

Q'FAST: Qada Fasting Mobile Application

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Abstract

'Fasting' during the month of Ramadan is a fundamental obligation in Islam. However, due to unavoidable circumstances such as illness, menstruation, travel, or pregnancy, Muslims may miss their fasts and are required to perform 'qada fasting' or pay 'fidyah'. Many individuals face difficulties in tracking missed fasts and accurately calculating fidyah payments. To address this issue, the Q'FAST – Qada Fasting Mobile Application was developed to assist the Muslim community in managing their 'fasting' obligations more effectively. The application enables users to record missed and completed fasts, calculate fidyah based on official state rates in Malaysia, and access educational information related to 'fasting' practices. The system was developed using Flutter and Firebase, following the Waterfall methodology to ensure a structured development process. A usability evaluation was conducted using the UMUX (Usability Metric for User Experience) questionnaire involving 10 users. The results indicate high user satisfaction and system performance, with satisfaction and efficiency achieving 98%, while effectiveness and ease of use recorded 96%. These findings demonstrate that the application is user-friendly, efficient, and capable of supporting users in managing their 'qada fasting' responsibilities. In conclusion, the Q'FAST mobile application provides a practical and accessible solution for tracking fasting obligations, improving record-keeping, and enhancing users' awareness and consistency in fulfilling their religious duties.

1. Introduction

'Fasting' throughout the month of Ramadan is one of the obligations that all Muslims must complete. However, certain individuals are excluded from performing this responsibility due to illness, travel, menstruation, pregnancy, or old age [1]. For individuals who are unable to fast, Islam allows them to make up missed fasts (qada) or pay 'fidyah' [2]. However, many Muslims have difficulty remembering the number of 'fasting' days that must be replaced and precisely calculating 'fidyah' [3]. The main objective for developing this application is to identify the requirements for a mobile application that focuses on recording the number of missed Ramadan fasts, reminding users to fulfil their 'qada fasting', and displaying the total 'fidyah' payment accordingly. Based on these requirements, the next objective is to design a 'qada fasting' reminder application that meets the identified needs. Finally, the application will be developed according to the established design to ensure that all key features function effectively and serve the intended purpose.

This study focuses on the development of the Q'FAST – Qada Fasting Mobile Application, which will primarily targets the Universiti Tun Hussein Onn Malaysia (UTHM) students and staff. However, it is also suitable for the general Muslim population. The software is intended to help users manage mandatory fasts, such as 'qada' 'fasting' for missed Ramadan days and 'nazar' fasts. Users can track the remaining number of days to be replaced. The software also has an optional reminder feature to help users maintain consistency in fulfilling their obligations. Users can input the date and cause for 'qada' and 'nazar' fasts, ensuring correct documentation and making fulfillment easy. Additionally, the application has an automated 'fidyah' calculator. Users can choose their status and state the number of missing days and years, and the app will compute the total 'fidyah' based on the official rates for each Malaysian state.

In today's technological age, people from all over the world have created a variety of applications. To construct this application, we must conduct extensive study to establish a firm foundation of needs for this application. Furthermore, it can help us discover the benefits that should be incorporated in this application to ensure that it can assist consumers in addressing their challenges. Many individuals remain uncertain about 'qada fasting' during Ramadan and manually computing 'fidyah' payments [4]. Manual reminders for 'qada fasting' and 'fidyah' computations can be mentally taxing and increase the likelihood of errors. To solve this issue, a literature review was done, followed by the development of a 'qada' puasa application using cutting-edge technology. The goal of this study is to get a better grasp of the computation of 'fidyah' for each state, as well as the multiplication calculation for 'qada fasting'.

1.1 Qada Fast Tracking and Fidyah Calculation Issues

Fasting during Ramadan is one of the pillars of Islam and is required of all adult Muslims. However, under specific circumstances, such as illness, menstruation, pregnancy, or travel, Muslims are permitted or compelled to suspend 'fasting'. The missed fasts must be completed after Ramadan. When it is not possible to make up fast before the next Ramadan, 'fidyah' is necessary. While the notion is thoroughly defined in Islamic jurisprudence, practical obstacles remain in its execution and understanding.

