Watch My Calorie: An Intelligent Mobile App for Personalized Nutritional Insights

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Abstract— **Watch My Calorie is a mobile application designed to help users monitor daily calorie intake and support a healthier lifestyle. It offers personalized features such as meal tracking, BMI calculation, nutritional insights and tailored health recommendations. Although many calorie tracking apps exist, they often lack strong personalization and user-friendly interaction. This highlights the need for a more intuitive and visually engaging solution. The app was developed using Flutter and Firebase through an iterative process informed by user surveys and usability testing. Results showed high user satisfaction, especially among university students and young adults, due to its simplicity and essential features. Specifically, the app achieved a User Acceptance Testing (UAT) score corresponding to a 96.83% for usability experience rating and 97% of participants able to navigate the app without difficulty and found key features such as meal logging, BMI calculation and calorie graph visualization that are highly beneficial for managing dietary intake and making informed food choices. Furthermore, 96.67% of users demonstrating strong trust and satisfaction, stated that the app to be a dependable and useful resource for tracking calories. By providing visual data analytics and recommendations based on activity level and health conditions, Watch My Calorie contributes to the expanding field of digital health interventions and encourages long-term health awareness and positive behaviour change.**

Keywords: dietary intake, calorie tracker, nutritional insight, personalized healthy lifestyle, tailored health recommendation.

I. INTRODUCTION

Poor dietary habits and sedentary lifestyles have led to increasing health issues, particularly obesity and non-communicable diseases (NCDs), across various populations. According to the World Health Organization (WHO), rates of overweight and obesity continue to rise in Southeast Asia, especially in Malaysia. One effective approach to addressing this problem is the use of mobile health (mHealth) applications, which allow users to track nutrition, access health information, and modify their eating behaviours.

However, studies indicate that many commercial apps such as Google Fit and MyFitnessPal often fail to meet local needs due to limited cultural adaptation, complex interfaces or insufficient personalised feedback [5], [11]. This further highlight the necessity for localized food databases, Bahasa Malaysia support and culturally relevant guidance when designing calorie-tracking apps for Malaysian users.

To bridge these gaps, Watch My Calorie was developed as a user-friendly, regionally tailored solution for Malaysian young adults. Built with Flutter and Firebase, it features meal logging, personalized health suggestions, calorie analysis and BMI-based insights. With an emphasis on simplicity, clarity and accessibility, the app aims to help users make informed nutritional decisions through a modern, intuitive interface.

Watch My Calorie prioritizes visual and personalized feedback to enhance user engagement. The development followed an iterative, user-centered approach, enabling early testing and refinement based on real user experiences. A field evaluation was also carried out to assess the app's performance in real-life use and identify areas for future improvement.

II. METHODOLOGY

A. Development Framework

The development of Watch My Calorie mobile app used the V-Model methodology, which selected for its structured verification-and-validation workflow. It is a software development technique that stresses a parallel interaction between development and testing phases [6]. This approach used to ensure high accuracy, strong reliability and systematic testing that important for health-related tools.

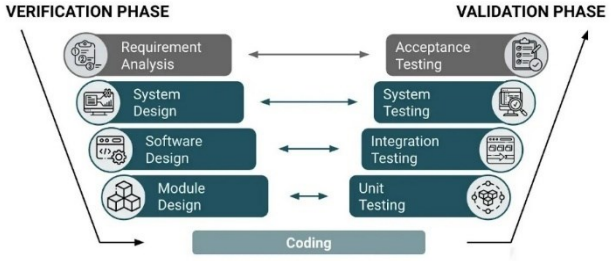


Fig. 1 V-Model Methodology

B. Verification Phases

1) Requirement Analysis:

User needs were gathered via surveys and literature review. The app main features such as meal logging, BMI computation, calorie tracking, personalized health insights were finalized.

2) System Design:

The system was built using Firebase for authentication, storage and real-time updates. UI wireframes focused on

minimalism, clarity and intuitive navigation simple to improve usability and match young users' expectations [12].

3) Software Design:

Modules such as BMI calculation, meal logger, water intake and recommendation engine were defined for seamless backend–frontend integration. The aim was to ensure a smooth flow of data and a seamless user experience, supporting personalized health outputs [9].

4) Module Design:

Five major modules were designed within the app:

- User Registration
- Meal Logging
- Calorie Log
- Calorie Analysis
- Profile

This is to ensure data consistency, reusability and smooth information flow.

5) Implementation:

Flutter and Dart were used as front-end development. For profile creation and ongoing recommendations, BMI calculation was applied in the app [13]. This calculation helps users in identifying if they fall in underweight, normal weight, overweight or obese, according to World Health Organization (WHO) standards. Daily water intake also included which helps users track hydration [2]. Charts were implemented for calorie intake visualization to enhance user engagement and awareness [10].

$$\text{BMI} = \frac{\text{Weight (kg)}}{[\text{Height (m)}]^2}$$

$$\text{Daily Water Intake (ml)} = \text{Weight (kg)} \times \text{Base Water (ml/kg)} \times \text{Activity Multiplier}$$

C. *Validation Phases*

6) Unit Testing:

Ensured accuracy in BMI calculations, input handling, and calorie computations.

