AN INTERACTIVE WEB-BASED EDUCATIONAL APPLICATION FOR PRESERVING TRADITIONAL MALAY DELI MUSICAL INSTRUMENTS: A LUTHER METHOD APPROACH

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Abstract

The rapid advancement of information technology has significantly influenced the development of learning media in education, creating opportunities for more interactive and flexible learning experiences. However, traditional Malay Deli musical instruments are becoming less familiar among elementary school students due to the dominance of modern musical instruments and limited engaging learning resources. This study aims to design and develop an application-based learning media to introduce traditional Malay Deli musical instruments using the Luther multimedia development method. The application was developed using Construct 2 to create interactive game-based learning content and integrated into a web-based platform using the Laravel framework to ensure accessibility and efficient content management. The research employed a research and development approach following six stages of the Luther method: concept, design, material collection, assembly, testing, and distribution. The developed application features interactive learning materials, audio-visual content, and quiz-based games designed to enhance student engagement and motivation. In addition, an administrative dashboard was implemented to allow teachers to manage learning materials, question banks, and student quiz results dynamically. The results indicate that the developed learning media provides an effective, user-friendly, and engaging learning environment for elementary school students. The integration of multimedia elements supports diverse learning styles and encourages independent learning, while the web-based implementation allows flexible access anytime and anywhere. This study concludes that application-based multimedia learning media can serve as an effective educational tool and contribute to the preservation of traditional Malay Deli cultural heritage by presenting traditional musical instruments in a modern and interactive digital format.

Keywords: traditional malay deli musical instruments; learning media; construct 2; laravel framework; luther multimedia development method.

1. INTODUCTION

Technological development has progressed rapidly over the past several decades, exerting a significant impact on various aspects of life, including the field of education [1]–[4]. The use of technology in education has become increasingly widespread, ranging from the utilization of software and applications to support learning processes to the development of online platforms that enable easier and more flexible access to learning materials. Technology not only facilitates effective content delivery but also provides opportunities for students to engage in independent and interactive learning. As a result, the teaching and learning process becomes more dynamic and capable of accommodating diverse student learning styles [5].

Traditional Malay musical instruments are currently less familiar to the public, particularly among elementary school students, due to the growing dominance of modern musical instruments in everyday life. This condition has led to a declining awareness among younger generations regarding their regional cultural heritage and traditional music. To address this issue, engaging and interactive learning media are required to increase students' interest in learning about traditional musical instruments. The development of learning media focused on traditional Malay musical instruments is expected to serve as a solution to the diminishing recognition and preservation of regional musical culture amid the rapid pace of modernization [6].

Traditional music is generally considered a shared cultural asset of the community and cannot be separated from their daily lives. It is influenced by local customs, traditions, and cultural values, including traditional Malay musical instruments that encompass various types and forms originating from coastal regions. Learning solely through textbooks is insufficient to attract students' interest in studying traditional music. Therefore, this study develops an application-based learning medium designed using Construct 2 software, which is then converted into a web-based application using the Laravel framework to ensure online accessibility for students. The learning media employs the Luther method, enabling the teaching and learning process to extend beyond conventional book-based

approaches. It is expected that this media will enhance students' interest, creativity, and imagination, thereby encouraging them to learn traditional Malay musical instruments in a more accessible and engaging manner.

A study conducted by [7] states that an application-based learning media for introducing traditional musical instruments serves as an alternative educational and promotional tool aimed at revitalizing and reintroducing cultural heritage, particularly to children, as a form of cultural preservation. The authors concluded that learning media applications can enhance the teaching and learning process by increasing engagement and reducing boredom and fatigue. Another study reported that traditional musical instrument applications can be utilized as learning media for students as well as for the general public. The study aimed to develop traditional musical instruments as a medium for preserving Sundanese culture and as an educational tool to introduce traditional Sundanese musical instruments through an Android-based application using the Multimedia Development Life Cycle (MDLC) method. The application also serves as a cultural arts platform designed to motivate children to engage more interactively in learning traditional musical instruments. Based on the responses of 21 fourth-grade students, the Single Ease Question (SEQ) usability testing yielded a score of 88%, indicating that the application is very easy to use. Meanwhile, the System Usability Scale (SUS) evaluation resulted in a total score of 1,627.5, with an average score of 77.5, which falls into the "Good" category with a grade scale of C, indicating high usability and ease of use [8].

