

INNOVATION OF INDONESIAN VOCABULARY LEARNING MEDIA BASED ON INTERACTIVE MULTIMEDIA FOR ELEMENTARY SCHOOL STUDENTS USING THE MDLC METHOD

Bernadete Deta^{1a}, Martinus Irwanto Ishak^{2b}, Piterilus Roniatin Lewokeda^{3c}, Sesilia G.L. Teluma^{4d}

^{1,2,3,4} Program Studi Teknik Informatika, Institut Keguruan dan Teknologi Larantuka, Nusa Tenggara Timur, Indonesia

^aE-mail: auran8150@gmail.com

^bE-mail: irwanto.martinus@gmail.com

^cE-mail: piterilus.roniatin97@gmail.com

^dE-mail: neditelumaa@gmail.com

(*) Corresponding Author
auran8150@gmail.com

ARTICLE HISTORY

Received : 20-02-2026

Revised : 14-04-2026

Accepted : 10-09-2026

KEYWORDS

*Learning Media,
Interactive Multimedia,
Multimedia
Development Life
Cycle,
Blackbox Testing*

ABSTRACT

This study addresses the low mastery of Indonesian vocabulary among elementary school students in rural areas, where local language use dominates daily communication and hinders proper understanding of Indonesian. The research aims to develop an interactive multimedia-based learning application to improve students' comprehension of nouns and verbs. The study was conducted in Lamawolo Village, East Flores, involving students from two elementary schools. The Multimedia Development Life Cycle (MDLC) method was applied, consisting of concept, design, material collecting, assembly, testing, and distribution stages. Data were collected through observations, interviews, usability testing, and learning outcome tests. The resulting product is a desktop-based application integrating text, images, audio, and interactive quizzes. Usability testing with 57 respondents yielded an average score of 86%, indicating that the application is easy to use and engaging. Learning outcomes also improved significantly, as reflected by the increase in average scores from 65.5 (pretest) to 89.2 (posttest), with an N-Gain value of 0.7 (high category). These results demonstrate that the developed multimedia application is effective in enhancing students' Indonesian vocabulary mastery.

This is an open access article under the CC-BY-SA license



INTRODUCTION

The Indonesian language holds a very important position in the life of the nation and state of Indonesia. It functions not only as a means of communication among members of society but also as a symbol of national identity

that represents the unity of a nation composed of diverse ethnic groups, cultures, and regional languages. In the context of statehood, the status of the Indonesian language is explicitly regulated in Article 36 of the 1945 Constitution, which states that the state language is Indonesian (Atika, 2025; Bustomi et al., 2018; Sugiarto, 2018). This provision demonstrates that Indonesian has a strategic role, both as the official language of the state and as an instrument for strengthening national integration. In addition, Indonesian also serves as a medium for the development of science, technology, and national culture. Through this language, knowledge can be conveyed, understood, and further developed by the wider community (Komarudin & Noor, 2017; Mahendra & Septiany, 2018; Zuhdi et al., 2024).

In the field of education, the Indonesian language also plays an equally significant role, particularly for students at the elementary school level. At this stage, children are in a crucial phase of language development that greatly influences their future learning processes. Good language mastery helps students understand various learning materials delivered by teachers, both through oral and written communication (Mukti et al., 2016; Suparlan, 2021). In other words, proficiency in Indonesian is not merely related to communication skills but is also closely connected to students' cognitive abilities in absorbing information and constructing new knowledge. Therefore, Indonesian language learning at the elementary school level needs to be designed effectively in order to optimally support the development of students' language skills (Rahmadi et al., 2025; Syihabudin & Ratnasari, 2020).

As a communication tool, the Indonesian language has a very broad function in daily life. Through language, individuals can convey ideas, thoughts, feelings, and information to others. For elementary school children, language ability becomes the foundation for interacting with their surrounding social environment, including peers, teachers, and the wider community. When students possess good language skills, they will find it easier to express their thoughts and understand the messages conveyed by others (Alfian, 2020; Firmansyah, 2015). Ultimately, this will help them build better social relationships and increase their confidence in communication.

