

Implementation of a Mobile Application for Al-Qur'an Memorization Evaluation Using a Gamification Approach and the SDLC Method

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Abstract

The Quran memorization evaluation process at Majelis Taklim Wasilatul Muhtadin is currently conducted manually; consequently, the recording of recitation submissions, the assessment process, and the monitoring of student progress are not operating optimally. This study aims to develop an Android-based mobile application utilizing a gamification approach to support a more effective and structured memorization evaluation process. The application was developed using the Software Development Life Cycle (SDLC) methodology with a Prototyping model. It was built in Android Studio using the Kotlin programming language and incorporates Firebase Authentication and Firebase Firestore. Key features include user login, memorization submission, memorization validation, practice sessions, quizzes, and exam package management. Gamification elements were implemented through features such as levels, memorization progress tracking, daily missions, quizzes, and exams. Testing results indicate that all application functions operate according to user requirements, achieving a user acceptance rate of 91.18% based on questionnaire data. Thus, the application serves as a supportive tool for Quran memorization evaluation while enabling instructors to monitor student progress more effectively.

Keywords: *Quran Memorization Evaluation, Gamification, Mobile Application, Android, SDLC*

1. Introduction

The process of memorizing the Quran is a learning activity that requires continuous practice and evaluation to maintain the quality of memorization [1]. At Majelis Taklim Wasilatul Muhtadin, the memorization evaluation process is currently conducted manually; consequently, the recording of recitations, the assessment process, and the monitoring of student progress are not functioning optimally. This situation renders the management of memorization data inefficient and makes it difficult for instructors to track each student's progress. With technological advancements, mobile applications can serve as flexible and easily accessible tools to support learning. Furthermore, the application of gamification in educational apps has been shown to boost user motivation and engagement through challenges, rewards, levels, and achievement systems. While previous studies have developed Android-based Quran memorization apps, most have focused primarily on learning materials or basic record-keeping, failing to fully integrate memorization evaluation systems with gamification elements. Therefore, this research develops a mobile application for Quran memorization evaluation using the Software Development Life Cycle (SDLC) methodology with a Prototyping model. The developed application includes features for login, recitation submission, memorization validation, practice, quizzes, and exam management, while incorporating gamification through levels, progress tracking, daily missions, quizzes, and exams. This research aims to produce an application that makes the memorization evaluation process more effective and structured while increasing student motivation to memorize the Quran.

2. Theoretical Review

2.1. Evaluation of Al-Qur'an Memorization

The evaluation of Quranic memorization is a process designed to assess a student's memorization ability, fluency, and recitation accuracy in accordance with tajwid principles [2]. These evaluations are conducted periodically through recitation sessions with an instructor, serving as a means to monitor the student's progress. The results provide a basis for the instructor to offer guidance and determine appropriate follow-up measures to ensure the quality of memorization is maintained.

2.2. Gamification

Gamification is the application of elements commonly found in games to non-game activities to enhance user motivation, engagement, and participation [3]. In this study, gamification is implemented through features such as levels, memorization progress tracking, daily missions, quizzes, and exams, with the aim of encouraging *santri* (Islamic boarding school students) to be more consistent in their memorization efforts and in participating in the memorization evaluation process.

2.3. Android Mobile Application

Mobile applications are software programs designed to run on mobile devices such as smartphones. The Android platform is a widely used operating system due to its open nature and ease of development, as well as its ability to support various educational application needs. Through mobile applications, the process of evaluating memorization can be conducted with greater flexibility, making it easier for both students and instructors to access information anytime and anywhere [4].

2.4. Software Development Life Cycle (SDLC)

The Software Development Life Cycle (SDLC) is a method used to develop software systematically through several stages, ranging from requirements analysis, design, development, and testing to implementation and maintenance [5]. This study employs a prototype model that enables developers to obtain user feedback at each stage of development, allowing the application to be tailored to user needs prior to implementation.

3. Research Methods

This study employs a descriptive research method with a qualitative approach. Data collection was conducted to gather information regarding the Quran memorization evaluation process at Majelis Taklim Wasilatul Muhtadin. Research data were obtained through observation, interviews, literature review, and documentation. Observations involved directly monitoring the memorization recitation and evaluation processes. Interviews were conducted with the *ustadz* (religious teacher) to identify system requirements and the challenges encountered. The literature review involved studying books, journals, and prior research related to mobile applications, gamification, and software development. Documentation served to support the system analysis and design process.