7)Integration Testing:

Modules were then combined and tested as a complete system to confirm that inputted meals affected calorie graphs and that BMI values influenced the app's health suggestions accurately. This to ensure it align with the app's goal of real-time, personalized feedback [1].

8)System Testing:

This phase performed on physical Android devices to assess speed, UI responsiveness and Firebase synchronization.

9) Acceptance Testing:

Involved 30 real users consists of UUM students and staffs. Participants performed real-life application tasks and completed a structured usability survey using a 6-point Likert scale. The results showed high satisfaction in ease of use and relevance of features, confirming its alignment with user expectations [5], [8].

III. SYSTEM IMPLEMENTATION

The interface was designed to support smooth navigation for first-time users. Key screens of the app included:

1) Sign-Up Page: Collects user details (age, gender, height, weight, health issues) for BMI and personalized recommendations.

2) Home Page: Displays daily calorie summary and shortcuts to Add Meal, Calorie Log, Calorie Analysis and Profile.

3) Add Meal Page: Allows users to log meal entry by name, calories, category and date. Below the form, the app provides personalized suggestions or health alerts based on the user's BMI and meal input. This supports better decision-making at the point of entry.

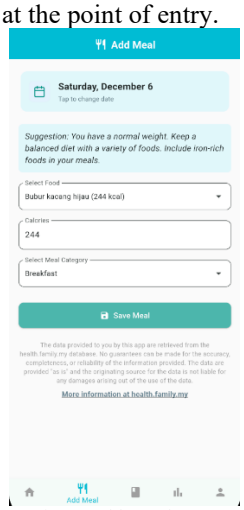


Fig 2. Add Meal Page

4) Calorie Log Page: This screen shows a list of meals that have been logged for the day. Each entry includes the meal name, calories, and portion details. This will help users stay aware of their daily intake and hydration.

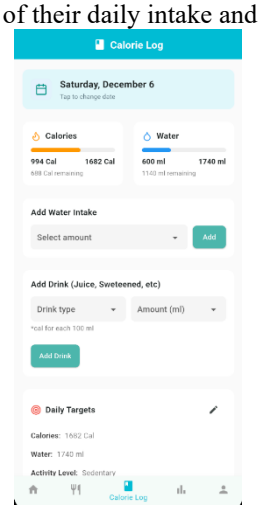


Fig 3. Calorie Log Page

5) Calorie Analysis Page: Shows weekly calorie-intake bar charts categorized by meal types. This will help users by providing a clear visual breakdown of eating patterns and supports reflection and progress tracking over time.

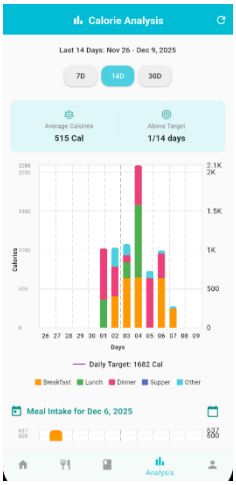


Fig 4. Calorie Analysis Page

6) Profile Page: Displays BMI status, personal details, and visual BMI indicator. This design emphasizes simplicity, cultural familiarity and visual clarity of which factors shown to enhance long-term engagement.

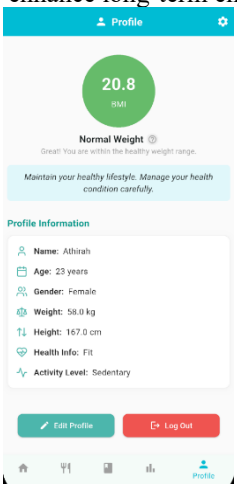


Fig 5. Profile Page

IV. RESULTS AND DISCUSSION

1) Usability Experience

Participants rated overall usability at 5.81/6, highlighting the app's clean layout, intuitive navigation, and minimalistic design. This shows that simplified interfaces significantly enhance user engagement and reduce cognitive load in calorie-tracking apps.

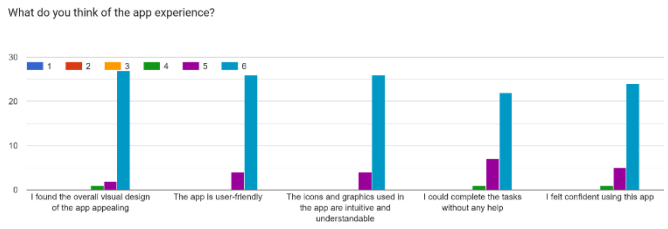


Fig 6. Usability Experience

2) Perceived Usefulness

The perceived usefulness scored 5.82/6. Users indicated that features such as automatic BMI calculation, weekly calorie trends and localized food options supported their nutritional decision-making.