However, the development of the modern era, marked by advances in information and communication technology, has also influenced language use in society. The increasingly open flow of globalization allows various foreign languages to enter everyday life. In addition, the use of slang that is popular among young people has become increasingly widespread in informal communication. This phenomenon indirectly leads to language mixing or linguistic acculturation within society. In certain circumstances, such mixing can create confusion, especially for children who are still in the early stages of formally learning a language (Husein et al., 2024).

This situation becomes even more complex when children live in communities where regional languages remain strongly used as the mother tongue. In many regions of Indonesia, including East Adonara, local languages are still the primary means of communication within families and communities. The use of regional languages in daily life certainly has positive value because it helps preserve local cultural heritage. However, on the other hand, the dominance of regional language use in family environments often makes children less accustomed to actively using Indonesian. As a result, when they enter school environments where Indonesian is used as the language of instruction, some students experience difficulties in understanding the material delivered by teachers.

This condition is reinforced by the results of interviews conducted with two school principals in the East Adonara area, namely the principal of SD Inpres Lamawolo Atas and the principal of SD Katolik Lamawolo. Based on the information obtained, it was found that the level of Indonesian language mastery among students is still relatively low. In classroom learning processes, teachers often have to use two languages simultaneously Indonesian and the local language so that students can understand the explanations given. Although the use of two languages on one hand helps students grasp the material more quickly, on the other hand it indicates that students' ability to use Indonesian still needs improvement.

If this condition continues without intervention, it may lead to various unfavorable impacts on students' academic development. One possible consequence is a decline in students' learning outcomes due to difficulties in understanding the subject matter delivered by teachers. Furthermore, limited proficiency in Indonesian can also hinder

students when communicating with individuals who do not use the same regional language. In the long term, this condition may even affect students' readiness to continue their education to higher levels, where the use of Indonesian becomes increasingly dominant.

Another factor contributing to the low level of Indonesian language proficiency among students is communication habits within the family environment. Many parents naturally use regional languages or their mother tongue when interacting with their children at home. This habit is actually part of an important process of cultural transmission. However, if it is not balanced with the habituation of using Indonesian, children will have limitations in understanding and using Indonesian properly and correctly. Therefore, efforts are needed to help students improve their Indonesian language skills more effectively, particularly in the aspect of vocabulary mastery.

One approach that can be implemented to address this issue is the utilization of information technology as a learning medium. The development of digital technology opens significant opportunities for the education sector to create learning methods that are more engaging, interactive, and easier for students to understand. The use of technology-based learning media can not only increase students' interest in learning but also help them understand learning materials more effectively. In the context of language learning, digital media can be used to introduce vocabulary, train pronunciation, and strengthen word meaning comprehension through various attractive visual and audio forms (Limbong et al., 2023).

Based on this background, this research focuses on the development of Indonesian vocabulary learning media for children using the Multimedia Development Life Cycle (MDLC) method. The MDLC method was chosen because it provides systematic stages in the process of developing multimedia applications, starting from planning, design, material collection, application development, testing, and distribution. Through this approach, the learning media developed is expected to be structured and aligned with the needs of users, particularly elementary school students.

The learning media developed in this study is designed in the form of a desktop-based application with a simple interface that is easy for students to use. The application interface is designed in accordance with the characteristics of elementary school children so that they can operate the application without significant difficulty. Through this application, students can learn various Indonesian vocabularies independently with the assistance of a computer or laptop. The multimedia-based material presented is expected to increase students' interest in learning while helping them understand word meanings more easily.

Furthermore, the use of application-based learning media also provides flexibility in the learning process. Students can access learning materials anytime and anywhere as long as a computer or laptop capable of running the application is available. Thus, the learning process is not limited to classroom activities but can also be carried out independently outside class hours. This aligns with the utilization of information technology in education aimed at creating learning experiences that are more effective, interactive, and enjoyable for students (Perdana et al., 2025; Satria et al., 2025).

Through the development of this multimedia-based learning media, it is expected that students' ability to understand and use Indonesian vocabulary will gradually improve. With better vocabulary mastery, students will find it easier to understand learning materials delivered by teachers and communicate more effectively in various situations. Ultimately, this effort is expected to contribute positively to improving the quality of Indonesian language learning in elementary schools, particularly in areas where the use of regional languages still dominates daily communication.