Many were unaware of the proper manner or quantity for making 'fidyah' payments, resulting in inconsistencies in practice. In particular, women always who missed multiple days per year due to menstruation or pregnancy, keeping an accurate record of missed fasts over time is a major issue. The lack of a formal or technological system to document these fasts frequently results in underreporting or forgetting entirely. This problem worsens in circumstances of long-term illness or chronic diseases, when people are unclear whether to conduct 'qada' later or provide 'fidyah' instead [5]. Recent research has also looked into the rising practice of paying 'fidyah' through internet platforms. While these platforms make 'fidyah' more accessible, there remain issues regarding the transactions' transparency and religious validity. [6] conducted an analysis of the utilization of platforms such as Kitabisa.com and discovered that users had conflicting attitudes about reliability and Shariah compliance.

Many struggle to distinguish between 'qada', 'fidyah', and 'kaffarah'. This misunderstanding may result in inappropriate religious practice, such as presenting 'fidyah' when 'qada' is required [7]. Furthermore, the various rulings among Islamic schools of thought, such as Hanafi, Shafi'i, Maliki and Hanbali, contribute to the confusion, particularly in multicultural communities. Despite the digital age, there are few user-friendly apps or systems for recording missed fasts, computing 'fidyah', and informing users about Islamic 'fasting' duties. Because of this technical divide, many Muslims must rely on recollection or informal methods, which increases the possibility of errors. Tools for combining religious regulations with digital convenience are noticeably lacking, particularly in local languages and cultural contexts [5].

1.2 Comparison between Existing Application

As a Muslim, remembering the number of days for making up missed fasts and the method of calculating 'fidyah' according to syariah is a primary issue for its implementation. Table 1 shows a comparison between existing systems. According to Table 1, many systems, including websites and mobile apps, have been established to assist users in tracking missed fasts and calculating 'fidyah'. However, each has different limits. The IKHLAS Fidyah Calculator [8] only estimates 'fidyah' at a fixed rate of RM2.00 per day, ignoring state-specific rates, which may be confusing. SAUM: Fast Tracker [9] focusses on tracking missed fasts and issuing reminders but does not include 'fidyah' calculations. Meanwhile, the 'Qadaa' [10] software logs missed fasts and prayers but does not keep track of voluntary (*sunnah*) fasting or even 'fidyah' payments. The features provided by all the aforementioned system of apps may not adequately address the different needs of users.

On the other hand, the IKHLAS Fidyah [8] Calculator only utilises a fixed rate and has no options for tracking missed fasts or scheduling reminders, forcing users to use alternative platforms. Meanwhile, SAUM: Fast Tracker [9] does not provide 'fidyah' calculation, and does not include a Hijri calendar. It is exclusively accessible for iOS only, limiting access to the non-iOS users. Similarly, the 'Qadaa' [10] app just tracks missed fasts and prayers, with no 'fidyah' computation or Hijri calendar. Its outdated design and Android-only availability further restrict

its usability. Therefore the existing platform, system or apps should include distinct features that are not present on others. Adding reminders and instructional sections can help users stay informed and carry out their obligations more successfully.

Table 1 Comparison between existing applications

Feature	IKHLAS Fidyah Calculator	SAUM: Fast Tracker	Qadaa Application
Developer	Ikhlas Com Travel & Umrah Sdn Bhd	Barakah Digital LLC	Mohamad-Reda Daoudi
Platform	Web-Based	iOS only	Android only
Main Function	'Fidyah' calculation and online payment	'Qada' fast tracking and reminders	'Qada' prayer and fast tracking
Application Performance	Providing a function for easy 'fidyah' calculation that can be accessed on any internet enabled device.	Smooth performance during use because it runs on iOS.	Functions to determine the number of missed fasts but have poor performance because it is rarely updated.
Application Weakness	Does not provide the value of 'fidyah' rates according to states throughout Malaysia and lacks a function to calculate the number of days for 'qada fasting'.	Cannot be accessed by Android users and has no function for calculating 'fidyah' payments.	An unappealing interface and no function for calculating the rate of 'fidyah' payments.