The purpose of this study is to design and develop an application-based learning medium for introducing traditional Malay Deli musical instruments by utilizing Construct 2 and the Laravel framework through the Luther multimedia development method [9]. This research aims to provide an interactive and accessible learning platform that supports the teaching and learning process for elementary school students while preserving local cultural heritage. In addition, the study seeks to enhance students' interest, creativity, and engagement in learning traditional musical instruments by integrating educational content with interactive game elements. The developed learning media is also intended to serve as an alternative instructional tool that facilitates independent learning and improves the effectiveness of cultural education in the digital era.

2. RESEARCH METHOD

2.1. Laravel Framework

The rapid development of information technology has brought significant changes to various aspects of life, including the field of web application development. Laravel, a framework based on the PHP programming language, has become one of the primary choices for developers due to its advantages in terms of ease of use, security, and efficiency. Laravel is designed to assist developers in building web applications with clean and well-organized code structures, while providing various built-in features that support modern development practices, such as routing, middleware, and authentication systems [10].

2.2. Construct 2

Construct 2 is a software tool used to develop games based on HyperText Markup Language (HTML). According to[11], construct 2 allows developers to create games without requiring in-depth programming knowledge, as all game commands and logic are managed through an Event Sheet system consisting of events and actions. This approach enables rapid development of interactive and educational game content, making Construct 2 suitable for application-based learning media development.

2.3. Research Design

This study employs a research and development (R&D) approach focused on the creation of an application-based learning media. The development process follows the Luther multimedia development method, which consists of six stages: concept, design, material collection, assembly, testing, and distribution. This approach ensures that the developed learning media is systematic, structured, and aligned with user needs [12]–[15].

2.4. Data Collection Technique

Data collection in this study was conducted through literature review, observation, and documentation. Literature review was used to identify relevant theories and previous studies related to learning media, traditional musical instruments, and multimedia development. Observation was carried out to analyze user needs, particularly elementary school students, while documentation supported the collection of multimedia materials such as images, audio, and video related to traditional Malay Deli musical instruments [16].

2.5. System Development Procedure

The system development process integrates Construct 2 for designing interactive game-based learning content and Laravel as the backend framework to manage data, user authentication, and content administration. The Construct 2 project is exported into HTML format and then integrated into the Laravel framework to enable web-based access and content management [17].

2.6. Testing and Evaluation

System testing was conducted to ensure that all application functionalities operate as expected. Functional testing was performed to verify menu navigation, material display, quiz functionality, and data storage. User testing was also conducted to evaluate usability and user interaction, focusing on ease of use, clarity of content, and overall user experience [18].

3. RESULTS AND DISCUSSION

3.1. System Features and Interface Implementation

This section presents the results and discussion of the research that has been conducted, focusing on the implementation of the developed learning media application and its main features.

1. Student Login Page

   The user login page provides a login button that directs students or users to enter their name as a player identity before accessing the application.

Figure 1. Student Login Page

2. Name Input Page

   After the login button is selected, a pop-up name input form appears. Once the user enters their name and clicks the login button, the system records the name as the player's identity.