METHOD

This study employs a multimedia development method using the Multimedia Development Life Cycle (MDLC) approach. The MDLC model is one of the methods widely used in developing multimedia applications because it

provides systematic and structured stages in the process of designing and distributing a product. According to (Amiluddin et al., 2025) the multimedia development process consists of six main stages, namely concept, design, material collecting, assembly, testing, and distribution. In principle, these six stages do not always have to be implemented rigidly and sequentially, because in practice some stages can be carried out in parallel or exchange positions depending on the development needs. However, the concept stage remains the initial stage that must be conducted because it determines the direction and objectives of the multimedia development (Wirawan & Nur, 2025). In this study, the MDLC method is used as a framework for developing an Indonesian vocabulary learning media in the form of a desktop-based application intended for elementary school students. The stages of the MDLC method used in this study are described as follows.

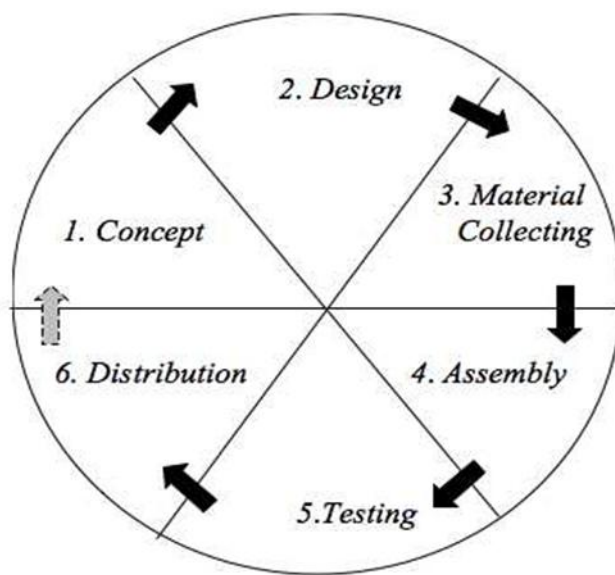


Figure 1. Multimedia Development Life Cycle Design

The concept stage is the initial stage in the multimedia development process, which aims to determine the basic concept of the application to be developed. At this stage, the researcher identifies the objectives of developing the application and determines the target users of the designed learning media. In this study, the developed application aims to help elementary school students improve their understanding of Indonesian vocabulary through interactive and engaging learning media. In addition, this stage also involves analyzing user needs, which include the characteristics of students, learning needs, and the problems faced by students in understanding the Indonesian language. This information was obtained through field observations and interviews with school authorities. The results of this stage serve as the basis for determining the features, learning materials, and the form of content presentation in the multimedia application to be developed.

The design stage is the planning phase that functions to develop the technical specifications of the multimedia application to be created. At this stage, the researcher designs the program structure, user interface, application navigation, and layout that will be used in the learning media. The design process also includes the creation of storyboards and flowcharts that illustrate the workflow of the application. The storyboard is used to describe the appearance of each application page along with the multimedia elements contained in it, such as text, images, and audio. Meanwhile, the flowchart is used to explain the navigation flow that users will follow when using the application. This stage is very important because it serves as the main guideline in the application development process at the next stage.

The material collecting stage is the process of gathering various materials required for developing the multimedia application. These materials may include images, illustrations, animations, audio, video, and text related to Indonesian vocabulary learning materials. In this study, the collected materials include a list of Indonesian vocabulary suitable for the comprehension level of elementary school students, illustrative images to help students understand the meanings of words, and other multimedia elements that support the learning process. The materials were obtained from various relevant sources, including books, online resources, and materials created directly by the researcher. All collected materials were then selected and adjusted according to the application design that had been prepared in the design stage.

The assembly stage is the implementation phase of all the designs that have previously been developed. At this stage, all multimedia materials that have been collected are integrated and arranged into a complete learning application. This process includes designing the application interface, integrating text, images, and audio, and organizing the navigation menu according to the planned design. In this study, the application was developed as a desktop-based application that can be run on a computer or laptop. The application development process utilized multimedia development software that allows the integration of various media elements interactively. The result of this stage is a prototype of an Indonesian vocabulary learning application that is ready to be tested.