2. Method

The waterfall methodology was adopted for the development of this application, as illustrated in Fig. 1. This approach enforces a sequential progression of project phases, thereby enhancing the structure and efficiency of the development process.

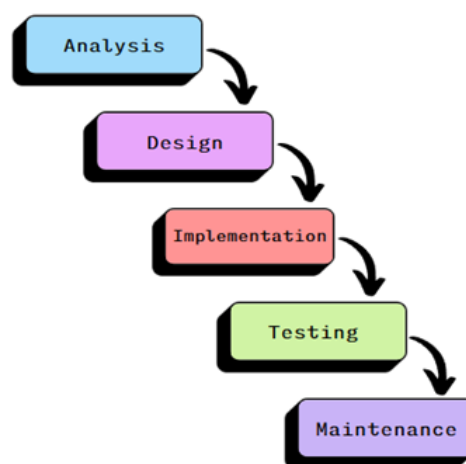


Fig. 1 Waterfall Methodology

2.1 Analysis

In the analysis phase, the project has been clearly defined based on the main objective, which is to develop a 'qada fasting' and 'fidyah' calculation application that helps users record the number of 'qada fasting' days that need to be replaced and calculate the total 'fidyah' payment that needs to be completed. Detailed preliminary research has been conducted to assist in the development of this application. Several surveys related to the development of the 'qada fasting' application and the calculation of 'fidyah' have been conducted, including demographic questions covering age groups, gender, and whether users have ever replaced their fasts or performed 'qada fasting' before. Next, we also posed questions about how users recorded their previous 'qada' fasts and whether they knew how to calculate the 'fidyah'.

2.2 Design

Various steps have been taken to ensure that the design of this application is suitable for users of all age groups. Among the design aspects that have been implemented are system architecture, user interface (UI) design, and database structure. This design focuses on the layout of the application, which includes the 'qada fasting' recording page, the manual and automatic calculation page, the information page, and the settings page. Next, the database structure has been planned to ensure that all information, such as the number of 'qada fasting' days, the total number of fasts completed, user information such as email, and the 'fidyah' rate according to the state, will be stored in an orderly and systematic manner. This design aims to ensure the usability of the application among all user groups, particularly the elderly, as well as to guarantee an optimal user experience. Therefore, the results from this design phase will serve as an important guide in the comprehensive development of the Q'FAST - Qada Fasting Mobile Application. Fig. 2 shows the storyboard of this project.

