

Multimedia-Based Learning Application for the History of Islam's Entry into Indonesia and the Stories of the Sunans

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Received: July 1, 2026; Accepted: July 25, 2026; Published: August 1, 2026.

Abstract: History education in primary schools often relies on textbook-based instruction, which may limit students' interest and participation in the learning process. This study aimed to develop an interactive multimedia learning application for teaching the history of the arrival of Islam in Indonesia and the Walisongo. The development process involved field observations, interviews with educational experts, and a literature review to collect and validate the historical learning materials. The validated materials were implemented in an offline multimedia application using graphic design and animation software. The application included an interactive interface, Indonesian-language narration, background audio, and multiple-choice quizzes to support students' learning activities and evaluation. The developed application was evaluated through expert validation, pretest-posttest assessment, and student responses. The results showed that the application was suitable for use as a learning medium and received positive responses from students. The pretest-posttest results also indicated an improvement in students' learning outcomes after using the application. The study indicates that interactive multimedia can serve as an alternative learning medium for supporting history learning, particularly on the history of Islam in Indonesia and the Walisongo.

Keywords: Interactive Multimedia; Learning Media; Multimedia; Islamic History; Walisongo.

1. Introduction

The development of information technology has expanded the use of digital media in education, including multimedia-based learning media for classroom instruction. Learning media are used to support the delivery of instructional materials and help teachers present content in forms that are more appropriate to students' needs and learning characteristics (Daniyati *et al.*, 2023; Juhaeni *et al.*, 2020). In this context, multimedia can combine visual elements, audio, text, and animation to present learning materials in a more varied form than conventional text-based explanations. This approach is relevant to primary education because students at this level often require concrete visual and auditory support to understand abstract, sequential, or historical information. History learning involves chronological events, figures, places, cultural changes, and relationships between past events that need to be explained according to students' level of understanding.

The history of the arrival and development of Islam in Indonesia is one of the topics that contains a wide range of historical information, including routes of arrival, propagation channels, influential figures, and cultural interactions. Mujib (2021) explains that the history of Islam in Indonesia is closely related to the diversity of

Islamic culture in the archipelago, which makes the topic important but also relatively complex for students to understand. In primary school learning, this material may become difficult when it is presented mainly through written text and teacher explanation, especially because students need to connect events, figures, places, and historical sequences. Interactive multimedia can provide an alternative way to present this material by combining explanations, illustrations, narration, and learning activities in a single medium. Previous studies also indicate that interactive and multimedia-based learning media can support the presentation of educational content in more varied forms, including Islamic Cultural History and primary school learning materials (Abubakar *et al.*, 2024; Audhiha *et al.*, 2022; Fauziah *et al.*, 2022).

At SDQ Imam Asy Syafi'i in Metro Lampung, the learning process for several history topics still relies mainly on textbook reading and teacher explanations. The material on the arrival of Islam in Indonesia and the biographies of the Walisongo contains many names, events, regions, and chronological relationships, which may be difficult for primary school students to understand through static learning materials alone. Although textbooks remain important as formal learning resources, their use may provide limited opportunities for students to interact directly with the material or review their understanding independently during the learning process. Based on the initial conditions identified by the researchers, teachers need learning media that can present historical information in a more varied form while remaining suitable for the characteristics of primary school students.

Previous studies have examined the use of digital and multimedia learning media in various educational contexts. Multimedia applications have been developed for primary school topics such as geometry, thematic learning, literacy, and cultural content, showing that visual and interactive components can be adapted to support classroom learning (Abubakar *et al.*, 2024; Audhiha *et al.*, 2022; Janto & Purwandari, 2022; Madona *et al.*, 2023). However, the development of interactive multimedia for specific local and religious history topics, particularly the history of Islam's arrival in Indonesia and the Walisongo, still requires further attention. Existing digital learning media also differ in terms of content, platform, interaction, and infrastructure requirements. Applications that depend on continuous internet access may be difficult to use in schools with limited connectivity, while presentation-based media may provide fewer opportunities for students to interact with the learning material.