The application was developed using the Software Development Life Cycle (SDLC) methodology with a prototyping model. This model was selected because it enables user participation in the development process through the evaluation of the created prototype. The development stages include requirements analysis, system design, prototype creation, prototype evaluation, implementation, testing, and maintenance. This approach allows the application to be developed in alignment with user needs and facilitates the gathering of feedback prior to full system implementation.

The system was designed using the Unified Modeling Language (UML), comprising Use Case Diagrams, Activity Diagrams, Sequence Diagrams, and Class Diagrams. The application was implemented in Android Studio using the Kotlin programming language, while Firebase Authentication handled user authentication and Firebase Firestore served as the database for storing application data. Following development, the application underwent Black Box Testing, White Box Testing, and questionnaire-based testing to verify that system functions operated as required and to assess the level of user acceptance.

4. Implementation and Testing

4.1. Interface Implementation

4.1.1. Login Page



Fig. 1: Login Page

The login page is the application's initial interface, used by users to access the system based on their respective access rights. Users authenticate using their registered email address and password. Upon successful login, the system directs the user to the main page corresponding to their role—administrator, *ustadz* (religious teacher), or *santri* (student).

4.1.2. Student Dashboard

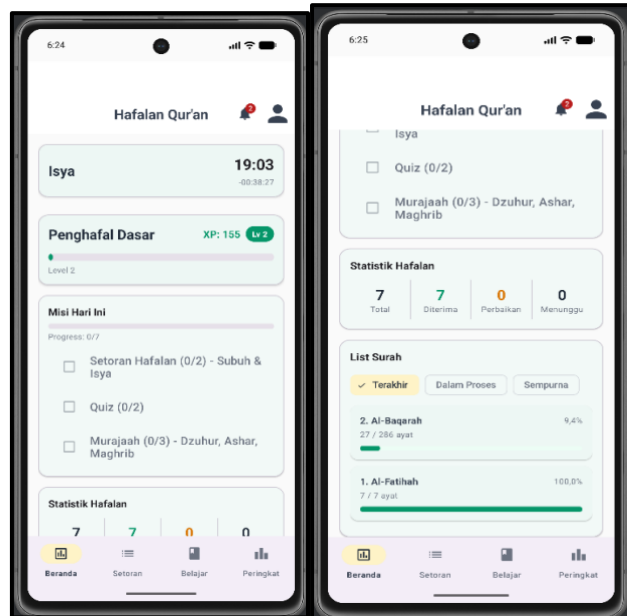


Fig. 2: Dashborad

The student dashboard displays key information regarding memorization activities—such as the volume of memorized material, progress, levels, and points—along with navigation menus for features like memorization submissions, quizzes, exams, and the leaderboard. This information helps students track their memorization progress in a more convenient and structured manner.

4.1.3. Memorization Recitation

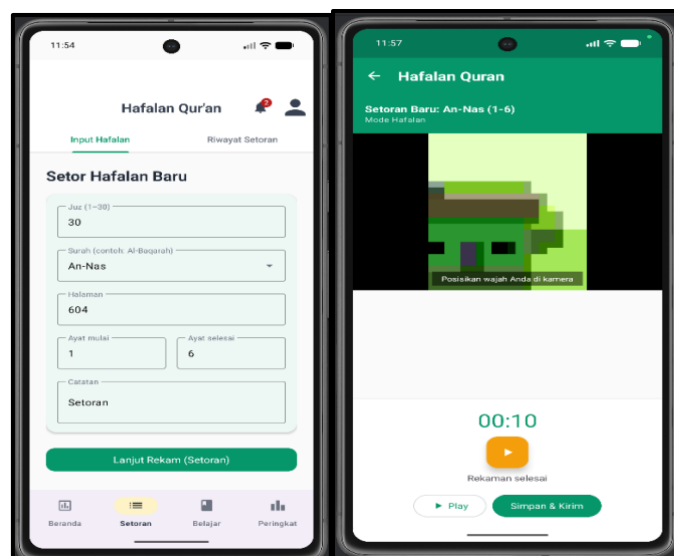


Fig. 3: Memorization Recitation

Students use this page to submit their memorization recitations to their teacher. They can select the specific *juz*, *surah*, page, and verses, as well as upload a recording of their recitation before submitting the data. Once submitted, the recitation awaits validation by the teacher.