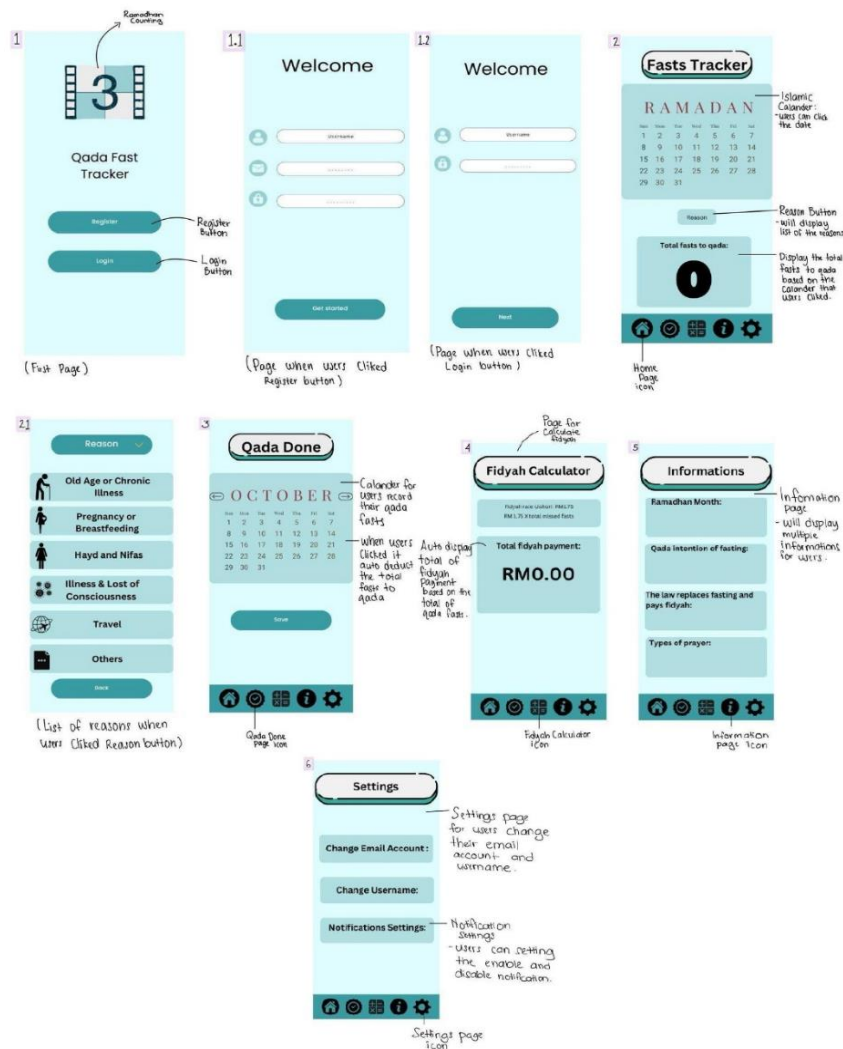


Fig. 2 Storyboard

2.3 Implementation

The 'qada fasting' mobile application was developed with modern tools and technology to ensure efficiency, scalability, and ease of maintenance. Visual Studio Code (VS Code) was chosen as the primary programming tool because of its lightweight yet powerful features. The programming language used is Dart. Google developed an open-source, general-purpose programming language. It is intended to develop quick and responsive user interfaces, particularly for mobile and web applications. Dart is the fundamental language of the Flutter framework, which allows developers to create high-performance, cross-platform applications with a single codebase.

Visual Studio Code was installed as the primary Integrated Development Environment (IDE), providing a good platform for coding, debugging, and testing. The database was built with Firebase and has a structure suited to hold user records and other vital information. The project setting begins with the creation of a new Flutter project in Visual Studio Code. The application employed a modular folder structure to segregate diverse features including UI components, logic, services, and data administration, which improved code readability and maintainability. The codebase was kept clean and scalable by utilising Flutter's built-in widget structure and state management capabilities. The pubspec.yaml file was used to manage dependencies and contains critical packages like firebase_core, cloud_firestore, and provider for state management. This design allowed for the successful integration of backend services and UI elements, resulting in a well-organized and robust mobile application development process for tracking 'qada fasting' information.

2.4 Testing

During the testing phase of our methodology, we took a user satisfaction survey to assess the effectiveness and usability of Q'FAST - Qada Fasting Mobile Application. As shown in Fig. 3, 80% of users evaluated their overall satisfaction as a 5, with the remaining users giving 20% rating it a 4. No users submitted ratings lower than 4, suggesting that the application was well received. This excellent response shows the app's effectiveness, satisfaction, ease of use and efficiency in meeting users' demands for managing their 'qada fasting' responsibilities.

