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Development of an interactive Android application for learning Hijaiyah letters with educational audio and visual features using the Waterfall method

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ABSTRACT

This study aims to develop and test the effectiveness of Android-based hijaiyah letter learning mobile applications as an interactive learning medium for beginners. The background of the research is based on the challenges in learning hijaiyah letters conventionally and the potential for the use of mobile technology to increase learning effectiveness. The research method uses a Research and Development (R&D) approach with the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model. System design uses an object-oriented approach with Unified Modeling Language (UML) to ensure a structured application architecture. The application development is carried out using Android Studio with the Kotlin programming language and implements the concept of M-Learning (Mobile Learning) by integrating interactive features such as audio pronunciation, letter writing animations, and mini games for learning evaluation. The test involved 150 respondents consisting of children aged 5-12 years and TPQ/TPA teachers. The results of the study showed a significant success rate with an increase in the ability to recognize hijaiyah letters by 85% compared to conventional methods. The user satisfaction level reaches 92%, with the aspects of ease of use and interactivity receiving the highest rating. This application also succeeded in increasing students' interest in learning by up to 78% based on observations and feedback from teachers. In conclusion, the mobile application for learning hijaiyah letters developed has proven to be effective as an alternative learning medium and a complement to conventional methods in recognizing hijaiyah letters.

Keyword : Android, Hijaiyah, M-Learning, UML.

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1. INTRODUCTION

Learning the Hijaiyah letters, which are the basic letters of the Arabic alphabet, is an important part of Islamic education, particularly for young children. The vast number of Hijaiyah letters, their various pronunciations, and the lack of universal standards for how to read them pose significant challenges for learners. (Alobaydi et al., 2016) To address these challenges, researchers have explored the use of modern technologies, such as mobile applications, to support Hijaiyah letter learning. The rapid adoption of mobile devices, particularly smartphones, has created new opportunities for educational innovation. Android-based mobile applications (Wahyuni & Mesra, 2022), in particular (Wahyuni, Hermansyah, et al., 2022), have been shown to be effective in supporting various learning activities, including language and vocabulary learning. (Susilo et al., 2020) These applications can provide interactive, engaging, and personalized learning experiences that can help learners overcome the difficulties associated with Hijaiyah letter learning. Several studies have explored the use of mobile applications for Hijaiyah letter learning and other Arabic language learning tasks (Sekarwangi et al., 2021). These studies have demonstrated the potential of mobile technologies to enhance the learning process and improve learner engagement and motivation (Wahyuni & Wadly, 2023).

The present research aims to develop an Android-based mobile application for Hijaiyah letter learning, with the goal of providing a user-friendly and effective learning tool for young children (Supiyandi et al., 2023; Supiyandi & Zen, 2019). The present research aims to develop an Android-based mobile application for Hijaiyah letter learning, with the goal of providing a user-friendly and effective

learning tool for young children. The development of this application comes at a crucial time, as the COVID-19 pandemic has forced many students to learn remotely, increasing the demand for accessible and engaging educational technologies (Singh et al., 2020; Thota & Ramez, 2021). Furthermore, the ongoing debate around the role of technology in early childhood education makes this project particularly timely and relevant (Mutaqin et al., 2021). The use of technology in teaching support media has had a positive influence on the learning interests of students and students (Sulistianingsih et al., 2019; Wahyuni, Hariyanto, et al., 2022).

2. RESEARCH METHOD

The research methodology that will be carried out in writing this thesis is as follows (Marlina et al., 2023; Wahyuni et al., 2023; Wahyuni, Sari, et al., 2022):

1. Literature Study At this stage, the necessary data is collected by studying and selecting books, journals, papers and several sites related to the writing of this thesis.
2. Needs Analysis This analysis is carried out to find out the scope of the hijaiyah letter learning application that will be built.
3. Application Design This stage is the stage of designing the flow of the learning application and making the application interface design.
4. Program Testing At this stage, testing is carried out on the applications that have been made.