In response to these conditions, this study develops an offline interactive multimedia application containing material on the arrival of Islam in Indonesia and the Walisongo. The offline design allows the application to be used in classroom situations without depending on continuous internet connectivity, while the multimedia components help present the material through visual displays, Indonesian-language audio narration, and interactive navigation. The application also includes multiple-choice quizzes so that students can evaluate their understanding after studying the material. The objectives of this study are to develop an interactive multimedia learning application for primary school history education, organize historical materials on the arrival of Islam in Indonesia and the Walisongo into an accessible digital format, and provide interactive quizzes to evaluate students' understanding. The developed application is evaluated through expert validation, student responses, and pretest-posttest assessments to examine changes in students' learning outcomes after using the application.

2. Related Work

Interactive and multimedia learning media have been widely examined as tools to support the presentation of learning materials in more varied forms. In the context of Islamic Cultural History, Fauziah *et al.* (2022) reported that interactive learning media with visual elements could support students' attention during the learning process. Related to the historical content of the present study, Mujib (2021) discussed the historical development and routes of Islam's arrival in the Indonesian archipelago, which provides a relevant basis for organizing materials on Islamic history in Indonesia. Other studies have also shown that digital and visual learning media can be applied to different educational contents, such as early vocabulary learning and cultural materials, with positive responses from users (Madona *et al.*, 2023; Usamah & Lutfi, 2022). These findings suggest that interactive media can be considered as an alternative for presenting historical, cultural, and religious materials, although their application to the specific topic of Islam's arrival in Indonesia and the Walisongo for primary school students remains limited.

The development of interactive learning applications requires both appropriate media design and a systematic development process. Learning media should be selected and organized according to learning objectives, student characteristics, and the nature of the material being taught (Daniyati *et al.*, 2023; Juhaeni *et al.*, 2020). In multimedia application development, the Multimedia Development Life Cycle (MDLC) has been used to structure the stages of concept development, design, material collection, assembly, testing, and distribution. Makaborang and Talakua (2023) applied MDLC in the development of multimedia-based learning media, while Bumbungan *et al.* (2024) used a structured multimedia development process to develop and

evaluate an educational application for primary school learning. These studies indicate that a systematic development model can help organize multimedia components, interface design, learning content, and testing procedures in an educational application.

Previous studies have also demonstrated the use of animation, graphic elements, and interactive controls in learning applications. Mulyoto *et al.* (2023) developed a multimedia-based mathematics learning application that used animation to present learning materials in sequential visual stages. Noperi and Reinita (2024), Audhiha *et al.* (2022), and Abubakar *et al.* (2024) also examined the development of interactive multimedia for primary education, including materials related to Pancasila education and geometry. In addition, Sweetly *et al.* (2023) developed an interactive application for syllable recognition, while Janto and Purwandari (2022) designed a multimedia-based interactive application for thematic learning in the first grade of primary school. Although these studies addressed different subjects, they show that visual presentation, animation, navigation controls, and interactive exercises can be incorporated into learning media for young learners.

Evaluation is also an important aspect in the development of multimedia learning media. Jumrah *et al.* (2025) reported changes in primary school students' learning outcomes after the implementation of multimedia-based learning media, while Damayanti *et al.* (2020) examined the use of interactive multimedia learning systems in relation to student learning outcomes. Kaniawati *et al.* (2023) emphasized that educational media should be evaluated to identify functional and technical issues before wider implementation. These studies indicate that the evaluation of multimedia learning applications should consider not only the availability of content and interface features but also the functionality of the application and students' responses after use. Studies by Aslamiah *et al.* (2023) and Imansyah *et al.* (2024) further show the importance of teacher readiness in using or developing multimedia-based learning media, although teacher training is not the main focus of the present study.