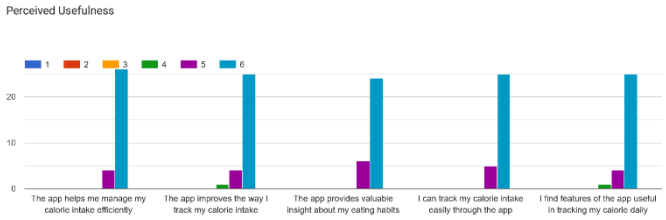


Figure 7. Perceived Usefulness

3) Perceived Acceptance

Perceived acceptance averaged 5.79/6, with users expressing confidence in the app's reliability and believed it was a trustworthy tool for daily calorie tracking.

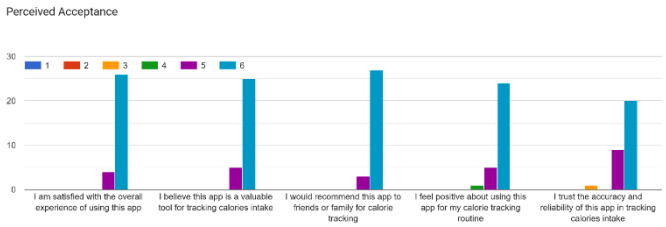


Figure 8. Perceived Acceptance

V. SUMMARY OF FINDINGS

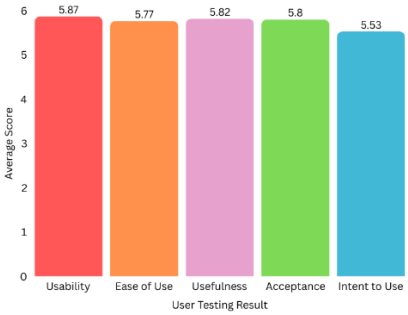


Fig 9. Average of Field Test Findings

Figure 9 illustrates the average bar graph of the Watch My Calorie user testing results, which show strong positive outcomes across all evaluation dimensions. Usability experience recorded an average score of 5.81/6, reflecting positive reception of the intuitive interface, clear layout and overall user-friendly design.

For features and functionality, the app scored 5.77 for perceived ease of use and 5.82 for perceived usefulness. Users navigated the app effortlessly and identified core features such as meal logging, BMI calculation and calorie graph visualization as highly beneficial for managing dietary intake and supporting informed food decisions. These features were viewed as both informative and motivating for tracking health progress.

The acceptance dimension averaged 5.8, indicating strong trust and satisfaction with the app. The intention to use score of 5.53 further suggests high willingness to continue using the app and integrate it into daily routines.

User feedback also emphasized several strengths, including the simple and intuitive interface, meaningful visualizations of

calorie intake and progress and the cultural relevance of the localized Malaysian food database. Personalized recommendations based on BMI and activity level were also identified as highly useful for supporting health goals.These findings align with existing literature highlighting personalization, localization and ease of use as key factors driving user satisfaction and long-term engagement.

VI. IMPLICATIONS

The results from the field testing of Watch My Calorie highlight several important implications for mobile health (mHealth) application design, particularly in promoting healthier eating habits among young adults. The high usability and satisfaction scores suggest that a culturally relevant, user-centered app can significantly support users in managing their nutrition that support previous findings in effective calorie tracking tools positively impact eating behaviours [5].

A key implication is the importance of localization. Unlike many global apps that overlook regional dietary patterns, Watch My Calorie integrates familiar Malaysian foods, enhancing user engagement and usability. This aligns with literatures who emphasize that localized content is crucial for adoption and long-term use in diverse populations [3], [9]. The positive reception of personalized feedback, such as the BMI calculator and calorie intake graphs, reinforces the need for visual, actionable insights which the trend also noted in the work of Gioia et al. and Standen and Rothman [4], [11].

Additionally, the high intention to use scores suggest the app's potential for sustained engagement, especially if future updates address user suggestions like auto-calorie estimation and activity tracking. This finding supports Vlahu-Gjorgievska et al., who argue that personalization and simplicity are key drivers of long-term app use [15]. As digital health technologies expand, this app demonstrates how well-designed, localized mobile solutions can empower users to take control of their nutritional choices [1], [8].

VII. CONCLUSION

Watch My Calorie was developed as a mobile app to assist users in tracking their daily calorie consumption and encouraging healthier eating habits. Built using Flutter and Firebase, the app incorporates key features such as meal logging, BMI calculation, visual calorie tracking and personalized recommendations based on individual health data. It was designed with a localized focus for Malaysian users and followed the V-Model methodology throughout its development.

Findings from the field test with 30 participants revealed strong user satisfaction in usability, functionality and engagement. Users praised the intuitive design, cultural relevance and clarity of features like the BMI calculator and daily calorie graph. These results confirm the app's value in helping users understand their dietary patterns and make informed nutrition decisions.

User feedback also suggested future improvements, such as expanding the food database, automating calorie suggestions and integrating activity tracking. With these enhancements, Watch My Calorie could evolve into a more all-encompassing health platform. On the whole, the study demonstrates that well-designed, localized mobile health (mHealth) applications can effectively support nutrition awareness and contribute to public health goals among young adults.

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