The testing stage is conducted after the application development process has been completed. The purpose of this stage is to ensure that the application functions properly according to the planned features. Testing is carried out by running the application directly to identify possible errors, system malfunctions, or inconsistencies between the design and implementation. In this study, testing was conducted using the black box testing method, which focuses on the main functions of the application without directly examining the program code. Through this testing process, it can be determined whether each menu, navigation button, and feature available in the application operates properly. If any errors or shortcomings are found, improvements are made before the application is used by users.

The final stage in the MDLC method is distribution, which refers to the process of distributing or deploying the completed application. At this stage, the application is stored in digital storage media so that it can be used by users. If the application file size is relatively large, a compression process may be carried out to adjust it to the storage capacity of the media used. In this study, the completed learning media application was distributed to the school to be used as a supporting medium in the Indonesian language learning process. In addition, this stage also becomes part of the product evaluation process. Through this evaluation, the researcher can obtain feedback that is useful for further development so that the resulting application becomes more effective and better suited to user needs.

By using the Multimedia Development Life Cycle (MDLC) method, the development process of learning media in this study can be carried out systematically and in a well-directed manner. Each stage is interconnected and contributes to producing an effective, interactive, and user-friendly learning application for elementary school students in learning Indonesian vocabulary.

RESULTS AND DISCUSSION

Results

The research was conducted in Lamawolo Village, Ile Boleng District, East Flores Regency. The data collection process began with a needs assessment stage. Preliminary research and initial data collection were carried out to determine the learning materials and analyze the needs that would serve as the basis for developing the product. At this stage, the researcher identified the materials and analyzed the needs involved in preparing the product to be developed. The material selected for this study focused on the introduction of adjectives and verbs in the Indonesian language. After determining the material to be developed, the researcher conducted a needs analysis to obtain a clearer understanding of the learning conditions and requirements.

The needs analysis was conducted through interviews with the school principals and homeroom teachers from grade 1 to grade 5 at two schools in Lamawolo Village, namely Lamawolo Atas Public Elementary School (SD Inpres Lamawolo Atas) and Lamawolo Catholic Elementary School (SD Katolik Lamawolo). The purpose of these interviews was to identify the conditions and characteristics of the respondents involved in the study. Based on the

results of interviews with the principals and teachers, it was found that many students still have a very low level of understanding of the Indonesian language, particularly in recognizing and using basic vocabulary. This situation indicates the need for an innovative learning approach that can support students in improving their language comprehension.

In response to these findings, the researcher planned to introduce an innovation by utilizing computer or laptop media through the development of interactive multimedia-based Indonesian language learning media. This learning media was designed to help students understand vocabulary in the Indonesian language more effectively by integrating various multimedia elements. Through the use of interactive features, it is expected that students will become more engaged in the learning process and better able to comprehend the learning materials presented.

Planning Stage

The planning stage was carried out after the completion of data collection and needs analysis. At this stage, the researcher began to design the development of interactive multimedia-based Indonesian language learning media. The planning process involved identifying the objectives of the learning media and analyzing the stages required for developing the product so that it could effectively support the learning needs of elementary school students.

Identification of Objectives

The development of interactive multimedia-based Indonesian language learning media focusing on nouns and verbs aims to create a learning media application that can support the teaching and learning process while improving the knowledge of children aged 6–12 years regarding Indonesian language mastery, which is still relatively low. In addition, this learning media is expected to facilitate students in conducting independent learning, enabling them to access learning materials outside the classroom environment and develop their language skills more effectively.

Analysis Stage

The analysis process in developing the learning material was conducted through two main stages: needs analysis and instructional analysis. The needs analysis was aimed at identifying the problems that arise during the learning process and determining the requirements of the learning media to be developed. The results of the analysis indicate that the learning media should have an attractive and engaging display to help students understand the concepts of nouns and verbs more easily. Furthermore, the learning media should be simple and user-friendly so that it can be accessed by students and other users who wish to learn the material. The interactive multimedia-based Indonesian language learning media developed in this study includes images, text, videos, learning resources, and user instructions, which are expected to help students better understand and absorb the learning materials presented.