Figure 2. Name Input Page

3. Student Main Menu

   After successfully entering their name, students can access the main menu, which includes options such as Play, Learning Materials, Guide, and Credits. The home interface is displayed as shown in Figure 3.
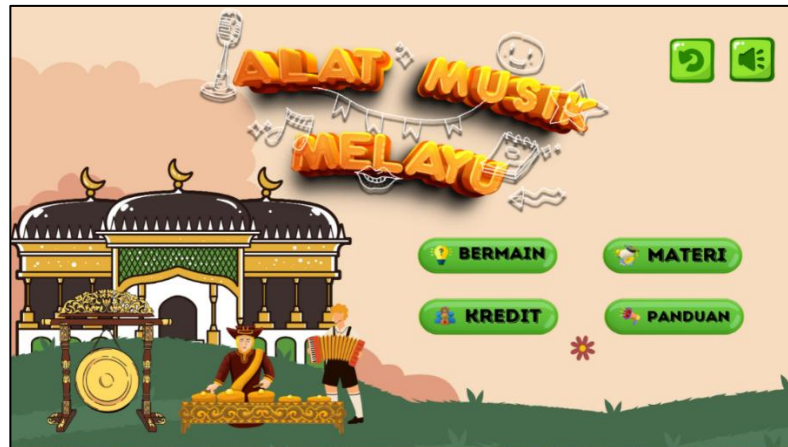
Figure 3. User/Student Main Menu

4. Learning Materials Page

The learning materials page includes a menu button at the top, along with video, image, and audio buttons to support material explanations. Navigation arrows are provided to move between slides, each displaying the name and description of the traditional musical instruments.

Figure 4. Learning Materials Page

5. Quiz Page

The game or quiz page features a menu button at the top, along with an image-based question and navigation arrows to move to the next question. Multiple-choice answers are provided with options labeled A, B, C, and D.
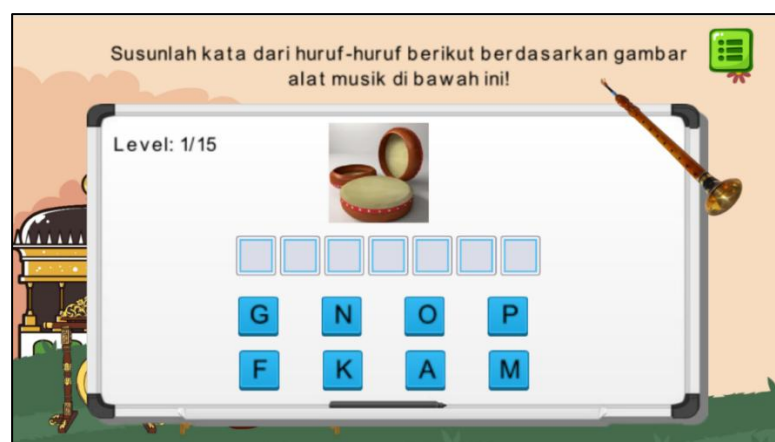

Figure 5. Quiz Page

6. Admin Login Page

The admin login page functions as an authentication mechanism that allows administrators or teachers to manage system access. After logging in, users are directed to a dashboard used to manage learning materials and image-based quiz questions to support student learning.
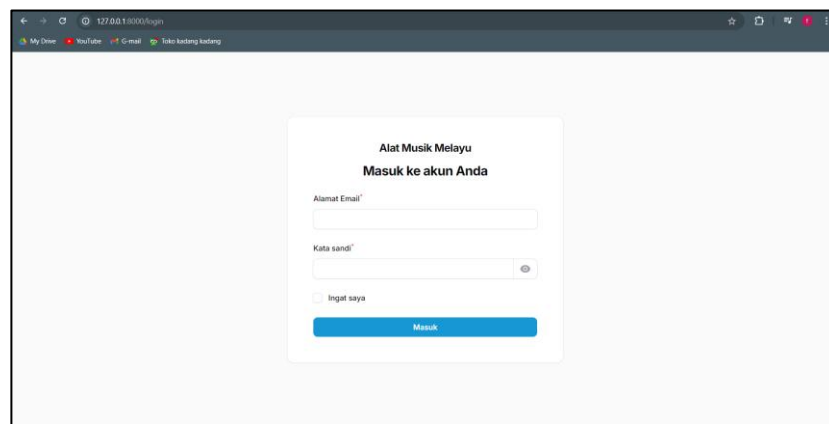
Figure 6. Admin Login Page