A. Use case diagram

System design is an attempt to create a new system or improve an old system as a whole or improve an existing system (Wahyuni, 2018). The purpose of system design is to meet the needs of users regarding a clear picture of the system design to be created and implemented (Nababan & Sitompul, 2018). System design generally identifies the components of the system to be designed in detail (Khaliq et al., 2023). The application design used is a Use Case Diagram as follows:

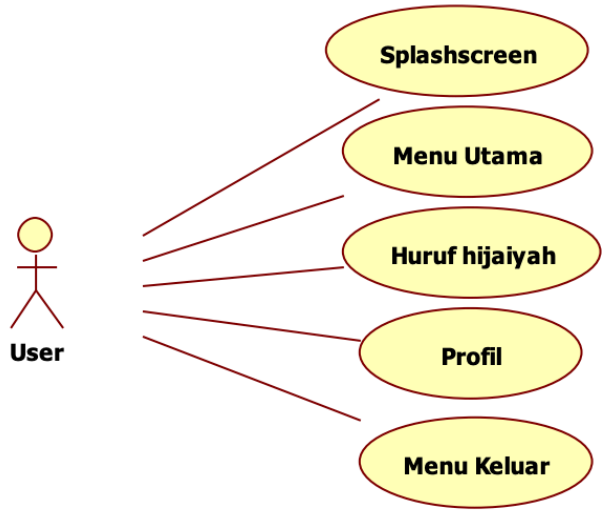

Fig 1. Use case diagram

B. Sequence Diagram

The design of the Sequence Diagram of this Android-based hijaiyah letter learning application can be seen in the following image :

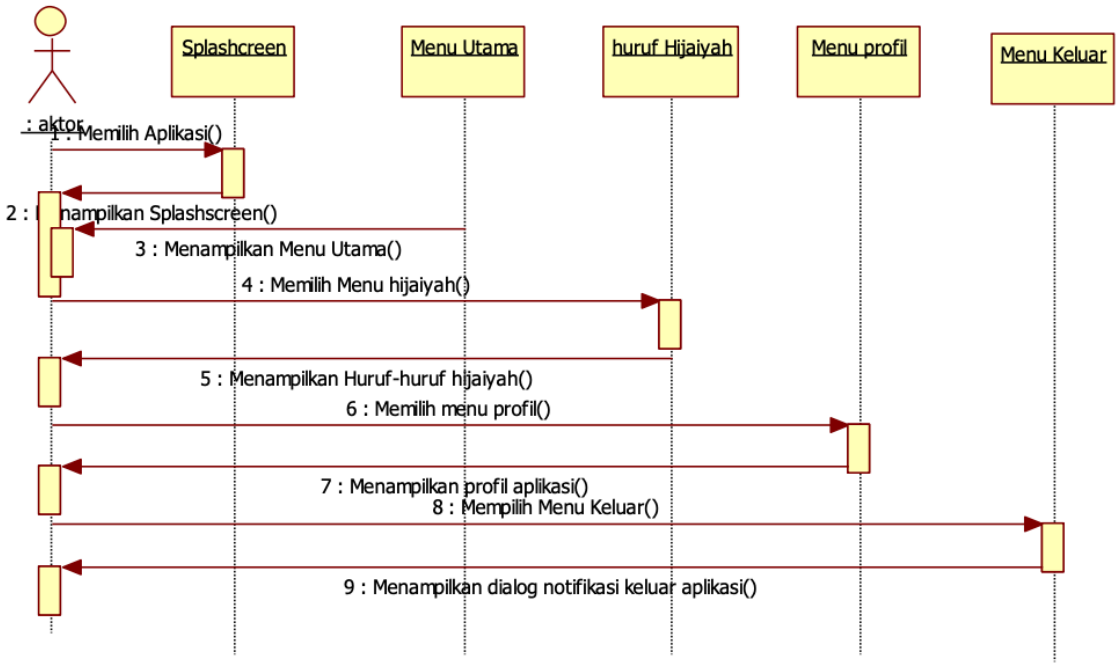

Fig 2. Sequence Diagram

C. Acitivity Diagram

The design of this Android-based hijaiyah learning Activity Diagram can be seen in the following image:

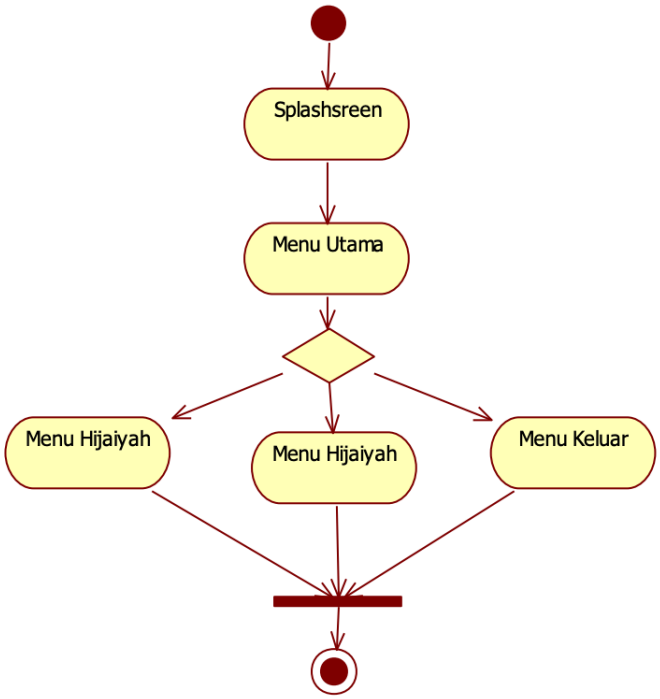

Fig 3. *Activity Diagram*

3. RESULTS

A. Main Menu Interface Display

The main menu display of the application will present the content of the information that will be displayed on the existing application accessed by the user. In figure 4.6, you can see the main menu display of the application as follows:

Fig 4. Home Menu

B. Listview Start Menu Interface Display

When the user selects the start menu, a listview display from the start menu will appear. In figure 5, you can see the start menu listview interface on the Mobile Learning Application for hijaiyah character recognition as follows:

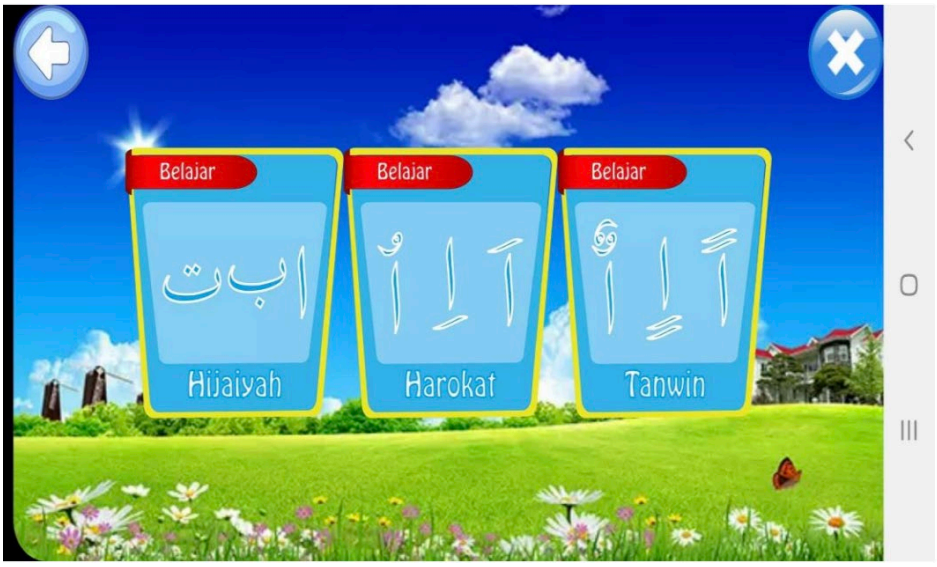

Fig 5. Display of hijaiyah, Harokat and Tanwin learning interface

In figure 5 above is the design of the start menu listview to start recognizing and learning hijaiyah, Harokat and Tanwin letters. In the following figure 6, you can see the contents of the interface of one of the listviews of the hijaiyah learning menu displayed on the Application:

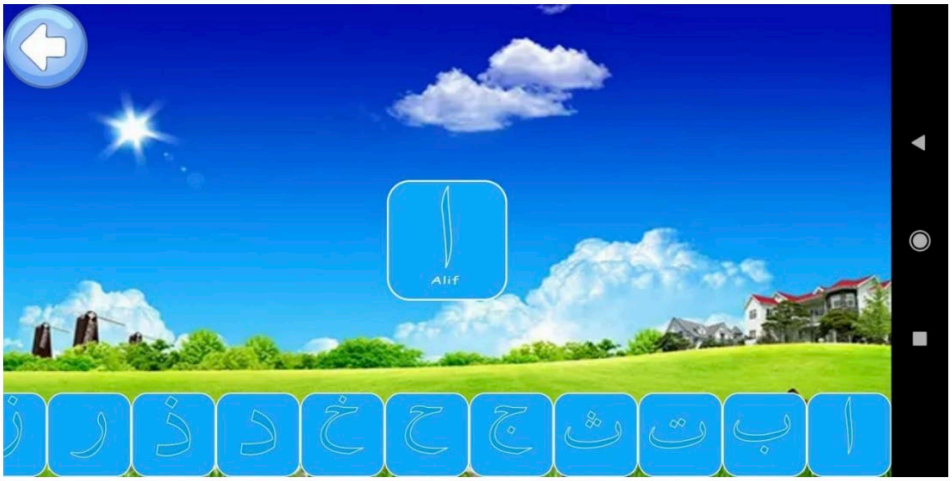

Fig 6. Display of hijaiyah, Harokat and Tanwin learning interface

In figure 6 above, you can see the contents of the display of the hijaiyah letters displayed so that when the user selects one of the letters, the application will display the letter accompanied by audio or sound reading of the hijaiyah letters. The interface of the sound will be displayed in the form of a pop up so that it is more interactive.

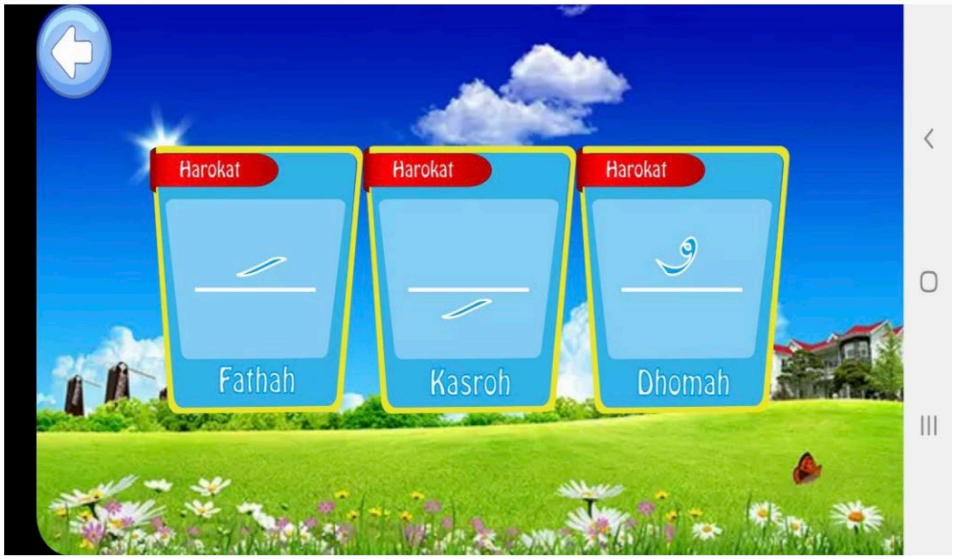

Fig 7. Interface Display Contents Listview Tanwin menu

In figure 7 above, you can see the contents of the display of the contents of the tanwin menu displayed so that when the user selects one of the letters, the application will display the letter accompanied by audio or sound reading of the hijaiyah letters. The interface of the sound will be displayed in the form of a pop up so that it is more interactive.

C. App Exit Interface

On the interface to confirm to the user the certainty to exit the application. The application exit interface can be seen in the following figure 8:

Figure 8. Settings Menu

4. CONCLUSION

Based on the research of the Hijaiyah Letter Recognition Mobile Learning Application, it can be concluded that:

1. With the existence of a mobile learning application operated on Android mobile devices, it can facilitate the learning process about hijaiyah letters which can be done anytime and anywhere in a more interactive way.
2. The application of the UML (Unified Modeling Language) object-oriented system method can provide a very complex modeling by providing a description of the system flow and logic in the designed system, namely the Hijaiyah Character Recognition Mobile Learning Application.

Based on the results of the research, the author realizes that there are still many shortcomings and can be perfected by the next developer. To improve this research, it is recommended that the provision of information on the application is still very limited, so that in the future it can be developed again and include a wider discussion. For certain purposes, this application can be developed with online content access so that the existing content can adapt to the development of information systems and technology.

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