Multimedia Product Development Stages

Pre-production Stage – Concept.

The concept stage was carried out to determine the objectives, type of media concept, learning materials, functions, and target users of the multimedia product. At this stage, the researcher defined the overall purpose of the learning media, designed the concept of the learning materials, and determined the structure of the media content to ensure that it aligns with the learning needs of elementary school students. The interactive multimedia-based Indonesian vocabulary learning media was designed specifically for students of Lamawolo Catholic Elementary School and Lamawolo Atas Public Elementary School, with the primary objective of improving their knowledge and understanding of Indonesian vocabulary so that it can support their learning at higher levels of education. The learning materials included explanations in the form of text and images related to the introduction of verbs and nouns in the Indonesian language. These materials were adapted from teaching materials obtained from one of the teachers at Menanga Public Elementary School (SD Inpres Menanga) to ensure that the content corresponds with the curriculum and learning needs of elementary school students.

Design Stage

The design stage involved planning the structure and content of the learning media in detail, including the design of learning materials and the development of a storyboard. At this stage, detailed specifications were prepared to ensure that the subsequent development process could be carried out effectively without the need for major revisions. The learning materials were designed based on the analysis of materials obtained from teachers at Menanga

Public Elementary School, ensuring that the content was appropriate and relevant for elementary school students. In addition, a storyboard was developed to illustrate the sequence and structure of the multimedia content in each section of the learning media. The storyboard serves as a visual guide that describes each scene, including the placement of multimedia objects such as text, images, and links to other scenes, thereby facilitating the development process of the interactive multimedia learning media.

Production Stage

The production stage is the phase of collecting various materials required for the development of the learning media. At this stage, the researcher gathers materials that are appropriate for the needs of the application to be developed. The materials obtained include instructional content in the form of Indonesian vocabulary materials that are arranged according to the level of understanding of elementary school students. In addition, supporting images are also collected to serve as illustrations of the material as well as animation objects within the learning media, making the application display more engaging and easier for students to understand. Besides images, audio elements are also prepared to be used as background music in the learning media so that the learning process becomes more interesting and less monotonous for users. All the materials that have been collected are then utilized in the stage of developing the multimedia application.

Table 1. Storyboard

Page/Scene	Description
Home Page (Scene 1)	This page contains the opening screen equipped with one button, namely the enter button.
Main Menu Page (Scene 2)	The menu page is displayed after the user presses the “enter” button on the home page. This page contains learning materials, quizzes, the developer profile, and application usage instructions. It also includes a button that functions to return to the home page.
Main Page of Learning Materials (Scene 3)	This page contains two submenus, namely the verb menu button and the noun menu button.
Quiz Page (Scene 4)	This page contains question items related to the learning materials.
Developer Profile Page (Scene 5)	This page provides information about one of the members of the application development team.
Instruction Page (Scene 6)	The instruction menu page contains guidelines on how to use the application.

Production Stage

The production stage is the phase of collecting various materials required for the development of the learning media. At this stage, the researcher gathers materials that are appropriate for the needs of the application to be developed. The materials obtained include instructional content in the form of Indonesian vocabulary materials that are arranged according to the level of understanding of elementary school students. In addition, supporting images are also collected to serve as illustrations of the material as well as animation objects within the learning media, making the application display more engaging and easier for students to understand. Besides images, audio elements are also prepared to be used as background music in the learning media so that the learning process becomes more interesting and less monotonous for users. All the materials that have been collected are then utilized in the stage of developing the multimedia application.

Post-Production

Usability Testing

After conducting usability testing involving 57 respondents who were students from Lamawolo Inpres Elementary School and Lamawolo Catholic Elementary School, aged between 6 and 12 years, a questionnaire consisting of 24 questions was administered. The results obtained were compiled and summarized, and the usability score recap can be seen in Table 2.