Based on the reviewed studies, interactive multimedia has been applied to various subjects and educational contexts, including Islamic Cultural History, literacy, mathematics, thematic learning, and other primary school subjects. However, limited attention has been given to an offline multimedia application specifically designed to present the history of Islam's arrival in Indonesia and the biographies of the Walisongo for primary school students. Previous studies have shown the applicability of multimedia components such as visual presentation, animation, audio-visual material, interactive navigation, and learning evaluation, but these components have not been sufficiently integrated for the specific historical content and school context addressed in this study. Therefore, this study develops an offline interactive multimedia application that combines historical materials, visual elements, Indonesian-language narration, and multiple-choice quizzes. The application is intended to provide an alternative learning medium for teaching Islamic history without depending on continuous internet connectivity and is evaluated through expert validation, student responses, and pretest-posttest assessment.

3. Methodology

The study was conducted at SDQ Imam Asy Syafi'i in Metro City, Lampung. Data were collected through observation, interviews, and literature review. Observation was conducted to identify the learning conditions and the use of instructional media in teaching Islamic history. A literature review was conducted to collect historical information related to the arrival of Islam in Indonesia and the biographies of the Walisongo. Structured interviews were conducted with three participants, consisting of the school principal and two history teachers. The interviews focused on the curriculum, learning materials, and instructional needs related to the development of the multimedia application. The historical materials collected from relevant sources were reviewed before being incorporated into the application. Expert judgment was also conducted to assess the accuracy and suitability of the historical content.

The application was developed using the Multimedia Development Life Cycle (MDLC), which consists of six stages: concept, design, material collecting, assembly, testing, and distribution. In the concept stage, the main requirements of the application were determined, including the target users, learning topics, offline operation, and display resolution of 800 × 600 pixels. The design stage involved designing the interface, navigation structure, learning materials, and interaction flow. During the material collecting stage, historical references, illustrations, background elements, audio narration, and other multimedia assets were prepared. The assembly stage involved combining the collected materials into the application and arranging them according to the designed interface and timeline structure. The testing stage was conducted to verify the functionality of the application before it was used by students.

The system design was represented using several system analysis diagrams. A context diagram was used to describe the relationship between the users and the main application system, as shown in Figure 1.

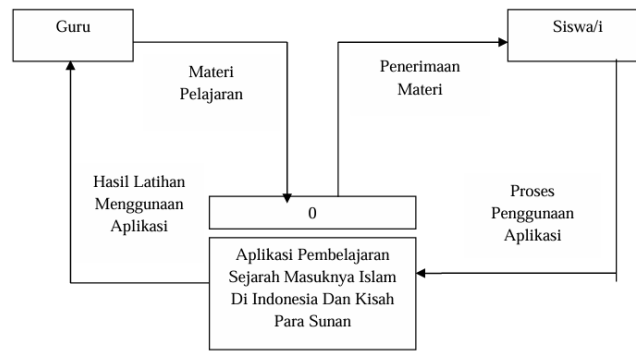


Figure 1. Context Diagram

The system structure was further described using a Level 0 Data Flow Diagram (DFD), which illustrates the main processes and data flows within the application, as shown in Figure 2.

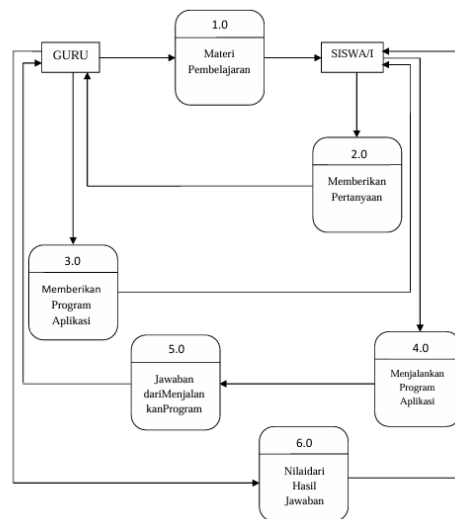


Figure 2. Data Flow Diagram

A flowchart was also developed to describe the application navigation and decision processes. The flowchart includes the main menu selection, access to learning materials, quiz activities, score calculation, and application termination, as presented in Figure 3.

