and assessment inefficiencies simultaneously. Finally, unlike previous studies that mainly examined feasibility or student motivation, this research evaluates the media comprehensively through validity, practicality, and effectiveness in improving students' learning outcomes within the context of elementary Indonesian language education.

## Method

This development research was guided by all stages of the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation) (Rayanto et al., 2020). This study was conducted at SDN 07 Sedoya and involved 25 fifth-grade students and one professional teacher. The research data were collected using test instruments, practicality questionnaires, and feasibility questionnaires to recapitulate the data.

*Content Validity Test of Research Instruments*

The instruments that had been developed were first validated by two expert judges before being used. The instrument validity test was conducted using the Gregory test. All findings and validation results were described quantitatively and descriptively through the calculation of the Gregory index coefficient.

According to Retnawati (2016), the first step in proving content validity using the Gregory index is to provide the instrument blueprint, instrument items, and validation sheets to two raters who are experts in the relevant field of study. The second step is for the raters to assess the suitability between the instrument items and the indicators in the blueprint by assigning scores

ranging from 1 to 4. The third step is to create a tabulation table based on the assessments of the two raters. The fourth step is to construct a 2×2 contingency table using weak and strong relevance categories. The fifth step is to calculate the content validity by the two raters using the following formula:

$$Validity\ Coefficient = \frac{D}{A+B+C+D} \quad (1)$$

Code A is assigned when both raters indicate disagreement in their assessments. Code B indicates that rater 1 agrees while rater 2 disagrees. If rater 1 disagrees while rater 2 agrees, it is assigned code C. Meanwhile, code D indicates that both raters agree in their assessments. After determining the total number of A, B, C, and D obtained, the fifth step is to interpret the results based on the Gregory coefficient category table proposed by Arikunto (2013) as follows Table 1.

**Table 1.** Gregory Coefficient Categories

| Coefficient | Category |
|---|---|
| 0.80–1.00 | High Validity |
| 0.40–0.79 | Moderate Validity |
| 0.00–0.39 | Low Validity |

*Feasibility Test of Website-Based Media*

The validity level of the product was determined based on the results of the validation questionnaire developed using a Likert scale with a score range of 1–5. The validity test was conducted by expert judgments. Product validity was assessed by considering three aspects, namely material, language, and media aspects. From the collected responses, the feasibility score of the media was calculated using the percentage formula proposed by Sugiyono (2019), as follows Formula 2.

$$PV\% = \frac{\sum r}{\sum rx} \quad (2)$$

Description:
PV = percentage of validity assessment
∑r = total responses from respondents
∑rx = maximum total score
100% = constant

From these calculations, the validity percentage of the developed website-based media can be determined, which is then used to identify its feasibility level based on the criteria table proposed by Anggara et al. (2024) as follows Table 2.

**Table 2**. Product Feasibility Criteria

| Percentage (%) | Qualification | Description |
|---|---|---|
| 80–100 | Excellent | Excellent, No revision |
| 61–80 | Good | Good, No revision |
| 41–60 | Fair | Fair, Revision needed |
| 21–40 | Poor | Not good, Revision needed |
| <20 | Very Poor | Very not good, Revision needed |

*Practicality Test of Website-Based Media*

The practicality score of the media was obtained through questionnaires designed to gather information regarding the practicality and ease of use of the product. The questionnaire was developed using a Likert scale with a score range of 1–5. After obtaining responses from the expert judgments, the average score was calculated using the formula proposed (Arsyaf et al., 2022).

$$V = \frac{\sum RA_i}{n} \quad (3)$$

V represents the average practicality score. RAi refers to the average practicality score of the i-th aspect. Since this study examined practicality from three aspects, the scores of each aspect were accumulated. Meanwhile, the number of aspects is represented by n. After the calculation process, the criteria for the practicality value of the website-based media were determined based on the criteria table proposed (Arsyaf et al., 2022).

**Table 3**. Media Practicality Criteria

| Score | Qualification |
|---|---|
| > 4.2 | Very Practical |
| 3.4–4.2 | Practical |
| 2.6–3.4 | Quite Practical |
| 1.79–2.6 | Less Practical |
| < 1.79 | Very Less Practical |

*Effectiveness Test of Website-Based Media*

The effectiveness of the website-based learning media was determined by comparing the mean scores before and after the learning process through pretests and posttests. In addition, the effectiveness of the media was also assessed using the results of a paired sample t-test. This statistical analysis method was employed to determine whether the use of website-based media had a significant effect on improving students' learning outcomes.