Table 2. Number of Each Indicator

Indicator 1	Indicator 2	Indicator 3	Indicator 4	Average
83%	90%	80%	87%	86%

Based on the usability testing results, the outcome was categorized as very satisfactory, as the analysis achieved an average percentage of 86%, which met the expected criteria. This value was calculated from both the overall average and the averages of each indicator.

Validity Testing

Validity testing is conducted to determine whether a measurement instrument is valid or not. The instrument used in this research consisted of questions included in the questionnaire. The following table presents the results of the validity testing.

Pretest and Posttest

Based on the results of the Pretest and Posttest conducted in two elementary schools, namely Lamawolo Atas Inpres Elementary School and Lamawolo Catholic Elementary School, the results obtained from each school were categorized as "Fairly Effective." This conclusion was drawn because the analysis from each school reached the expected average percentage, with Lamawolo Atas Inpres Elementary School achieving 65% and Lamawolo Catholic Elementary School achieving 71%, calculated from the overall average results.

Black Box Testing and Distribution

Based on the testing conducted in accordance with the functional specifications of the application, the system operates properly. The testing was carried out using the Black Box Testing method, which focuses on evaluating the functions contained in the application without directly examining the program code. Through this testing process, the researcher was able to identify potential errors or deficiencies in the application, allowing improvements and refinements to be made to the system if necessary.

After the testing stage was completed and the application was confirmed to function properly, the next stage was distribution. At this stage, the learning media that had been fully developed was saved in the form of a .exe file and then copied to a storage device such as a flash drive. Subsequently, the learning media was distributed to users so that it could be utilized effectively in accordance with its intended purpose in the learning process.

Discussion

The findings of this study indicate that the development of interactive multimedia-based Indonesian language learning media has the potential to improve students' understanding of vocabulary, particularly nouns and verbs, among elementary school students in Lamawolo Village. The needs analysis conducted through interviews with school principals and teachers revealed that many students still experience difficulties in understanding and using Indonesian vocabulary. This condition is understandable considering that students in rural areas often use local languages in their daily communication, which indirectly affects their mastery of the Indonesian language as the national language used in formal education. The limited availability of innovative learning media in the classroom also contributes to the low level of student engagement and understanding of the learning materials. Therefore, the development of interactive multimedia learning media becomes a relevant and strategic solution to address these learning challenges.

The planning and analysis stages of the research played a crucial role in ensuring that the developed learning media met the actual needs of students and teachers. The identification of learning objectives clearly emphasized the importance of improving Indonesian language mastery among children aged 6–12 years. At this developmental stage, children require learning approaches that are not only informative but also engaging and interactive. By integrating multimedia elements such as images, text, audio, and videos, the learning media developed in this study was designed

to create a more stimulating learning environment. Such an approach aligns with the principles of multimedia learning, which suggest that students learn more effectively when information is presented through multiple forms of representation. Consequently, the integration of various multimedia components in the application was expected to enhance students' comprehension and retention of vocabulary concepts.

Furthermore, the concept and design stages ensured that the learning media was systematically organized and pedagogically appropriate for elementary school students. The preparation of storyboards allowed the researcher to visualize the structure and flow of the learning media before the production process began. This step is particularly important in multimedia development because it helps developers anticipate the arrangement of content and interactive elements in each scene. The storyboard also served as a guide in determining the placement of images, text, navigation buttons, and other multimedia objects, thereby ensuring that the final product was coherent and user-friendly. The clear organization of menus, including the home page, learning materials, quizzes, developer profile, and user instructions, demonstrates that the application was designed to facilitate easy navigation for young learners.

The production stage involved the collection and preparation of various materials required for the multimedia application, including vocabulary materials, illustrative images, and background audio. The use of visual illustrations in learning media is particularly important for elementary school students because visual elements can help them connect abstract language concepts with concrete representations. For example, images associated with verbs and nouns can assist students in understanding the meaning of words more intuitively. In addition, the inclusion of background music and simple animations contributes to creating a more engaging learning atmosphere. This approach is consistent with the idea that interactive and visually rich learning environments can increase students' motivation and interest in the learning process.