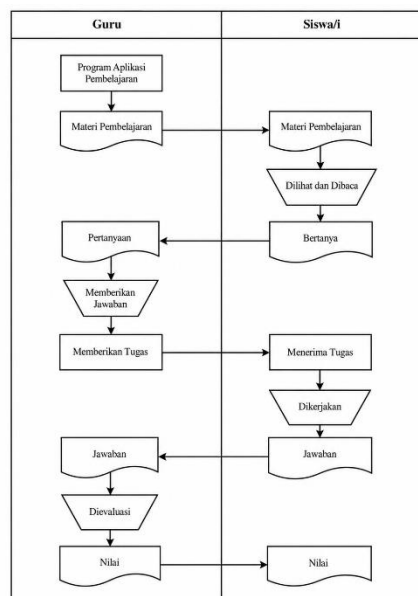


Figure 3. Flowchart

The visual components of the application were prepared using Adobe Photoshop and incorporated into the multimedia authoring environment used to develop the application. The visual elements included background layouts, illustrations, navigation buttons, text, and other graphical components. ActionScript 2.0 was used to control application interactions, including menu navigation, audio playback, button functions, and quiz scoring. Alpha testing was conducted using the black-box testing method to examine the functionality of the application. The testing covered the main menu, learning material navigation, audio playback, quiz functions, score calculation, and exit function. Each function was tested by comparing the expected output with the actual output generated by the application. The instructional evaluation used a quantitative approach involving 30 primary school students. The participants completed a pretest before using the multimedia application and a posttest after the learning activity. The study used a one-group pretest-posttest design to examine changes in students' learning outcomes following the use of the application. The pretest and posttest consisted of questions based on the historical materials presented in the application. In addition to the learning assessment, students completed a five-point Likert-scale questionnaire to provide responses regarding their experience using the application. The questionnaire results were analyzed descriptively using mean scores and percentages according to the predetermined interpretation criteria. The pretest and posttest scores were analyzed using a paired-samples t-test because the two measurements were obtained from the same group of students. The significance level was set at $\alpha = 0.05$. Before conducting the paired-samples t-test, the normality of the score differences was examined. The results of the statistical analysis were used to determine whether there was a statistically significant difference between students' learning outcomes before and after using the multimedia application.

4. Result and Discussion

4.1 Results

The implementation phase produced an offline interactive multimedia learning application for primary school students. The application was developed using an 800 × 600 pixel canvas and an ActionScript 2.0-based project environment. The main application file was compiled as an SWF file and contained the learning materials, navigation controls, audio components, and interactive quiz functions. The implementation phase produced an offline interactive multimedia learning application for primary school students. The application was developed using an 800 × 600 pixel canvas and an ActionScript 2.0-based project environment. The main application file was compiled as an SWF file and contained the learning materials, navigation controls, audio components, and interactive quiz functions.



Figure 4. Main Interface of the Software Editing Process

The visual components were arranged on separate timeline layers according to their functions. Background elements were placed on designated layers, while interactive components were arranged on separate layers to support the organization of the interface and navigation. The use of timeline layers allowed the developers to organize the visual and interactive components within each application screen.

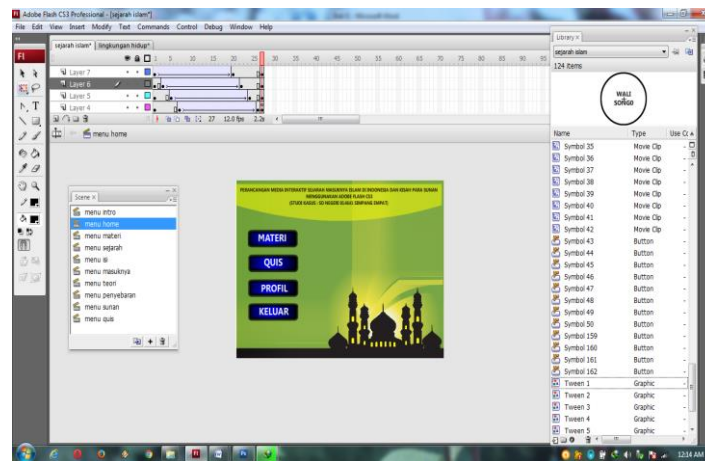


Figure 5. Graphical Background Editing Process

The learning materials were divided into two main topics: the history of the arrival of Islam in Indonesia and the biographies of the Walisongo. Text, illustrations, and navigation buttons were arranged into separate sections so that students could access each topic through the main learning menu.