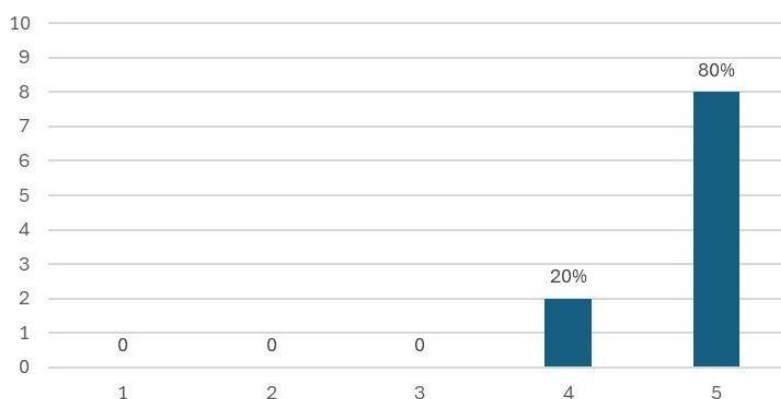


Fig. 3 Surver Result

2.5 Maintenance

Following the first deployment of the Q'FAST - Qada Fasting Mobile Application, maintenance is critical for guaranteeing long-term stability, performance, and satisfaction for users. Regular maintenance includes monitoring the app performance, identifying the problems occurred, and upgrading features in response to user feedback. Firebase's real-time database and analytics capabilities enable the development team to quickly track usage patterns and identify technical concerns. Additionally, security dependency and patch updates will be done on a regular basis to ensure program safety and compatibility with the most recent mobile operating system versions. Future updates will take into consideration user suggestions such as introducing a password recovery tool, updating the layout, and enabling bilingual language support in order to improve usability and accessibility. The current maintenance ensures that the app stays functioning, relevant, and useful to its users over time.

3. Results

The 'qada fasting' mobile application is designed to make it easier for users to log missed fasts, resulting in better time management for 'qada'. The system strives to satisfy the user's individual demands by incorporating important features and using modern technology, providing another alternative for 'fidyah' computation if the user is unable to perform 'qada fasting'. The project's outcomes and user's feedback analysis will be detailed in the following sections.

3.1 Track Missed Fast Module

The 'Track Missed Fast Module' enables users to record and manage missed fasts in an orderly and effective manner. Users can label missed fast days on the calendar by entering details such as the date and reasoning for the missed fast using user-friendly forms (refer Fig 4). The entered data is later securely stored in Firebase

Firestore, allowing for real-time access and updates across devices. The application also allows users to delete entries via the reset button, providing them with authority over their fasting data. By keeping an up-to-date log of missed fasts, this module helps users be accountable and consistent in meeting their duties.

3.2 Track Qada Done Module

The 'Track Qada Done' module allows users to mark and track the 'qada fasting' that they had performed successfully (refer Fig 4). When a user sees a missed fast, they can change the status by a tap on the calendar to indicate the completion of the 'qada fasting'. The module communicates with the database in real time, updating the related fasting record and making sure that the user's fasting progress is accurately documented. The displayed data helps users identify remaining and completed fasts. This module plays a crucial role in enhancing user motivation and accountability since it gives a clear and systematic approach to track one's progress towards meeting 'qada' commitments.

3.3 Fidyah Calculator Module

The 'Fidyah Calculator' module helps users calculate the amount of 'fidyah' they may need to pay for missed fasts that cannot be replaced for specific reasons, such as menstruation, pregnancy, chronic illness or old age (refer Fig 4). When users enter the number of missed fasts and choose a specified state for the current 'fidyah' rate, the module will calculate the total sum that needs to be paid. The 'fidyah' rate exactly matches the current rate in the specified state. Users can also receive an auto-calculated amount of 'fidyah' depending on incomplete 'qada fasting' days. The calculation is performed locally within the app to deliver immediate results, giving users an easy and quick way to comprehend their commitments. This module is especially useful for users who are confused about how to calculate 'fidyah', making the app more complete in terms of meeting various fasting-related demands according to Islamic guidelines.