The usability testing results further support the effectiveness of the developed learning media. The involvement of 57 students aged between 6 and 12 years in the usability testing provided valuable insights into how the application was perceived and used by the target users. The average usability score of 86% indicates that the application was considered very satisfactory by the respondents. This high usability score suggests that the learning media is easy to use, visually appealing, and capable of supporting students in understanding the learning materials. The positive responses from students demonstrate that interactive multimedia learning media can successfully attract learners' attention and encourage them to actively participate in the learning process.

In addition to usability testing, the results of the pretest and posttest conducted in two schools also provide evidence of the effectiveness of the learning media. The findings show that the application contributed to an improvement in students' learning outcomes, as indicated by the average percentages of 65% in Lamawolo Atas Inpres Elementary School and 71% in Lamawolo Catholic Elementary School. Although these results were categorized as "fairly effective," they still demonstrate a positive impact of the learning media on students' vocabulary mastery. The improvement in posttest scores suggests that students were able to better understand the concepts of nouns and verbs after interacting with the multimedia learning application. This indicates that the integration of interactive features, visual illustrations, and structured learning materials can support students in developing their language skills more effectively.

The technical reliability of the application was also confirmed through Black Box Testing. This testing method focuses on evaluating the functionality of the application without examining the internal program code. The results of the testing show that all application functions operated properly according to the designed specifications. The successful implementation of this testing stage indicates that the application is technically stable and ready to be used by students and teachers in the learning process. Ensuring that the application functions correctly is essential because technical errors or system failures could negatively affect the learning experience of users.

Finally, the distribution stage ensured that the developed learning media could be easily accessed and utilized by users. By saving the application in the form of a .exe file and distributing it through storage devices such as flash drives, the researcher ensured that the learning media could be used even in areas with limited internet connectivity. This approach is particularly suitable for rural educational settings where access to online learning platforms may be

limited. The distribution of the application allows teachers and students to integrate the multimedia learning media into classroom activities as well as independent learning outside the classroom.

Overall, the results of this study demonstrate that the development of interactive multimedia-based Indonesian language learning media provides a promising alternative to support language learning in elementary schools. The integration of multimedia elements, interactive features, and structured learning materials not only improves students' understanding of vocabulary but also enhances their motivation and engagement in the learning process. Therefore, the use of multimedia-based learning media can serve as an effective strategy to improve the quality of Indonesian language learning, particularly in schools that face challenges related to limited learning resources and low student engagement.

CONCLUSION

Based on the results of the analysis covering the stages of design, implementation, and testing, it can be concluded that the development of interactive learning media on nouns and verbs in the Indonesian language for students of Sekolah Dasar Katolik Lamawolo and Sekolah Dasar Inpres Lamawolo Atas has been successfully developed and demonstrates a relatively high level of effectiveness. The learning media application was designed with attractive, simple, and easily understandable features for students, thereby supporting the learning process at the elementary or beginner level.

The results of the usability testing conducted with 57 respondents through four main indicators show a very good level of usability, with a usefulness rate of 83%, learnability of 90%, ease of use of 86%, and user satisfaction of 87%. Overall, these results indicate that the developed learning media has a very high level of ease of use for students. Furthermore, the results of the pretest and posttest conducted through 35 multiple-choice questions show an improvement in students' learning outcomes, where the average pretest score of 65.5 increased to 89.2 in the posttest, with an N-Gain value of 0.7, which falls into the high gain category. This finding indicates that the use of interactive learning media has a positive impact on improving students' understanding of the learning material.

In addition, the results of testing using the Black Box Testing method indicate that all functions and features within the learning media operate properly as expected, enabling the application to be used optimally in supporting the learning process.