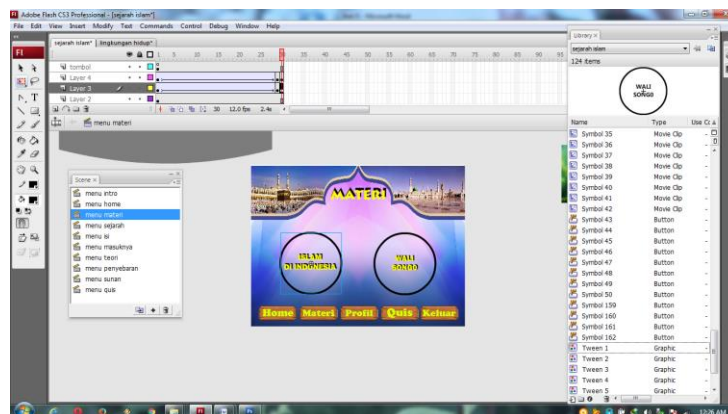


Figure 6. Creation and Layout Structure of Learning Materials

Audio components were also incorporated into the application. Background music and Indonesian-language narration were assigned to specific timeline sections so that the audio could be played together with the corresponding learning material. The audio component was intended to provide additional support when students accessed the visual and textual content. The application also included a multiple-choice quiz. Students were required to enter their names before starting the quiz. Each question was displayed through a separate interface, and the scoring system assigned 20 points for each correct answer. The final score was calculated automatically by the application based on the number of correct answers.

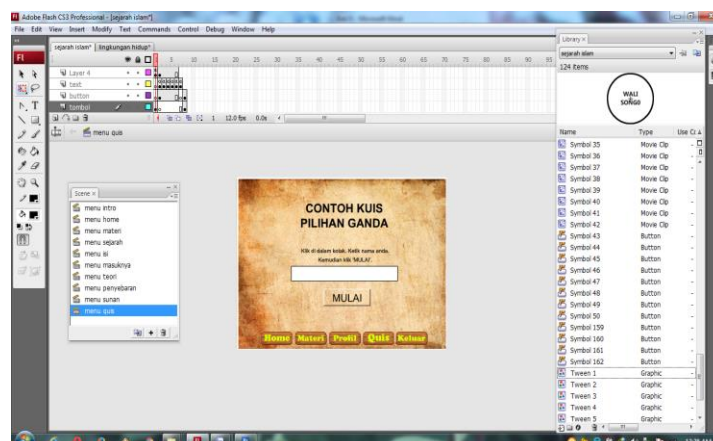


Figure 7. Initial Display of the Multiple-Choice Quiz

The application operated offline and did not require an internet connection during use. Functional checks were conducted during development to examine navigation buttons, variable loading, audio playback, and quiz functions. The application opened with an introductory page containing the title and a start button.



Figure 8. Main Introduction Page Interface

After the start button was selected, the application displayed the main menu. The menu contained four main options: learning materials, quiz, author information, and exit.



Figure 9. Home Dashboard Page Interface

The learning materials menu provided access to two main topics: the history of Islam in Indonesia and the biographies of the Walisongo.



Figure 10. Material Selection Page Interface

The history of Islam in Indonesia section contained several subtopics, including the general history of Islam's arrival, the channels of propagation, theories concerning its origins, and geographical distribution.



Figure 11. Islam in Indonesia Sub-Topic Page Interface

The section on the channels of propagation presented five topics related to the spread of Islam, namely trade, cultural adaptation, education, marriage, and political activities.