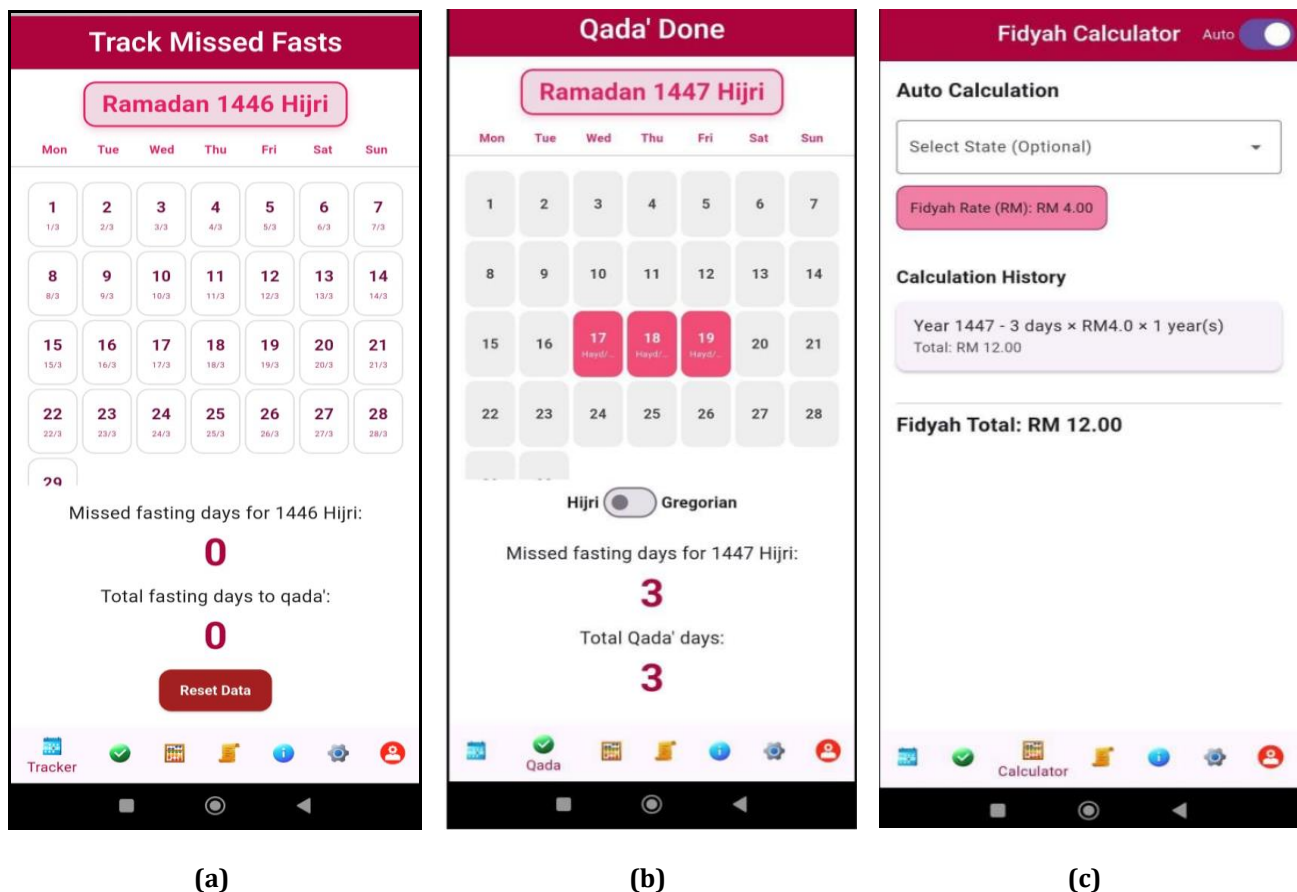


Fig. 4 User Interface for (a) Track Missed Fast; (b) Qada Done; (c) Fidyah Calculator

3.4 Information Module

The 'Information' module provides users with important knowledge and guidance about 'qada fasting' and Ramadan. It has a countdown feature that displays the number of days before the next Ramadan, allowing users to keep on track for completing missed fasts. Furthermore, the module discusses the 'niyyah' (intention) for 'qada fasting', the norms and principles for 'qada' and 'fidyah', and the many forms of prayers performed during Ramadan. By gathering a wide range of resources in a single place, the module was provided as educational information for individuals looking to better understand and carry out their religious obligations. The content is presented in a clear and easy to understand way to ensure that it is accessible to users from different backgrounds.

3.5 Setting Module

The 'Setting' module enables users to manage and change their personal preferences within the application. It contains a dark mode feature, which lets users switch between light and dark themes for improved visual comfort, particularly in low-light situations. Users can also change their registered email address to keep their account information updated. A logout function is also available, allowing users to securely sign out of their accounts as needed. This module improves the user experience by providing flexibility, personalization, and enhanced account security.