As a prerequisite before conducting hypothesis testing, a normality test was first performed. The normality test was used to determine whether the sample scores could reasonably be considered to originate from a population with a specific distribution

(Nasar et al., 2024; Nuryadi et al., 2017). The normality test was conducted using the Shapiro–Wilk model with the assistance of SPSS version 25. If the data were found to be normally distributed, a paired sample t-test analysis was subsequently performed using SPSS version 25.

## Result and Discussion

Product development at the design stage began with formulating the learning objectives, conceptualizing the learning materials, developing the blueprint and items for the pretest and posttest, creating a learning video design, designing images using Canva, selecting color schemes for the Google Sites website, determining the layout, and developing a flowchart.

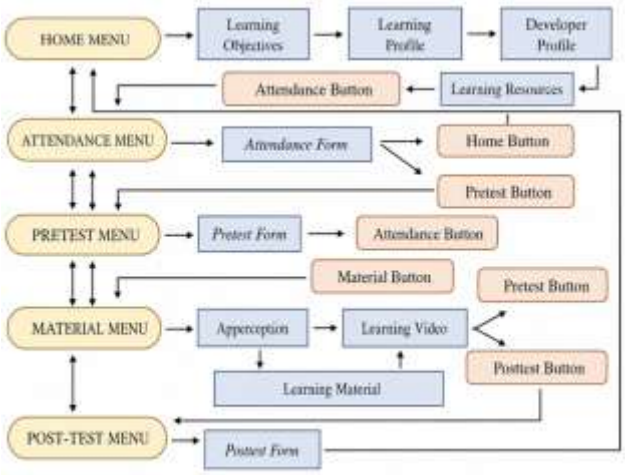


**Figure 2.** Product Design Flowchart

Next, the development stage was continued by creating an attendance page using Google Forms, developing pretest and posttest pages in Google Forms, producing learning videos, uploading the videos to YouTube, inserting learning materials into Google Sites, linking the attendance form and the pretest and posttest forms to the Google Sites website, embedding the learning videos into the website, and creating navigation buttons within Google Sites. The website-based learning media developed in this study consisted of five main pages: the Home page, Attendance page, Pretest page, Learning Materials page, and Posttest page.

*Results of the Instrument Validity Test*

The content validity of the instruments was tested using the Gregory Index by comparing assessments from two raters. The validation process involved two raters who had completed master's degree education. The validated instruments included the feasibility questionnaire, practicality questionnaire, pretest questions, and posttest questions.

Based on the cross-tabulation table of the feasibility questionnaire instrument, the values obtained for A, B, and C were 0, while D was 33. Subsequently, the validity coefficient was calculated and yielded a value of 1.00. This indicates that the feasibility questionnaire had high validity. Nevertheless, the raters provided a suggestion for improvement, namely simplifying the wording of item B8 to make it easier to understand. Accordingly, the questionnaire was revised based on this feedback.

The cross-tabulation results of the practicality questionnaire instrument showed that the values of A, B, and C were each 0, while D was 18. Based on these results, the validity coefficient of the practicality questionnaire instrument was also 1.00. This indicates that the practicality questionnaire possessed high validity. Both raters agreed that the questionnaire was appropriate and required no revisions.

Meanwhile, the cross-tabulation table for the pretest instrument showed that A, B, and C were 0, while D was 9. Therefore, the validity coefficient of the pretest instrument was 0.90, indicating that the pretest items also had high validity. However, the raters noted an error in the wording of item number 4 and an inappropriate variation of stimulus options in item number 6. Consequently, the pretest questions were revised according to the recommendations provided.

For the posttest instrument, the values of A, B, and C were 0, while D was 10. Thus, the validity coefficient obtained for the posttest instrument was 1.00. This value indicates that the posttest items possessed high validity. Nevertheless, a recommendation was given to revise the distractor options in item number 4, and the posttest instrument was revised accordingly.

*Results of the Website-Based Media Feasibility Test*

The feasibility of the website-based media was evaluated based on three aspects: material, language, and media. Each aspect was assessed by two expert judges according to their areas of expertise. The results are presented as follows.

**Table 3**. Material Feasibility Results

| Indicator | Total Score |
|---|---|
| Suitability of the material with Learning Outcomes (CP) and Learning Objectives (TP) | 20 |
| Accuracy of the material | 10 |
| Depth of the material content | 10 |
| Supporting elements of the learning material | 37 |
| Currency of the material content | 9 |
| Suitability of media development with the characteristics of the Indonesian Language subject | 10 |

| Indicator | Total Score |
|---|---|
| Total Score | 96 |
| Maximum Score | 100 |
| Percentage (%) | 96 |

Based on the table above, the maximum score was 100, while the total score obtained from the two experts was 96. The calculated percentage of material validity was therefore 96%. Thus, the material component of the website-based learning media was categorized as excellent and deemed highly feasible, making further testing unnecessary.