Figure 12. Main History Narrative Page Interface

The section on theories of the arrival of Islam presented four theories: the Mecca theory, Gujarat theory, Persia theory, and China theory.



Figure 13. History Theory Comparison Page Interface

The geographical distribution section used an interactive map to present information about the spread of Islam in several regions of Indonesia.



Figure 14. Geographical Distribution Map Page Interface

The Walisongo section presented the names and illustrations of the nine saints. Students could select individual figures to access their respective biographical information.



Figure 15. Stories of the Sunans Matrix Page Interface

The quiz module provided instructions and an input field for the student's name before the assessment began.



Figure 16. Quiz Module Runtime Interface

Before the application was used by students, expert validation was conducted to evaluate the historical content and multimedia aspects. The validation results are presented in Table 1.

Table 1. Expert Validation Results

Expert Category	Score	Focus Area
Historian Expert	92%	Early propagation channels and biographical data accuracy.
Media Expert	88%	Layout architecture, interface animations, and audio synchronization parameters.

The results indicate that the application received validation scores of 92% from the historian expert and 88% from the media expert. Black-box testing was subsequently conducted to examine the functionality of the main application features. The test results are presented in Table 2.

Table 2. Black-Box Functional Testing Results

Feature Tested	Expected Output	Actual Output	Status
Main Menu Controls	Playhead routes smoothly to clicked node configurations	Interface updates instantly with zero component lag	Pass
Material Routing	Asset layers display corresponding narrative data frames	Target sub-topic paragraphs render in correct sequences	Pass
Audio Execution	Soundtrack links trigger voice narratives automatically	Vocal scripts initialize with clear runtime balances	Pass
Quiz Scoring Logic	Correct selections trigger script increments of twenty	Variable score container records points accurately	Pass
Exit Protocol	Termination routine triggers smooth window shutdowns	Application window closes instantly upon request	Pass

The functional testing results show that all tested features operated according to their expected functions. The application was then tested with 30 primary school students using a one-group pretest-posttest design. The mean pretest score was 54.20, while the mean posttest score was 86.50. The difference between the two mean scores was 32.30 points. These results indicate an increase in students' scores after using the multimedia application. A paired-samples t-test was conducted to determine whether the difference between the pretest and posttest scores was statistically significant. The complete statistical results should include the mean difference, t-value, degrees of freedom, and p-value.

Table 3. Pretest and Posttest Learning Outcomes

Evaluation Stage	Mean Score	Significance (p-value)
Pre-test	54.20	< 0.05
Post-test	86.50	< 0.05

The student response questionnaire produced an overall score of 91.33%. This result indicates a positive response toward the use of the multimedia application. However, the questionnaire result should be interpreted as a measure of students' responses or perceptions unless the questionnaire was specifically designed and validated to measure student engagement.

4.2 Discussion

The results show that the developed application was able to integrate historical text, illustrations, audio narration, navigation features, and interactive quizzes into an offline learning medium. This integration is relevant to primary school learning because historical materials often require visual and auditory support to help students understand events, figures, places, and chronological relationships. The organization of the content into two main topics, namely the history of Islam's arrival in Indonesia and the biographies of the Walisongo, allowed the material to be presented in smaller sections that students could access through the application menu. This finding is in line with the view that multimedia-based learning materials can present instructional content in more varied and accessible forms (Handoyo *et al.*, 2025; Manurung, 2020). The use of visual components and animation also corresponds with previous studies emphasizing the role of interactive digital animation and multimedia elements in primary school learning media (Hendrick *et al.*, 2024; Kusrini *et al.*, 2022). In this study, the combination of visual display, narration, and interactive navigation helped transform historical material that is commonly delivered through textbooks into a more structured digital learning format.