7. Admin Dashboard Page

The admin dashboard page is accessible after successful login. This page provides two main menus: the Learning Materials menu and the Question Bank menu, which allow administrators to manage content efficiently.
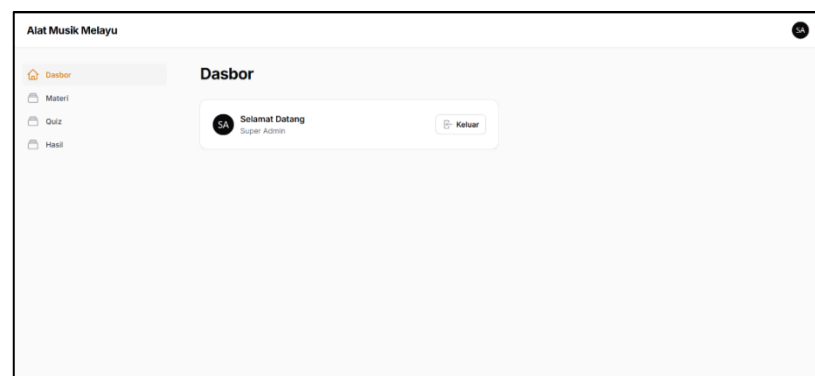

Figure 7. Admin Dashboard Page

8. Learning Materials Management Page

The learning materials management page allows administrators to create, edit, and delete learning materials. The managed content is displayed in the learning materials section of the application accessed by students.
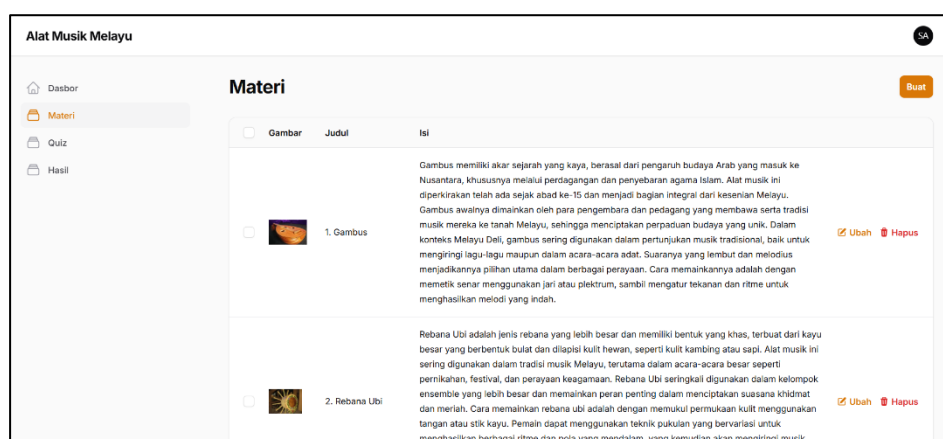

Figure 8. Learning Materials Management Page

9. Question Bank Management Page

The question bank management page is used to manage image-based quiz questions. Administrators can create, edit, and delete quiz questions, which are then displayed in the game menu of the learning application accessed by students.
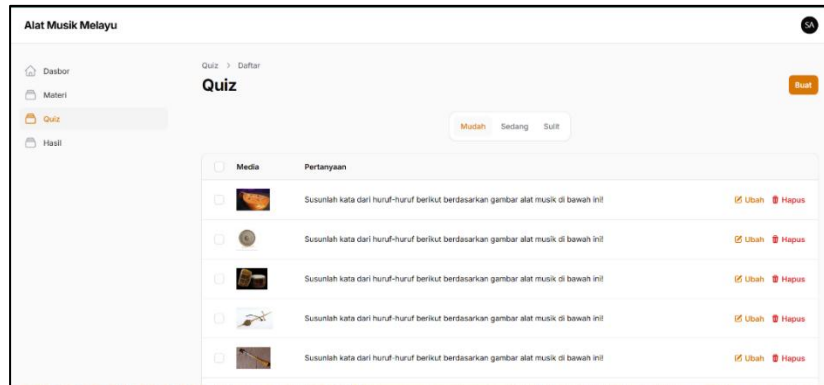
Figure 9. Question Bank Management Page