3.6 Feedback Analysis

The effectiveness of Q'FAST - Qada Fasting Mobile Application in handling 'fasting' data and 'fidyah' calculations was assessed using the UMUX (Usability Metric for User Experience) questionnaire administered via an online survey. The poll was delivered to 10 users of the product which includes UTHM students and staff, who represent the application's primary target users. The feedback gathered during this phase was utilised to evaluate user's satisfaction, opinion on the ease of use, the product's efficiency and effectiveness.

Fig. 5 depicts the findings of a UMUX (Usability Metric for User Experience) survey done to assess the Q'FAST - Qada Fasting Mobile Application from the users' perspective. The chart assesses four major usability aspects: effectiveness, satisfaction, ease of use, and efficiency. Based on user feedback, satisfaction and efficiency obtained the highest marks, both at 98%, suggesting that users regarded the program to be highly satisfying and capable of assisting them in efficiently managing their 'qada fasting' responsibilities. Meanwhile, both effectiveness and ease of use received 96% ratings, indicating that users found the application to be very functional and easy to operate. These consistently high ratings across all areas indicate a positive user response and prove that the application achieves its usability objectives. The findings also indicate that users, particularly those unfamiliar with mobile technology, were able to use the app efficiently and successfully. Overall, the UMUX study shows that Q'FAST - Qada Fasting Mobile Application provides a user-friendly and efficient experience while achieving its intended objective.

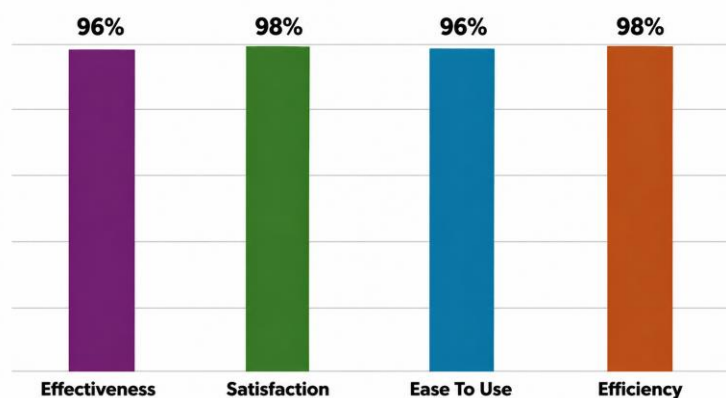


Fig. 5 The UMUX analysis for the Q'FAST - Qada Fasting Mobile Application

4. Conclusion

This study presented the development and evaluation of the Q'FAST - Qada Fasting Mobile Application, designed to assist Muslims in managing 'qada fasting' and 'fidyah' obligations in a structured and efficient manner. The application integrates key features such as tracking missed and completed fasts, automatic fidyah calculation based on state rates, and educational resources to enhance users' understanding of 'fasting' practices. The usability evaluation using the UMUX questionnaire demonstrated positive user acceptance, with satisfaction and efficiency achieving 98%, while effectiveness and ease of use recorded 96%. These results indicate that the application is user-friendly, efficient, and capable of supporting users in fulfilling their religious responsibilities.

accurately and consistently. Despite the positive outcomes, several improvements can be considered for future development, including the integration of in-app tutorials, password recovery functionality, improved interface design, and bilingual language support. Overall, the Q'FAST application provides a practical digital solution that enhances awareness, improves record-keeping, and supports users in managing their 'fasting' obligations effectively.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper; **studies of concept and design:** Ain Aziz; **data collection:** Nur Aisyatul Balqis Saiful Faizal; **analysis and interpretation of results:** Nurnabila Mahmod and Rosfuzah Roslan; **draft manuscript preparation:** Ain Aziz, Nur Aisyatul Balqis Saiful Faizal, Nurnabila Mahmod. All authors reviewed the results and approved the final version of the manuscript.

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