The expert validation results indicate that the application was considered appropriate from the perspectives of historical content and media design. The historian expert gave a score of 92%, while the media

expert gave a score of 88%, suggesting that the historical materials and multimedia components met the assessment criteria used in the study. The black-box testing results further show that the main menu, material navigation, audio playback, quiz scoring, and exit functions operated according to their expected outputs. From a technical perspective, these findings indicate that the core functions required for classroom use were available in the developed application. The use of an ActionScript-based environment is also consistent with previous multimedia learning developments that used Adobe-based platforms and scripting to support interactive functions in educational applications (Prahasti *et al.*, 2025; Siagian & Syahril, 2024). However, the results of technical testing should be understood as evidence of functional operation rather than as a comprehensive measure of usability or long-term system reliability.

The pretest and posttest results show an increase in the mean student score from 54.20 to 86.50, with a mean difference of 32.30 points. The paired-samples t-test was used to examine whether the difference between the two measurements was statistically significant, and the reported p-value of less than 0.05 indicates a statistically significant difference between the pretest and posttest scores. This result suggests that the use of the multimedia application was followed by improved student learning outcomes. Nevertheless, because the study used a one-group pretest-posttest design without a control group, the increase should not be interpreted as definitive evidence that the application alone caused the improvement. Other factors, such as teacher guidance, students' prior knowledge, classroom conditions, and repeated exposure to similar material, may also have contributed to the score increase. This interpretation is important to keep the discussion consistent with the research design and avoid overstating the effect of the application.

The student questionnaire score of 91.33% indicates a positive response to the application. This result suggests that students accepted the multimedia application as a learning medium and responded positively to its presentation of historical content. The finding is relevant to broader discussions on the use of educational technology and multimedia in learning, which emphasize that digital media can support the delivery of instructional materials when the content, interface, and learning objectives are aligned (Paputungan & Paputungan, 2023; Sudrajat *et al.*, 2023). The offline design also provides a practical advantage because the application can be used without continuous internet connectivity, making it suitable for classroom environments where internet access is limited or unstable. However, the questionnaire result should be interpreted according to the indicators measured by the instrument. If the questionnaire focused on students' perceptions of the application, the result should be described as a positive student response rather than direct evidence of classroom engagement. In addition, because the application was developed as a standalone medium, its use still depends on the compatibility of the software and hardware available at the school.

The application has several limitations. Its multimedia content does not currently include full-motion video, which limits the range of visual materials that can be used to explain historical events. Updating the learning materials or graphical assets may also require changes to the timeline and application structure, making content revision less flexible. In addition, the development process requires the preparation and arrangement of visual, audio, and interactive assets before the application can be deployed. Future development may consider the use of more modular content structures and additional multimedia formats to simplify content updates and provide more varied learning materials. Further evaluation involving more students, different schools, or a comparison group would also provide stronger evidence regarding the contribution of the application to students' learning outcomes.

5. Conclusion and Recommendations

This study developed a standalone interactive multimedia learning application for teaching the history of Islam's arrival in Indonesia and the biographies of the Walisongo to primary school students. The application integrates historical text, illustrations, Indonesian-language audio narration, interactive navigation, and multiple-choice quizzes in an offline learning environment. The implementation and functional testing results show that the application was able to present the planned learning materials and operate the main interactive features required for classroom use. The use of the application was followed by an increase in students' learning scores. The mean score increased from 54.20 in the pretest to 86.50 in the posttest, with a mean difference of 32.30 points. The student questionnaire also showed a positive response, with an overall score of 91.33%. These findings indicate that the multimedia application is suitable as an alternative learning medium for the target material and that its use was associated with improved student learning outcomes. However, because the study used a one-group pretest-posttest design, the results should be interpreted carefully and should not be considered definitive evidence of causal effect without further comparative testing.

It does not include full-motion video, and updating the learning materials or graphical assets may require changes to the application structure and timeline. The development process also requires careful preparation and arrangement of visual, audio, and interactive assets for each learning topic. Future research may consider adding video-based materials, developing a more modular content structure to simplify updates, and

conducting evaluations with more students and schools. Further studies may also use a control group or a quasi-experimental design to provide stronger evidence regarding the contribution of the application to students' learning outcomes.

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