10. Quiz Results Page

The quiz results page functions as a data management interface for quiz outcomes. Administrators can view each student's quiz score and have the option to delete quiz result data if necessary. The results are also displayed in the application for review purposes.
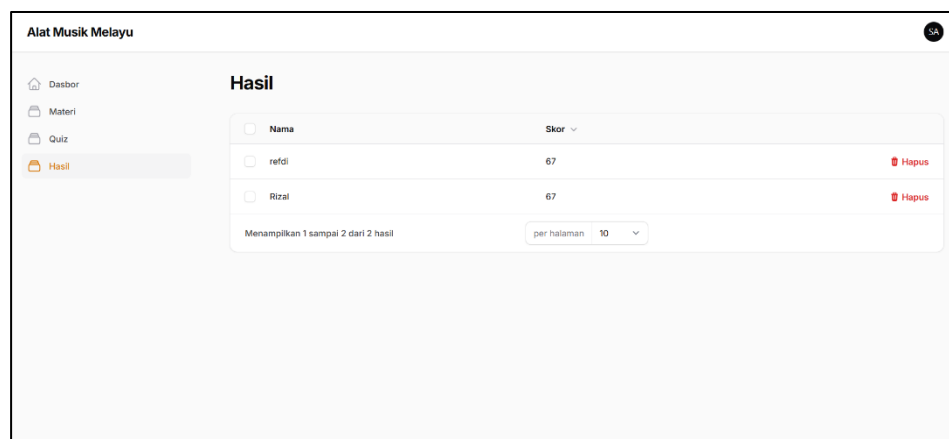

Figure 10. Quiz Results Page

3.2. Discussion

The results of this study demonstrate that the developed application-based learning media effectively integrates educational content with interactive multimedia elements to support the learning process of traditional Malay Deli musical instruments. The implementation of the Luther multimedia development method ensured a systematic and structured development process, starting from conceptual design to distribution. The user interface design emphasizes simplicity and ease of navigation, which is particularly important for elementary school students. Features such as name-based login, interactive learning materials, audio-visual content, and game-based quizzes contribute to increased learner engagement and motivation. The integration of Construct 2 for interactive content development and Laravel as the backend framework enables efficient content management, user authentication, and data storage, supporting both student and administrator needs.

From an educational perspective, the application facilitates active and independent learning by allowing students to explore learning materials at their own pace while reinforcing their understanding through interactive quizzes. The inclusion of multimedia elements, such as images, sounds, and videos of traditional musical instruments, enhances students' comprehension and supports diverse learning styles. Furthermore, the administrative dashboard allows teachers to manage learning materials and question banks dynamically, ensuring that the content remains relevant and adaptable to instructional needs. These findings align with previous studies that highlight the effectiveness of multimedia-based learning applications in increasing student interest and reducing learning fatigue. Overall, the developed learning media not only serves as an effective instructional tool but also contributes to the preservation of local cultural heritage by introducing traditional Malay Deli musical instruments in a modern, accessible, and engaging digital format.

4. CONCLUSION

This study successfully designed and developed an application-based learning media for introducing traditional Malay Deli musical instruments by utilizing Construct 2 and the Laravel framework through the Luther multimedia

development method. The development process was carried out systematically through six stages, concept, design, material collection, assembly, testing, and distribution, ensuring that the application meets both technical and educational requirements. The resulting learning media integrates interactive multimedia elements, including images, audio, video, and game-based quizzes, which effectively support the learning process for elementary school students.

The findings indicate that the application provides an engaging and user-friendly learning environment that enhances student interest, motivation, and participation in learning traditional musical instruments. The simple interface design and intuitive navigation enable students to use the application independently, while the administrative features allow teachers to manage learning materials and assessment content efficiently. Moreover, the integration of web-based technology ensures accessibility and flexibility, allowing the learning media to be used anytime and anywhere. Overall, this research demonstrates that application-based multimedia learning media can serve as an effective educational tool and a strategic approach to preserving local cultural heritage in the digital era. Future research is expected to focus on usability evaluation with larger user groups and the integration of additional features to further improve learning effectiveness.

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