The learning materials presented in the website-based media were aligned with the Indonesian Language Learning Outcomes (CP) for Phase C. The learning objectives were clearly formulated, relevant to the content, and measurable. The material content was presented accurately, systematically, and up-to-date, beginning with apperception activities, followed by synonym and antonym materials, and supplemented with instructional videos. The inclusion of relevant images and learning videos made the media more varied and enhanced students' understanding of the content.

**Table 4**. Language Feasibility Results

| Indicator | Total Score |
|---|---|
| Use of clear and straightforward language | 10 |
| Use of communicative sentences | 9 |
| Dialogic and interactive sentences | 10 |
| Suitability to students' developmental level | 9 |
| Coherence of sentences and logical flow of ideas | 20 |
| Use of terminology according to Indonesian language conventions | 18 |
| Total Score | 76 |
| Maximum Score | 80 |
| Percentage (%) | 95% |

Based on the results above, the maximum score was 80, and the total score obtained from the two experts was 76. The percentage of language validity was therefore 95%. Thus, the language aspect of the website-based media was categorized as excellent and highly feasible, eliminating the need for further testing.

The sentences and instructions used in the media were clear, concise, and communicative. The language employed in presenting the material was easy to understand and appropriate for the language development level of fifth-grade students. This finding is consistent with Ilhami (2022), who stated that fifth-grade students have reached the operational stage of language development. At this stage, students are capable of dealing with more complex problems. Therefore, the media provided more complex examples to enrich students' vocabulary.

**Table 5**. Media Feasibility Results

| Indicator | Total Score |
|---|---|
| Ease of navigation use | 17 |
| Usefulness of navigation buttons | 9 |
| Accuracy of navigation button functions | 7 |
| Quality of text presentation | 8 |
| Readability of text | 9 |
| Appropriateness of font size | 7 |
| Appropriateness of font color | 8 |
| Appropriateness of font type | 7 |
| Suitability of appearance for target users | 9 |
| Appropriateness of images and illustrations | 8 |
| Appropriateness of layout | 8 |
| Appropriateness of color combinations | 8 |
| Appropriateness of background selection | 7 |
| Quality of design appearance | 9 |
| Total Score | 121 |
| Maximum Score | 150 |
| Percentage (%) | 81% |

The table shows that the maximum score was 150, while the total score obtained from the two experts was 121. The calculated validity percentage was 81%. Therefore, the media aspect of the website-based learning media was categorized as excellent and highly feasible, making further testing unnecessary.

From the media perspective, the website-based learning media was considered highly feasible. The website navigation was easy to locate, the buttons functioned properly and directed users to the correct pages. The text displayed on the website was of good quality, appropriately sized, and easy to read. The color combinations between text and background provided reading comfort. Furthermore, images, text, and videos were arranged appropriately according to the learning content. The selected background matched both the subject matter and the target audience. Overall, the website appearance was attractive and suitable for its intended users.

Although the media met the feasibility criteria, several suggestions were provided to improve its appearance and content. First, the navigation button on the "Material" page did not function properly in directing users to the next page, so the button link was corrected. Second, the font size on the material page appeared slightly inconsistent; therefore, font sizes across pages were adjusted for better uniformity. Third, separate submenu sections for synonym and antonym materials were added to improve accessibility. Fourth, greater attention was given to the selection of background colors. Fifth, the material, exercises, and discussion pages were separated to enhance effectiveness. After these revisions were made, the website-based media was ready for implementation.

*Practicality Test Results*

The practicality test was conducted to determine the practicality and utility of the product. The evaluation was carried out by a learning expert, namely the fifth-grade classroom teacher. The results are presented in Table 6.

The material aspect obtained a score of 4.3, the media aspect obtained a score of 4.0, and the ease-of-use aspect obtained a score of 3.8. After calculation, the overall practicality score was 4.0. Based on the practicality criteria table, the website-based learning media was categorized as practical.

The website-based learning media was considered capable of accommodating various learning styles and supporting the learning process effectively. The media was interactive and communicative, generating students' interest and enthusiasm during learning activities. This finding is in line with Panjaitan et al. (2022), who stated that Google Sites makes learning more engaging and enjoyable. The ease of operation and user-friendly navigation system for moving between pages were considered additional advantages of the media. Furthermore, the media was regarded as flexible because it enabled students who were absent from school to participate in learning activities from home.