REFERENCES

- Alfian, A. N. (2020). Aplikasi media pembelajaran pengenalan kosakata harian bahasa arab dengan metode multimedia development life cycle (MDLC). *Information Management for Educators and Professionals: Journal of Information Management*, 5(1), 95–104.
- Amiluddin, Z., Munirah, M., & Akhir, M. (2025). Development of Interactive Multimedia Based on Educational Game Applications in Indonesian Language Learning for Grade V Elementary School Students. *Jurnal Konseling Pendidikan Islam*, 6(3), 63–74.
- Atika, S. (2025). Recent Trends and Innovations in Elementary School Educational Game Development: A Literature Review. *Jurnal Teknologi Dan Ilmu Komputer Prima (JUTIKOMP)*, 8(1), 53–63.
- Bustomi, T., Kridalaksana, A. H., & Fachruddin, F. (2018). Aplikasi media pembelajaran Bahasa Indonesia berbasis multimedia. *Sebatik*, 10(1), 1–7.
- Firmansyah, A. U. (2015). Rancang Bangun Aplikasi Media Pembelajaran Bahasa Arab Berbasis Multimedia Dengan Menggunakan Adobe Flash Cs6 Pada Kelas Vii Madrasah Tsanawiyah Islamiyah Hessa Air Genting. *Jurteks Royal Vol 2 No 1*, 2.
- Husein, A. M., Meisarah, F., & Sudrajat, D. (2024). The impact of using multimedia in improving English vocabulary acquisition among primary school students. *Indonesian Journal of Education (INJOE)*, 3(3), 606–618.

- Komarudin, R., & Noor, R. R. (2017). Analisis perancangan media pembelajaran animasi interaktif mengenal bahasa Jepang. *Jurnal Pilar Nusa Mandiri*, 13(1), 12–20.
- Limbong, T., Napitupulu, E., & Sriadhi, S. (2023). Development of game based learning for Toba Batak script learning media with multimedia development life cycle (MDLC) model. *INTERNATIONAL CONFERENCE OF SNIKOM 2021*, 2798(1), 020046.
- Mahendra, I., & Septiany, N. (2018). Analisa faktor-faktor yang mempengaruhi minat mahasiswa dalam penggunaan aplikasi grab (studi kasus: mahasiswa stmik nusa mandiri jakarta). *JITK (Jurnal Ilmu Pengetahuan Dan Teknologi Komputer)*, 4(1), 9–16.
- Mukti, I. S. A., Lumenta, A. S. M., & Sugiarto, B. A. (2016). Rancang Bangun Aplikasi Pembelajaran Untuk Anak Umur 6–9 Tahun Berbasis Android. *Jurnal Teknik Informatika Unsrat*, 7(1), 140701.
- Perdana, A., Herman, A. M., Saputri, F. H., & Bangun, E. U. P. B. (2025). Game Based Learning Using Construct for Basic English Vocabulary at Elementary School Students. *G-Tech: Jurnal Teknologi Terapan*, 9(2), 938–946.
- Rahmadi, L., Effendi, M. J., & Hasibuan, M. S. (2025). Interactive Learning Media for Early Childhood Education through Android-Based Educational Games using GDLC Method. *PIKSEL: Penelitian Ilmu Komputer Sistem Embedded and Logic*, 13(1), 11–28.
- Satria, D. A., Laksmi, N. C., & Arifianto, R. (2025). Design of Interactive Media for World of Mathematics using MDLC Method. *International Journal of Informatics and Computation*, 7(2), 499–509.
- Sugiarto, H. (2018). Penerapan multimedia development life cycle pada aplikasi pengenalan abjad dan angka. *IJCIT (Indonesian Journal on Computer and Information Technology)*, 3(1).
- Suparlan, S. (2021). Keterampilan membaca pada pembelajaran Bahasa Indonesia di SD/MI. *Fondatia*, 5(1), 1–12.
- Syihabudin, S. A., & Ratnasari, T. (2020). Model pembelajaran bahasa indonesia yang efektif pada anak usia sekolah dasar. *Jurnal BELAINDIKA: Pembelajaran Dan Inovasi Pendidikan*, 2(1), 21–31.
- Wirawan, R., & Nur, M. A. (2025). Development of English Learning Media on Vocabulary Material for 5th Grade Students of SDN 298 Cabalu Based on Macromedia Flash 8. *Journal System Information And Computer*, 4(02), 327–334.
- Zuhdi, A. I., Mustafidah, Z., Alam, M. R. N., & Irawan, S. A. (2024). Implementation Multimedia Development Life Cycle in Interactive Multimedia Design for Traditional Indonesian Music Instruments Introduction. *JIKO (Jurnal Inform. Dan Komputer)*, 7(1), 43–50