4.1.4. Quiz Page

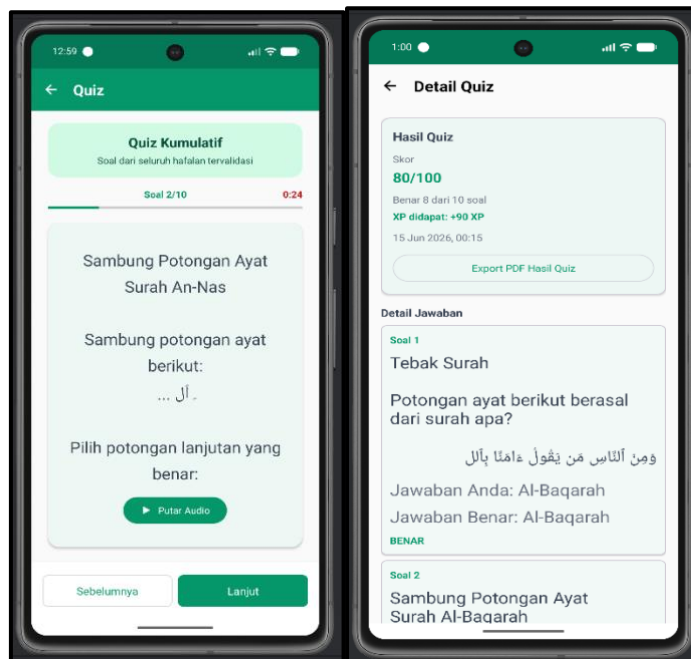


Fig. 4: Quis Page

The quiz page serves as a practice tool to assess the students' memorization skills. Questions are based on memorization material validated by the instructor. Scores achieved will influence point accumulation and level progression within the gamification system.

4.1.5. Ustadz Validation Page

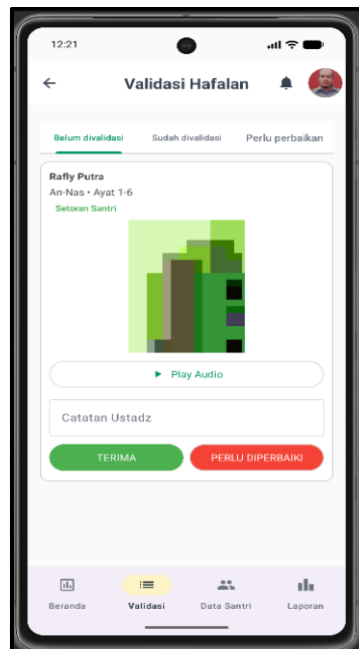


Fig. 5: Validation Page

The validation page is used by the *ustadz* (instructor) to review memorization submissions sent by students. The instructor can assign an "accepted" or "rejected" status and provide notes as feedback on the submitted memorization.

4.2. System Test Results

4.2.1. Black Box Testing

Black box testing was conducted to ensure that all application functions operate in accordance with the system's functional requirements. Testing covered the login feature, user data management, memorization submissions, memorization validation, practice sessions, quizzes, exams, the leaderboard, and reports. Based on the test results, all features performed correctly according to the designed scenarios; therefore, the application is confirmed to be functioning as intended.

4.2.2. White Box Testing

White box testing was conducted to evaluate the program logic within several key application processes. The test results indicate that the program flow operates according to the design and that every function executes without logic errors affecting system performance. Consequently, the application is capable of consistently performing data processing tasks in accordance with user requirements.

4.2.3. Questionnaire Testing

Questionnaire-based testing was conducted to assess the level of user acceptance regarding the developed application. The questionnaire was administered to 34 respondents, comprising 30 students (*santri*), 3 instructors (*ustadz*), and 1 administrator. The results indicate that the application achieved a user acceptance rate of 91.18%, placing it in the "excellent" category. These findings demonstrate that the application is user-friendly, facilitates the Quran memorization evaluation process, and meets user needs in supporting memorization assessment activities at Majelis Taklim Wasilatul Muhtadin.

5. Conclusion

This study successfully developed an Android-based mobile application for evaluating Quran memorization using the Software Development Life Cycle (SDLC) methodology with a prototyping model. The application features memorization submissions, validation by instructors, practice sessions, quizzes, exams, and a leaderboard, alongside gamification elements—such as levels, points, memorization progress tracking, and daily missions—designed to boost students' motivation to memorize the Quran. Black Box and White Box testing confirmed that all application functions operated according to system requirements, while questionnaire results indicated a user acceptance rate of 91.18%, classified as "excellent." Based on these findings, the application is deemed capable of facilitating the Quran memorization evaluation process, simplifying the monitoring of students' progress for instructors, and providing a more effective and engaging learning experience through the implementation of gamification..

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