**Table 6**. Practicality Test Results

| Aspect | Total Score Obtained | Maximum Score | Aspect Score | Practicality Score | Category |
|---|---|---|---|---|---|
| Material | 30 | 35 | 4.3 | | |
| Media | 20 | 25 | 4.0 | 4.0 | Practical |
| Ease of Use | 23 | 30 | 3.8 | | |

The website-based media was also considered capable of overcoming teachers' challenges in the assessment process. Assessment preparation and implementation became more efficient. As previously identified, teachers faced challenges related to grading time, limited printing facilities, and the risk of errors in typing questions and calculating scores. Therefore, assessments were designed using Google Forms and linked to the Google Sites platform. In addition to being cost-free, integrating Google Forms into Google Sites was straightforward and did not require additional expenses. Consequently, the learning expert concluded that the website-based learning media was practical and easy to use.

*Results of the Website-Based Media Effectiveness Test*

The effectiveness of the media was determined by comparing the mean pretest and posttest scores. During the first implementation, the mean pretest score was 56.00, while the mean posttest score increased to 75.20. The pretest results showed a maximum score of 90.00 and a minimum score of 10.00. In contrast, the posttest results showed a maximum score of 100 and a minimum score of 50. Based on the difference between these scores, a substantial improvement was observed. Furthermore, an examination of individual student scores revealed that all students demonstrated improvements in their learning outcomes.

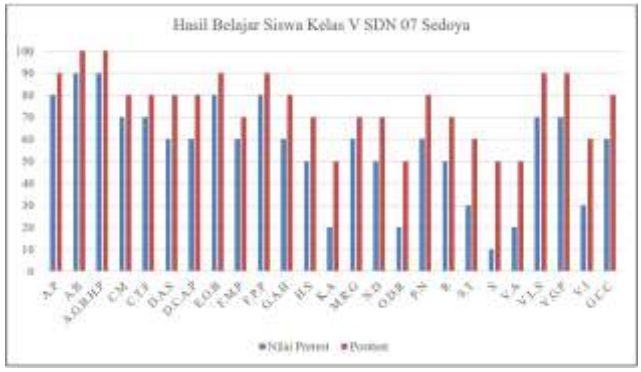


**Figure 3.** Students' Learning Outcomes

The effectiveness of the product was also determined through statistical analysis using a paired-sample t-test. However, before conducting the hypothesis test, a normality test was first performed using the Shapiro–Wilk model. This test was selected because the number of data samples used was fewer than 50.

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Pretest | .210 | 25 | .006 | .921 | 25 | .055 |
| Posttest | .183 | 25 | .030 | .921 | 25 | .054 |

a. Lilliefors Significance Correction

**Figure 4.** Normality Test Results

Based on the table, the significance value (Sig.) obtained for the pretest was 0.055. Therefore, the pretest data were normally distributed because the significance value was greater than 0.05. Similarly, the significance

value for the posttest was 0.054, indicating that the posttest data were also normally distributed.

After confirming that both datasets were normally distributed, they were analyzed to test the hypothesis using a paired-sample t-test. The paired-sample t-test was conducted to examine a hypothesis involving dependent data, meaning that the same individuals were subjected to two different treatments. The t-test analysis was performed using SPSS version 25, yielding the following results.


**Figure 5**. Paired-Sample T-Test Results

Based on the table above, the obtained Sig. (2-tailed) value was 0.00. This value represents the smallest significance value obtainable from the t-test calculation. Therefore, it can be concluded that the use of website-based learning media significantly influenced the improvement of students' learning outcomes in the Indonesian Language subject for fifth-grade students at SDN 07 Sedoya.

## Conclusion

Based on the results and discussion presented above, several conclusions can be drawn. First, the website-based learning media was categorized as highly feasible in terms of material aspects, with a score of 96%; highly feasible in terms of language aspects, with a score of 95%; and highly feasible in terms of media aspects, with a score of 81%. Second, the website-based learning media was categorized as practical, achieving a practicality score of 4.0. This indicates that the media contained systematic and relevant learning materials aligned with the learning outcomes, accommodated diverse learning needs, provided benefits to the learning process, and was easy to operate and access. Third, the website-based learning media was proven effective in improving students' learning outcomes. This conclusion was supported by the results of the paired-sample t-test, which yielded a significance value of 0.00. Therefore, the use of website-based learning media had a significant effect on improving the learning outcomes of fifth-grade students in the Indonesian Language subject at SDN 07 Sedoya.

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The authors declare no conflict interest.

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