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THE ASSESSMENT OF CALORIEMASTER THROUGH THE SYSTEM USABILITY SCALE

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Abstract:

The increasing prevalence of obesity worldwide and associated health issues suggest that there is an urgent need for successful digital health interventions. CalorieMaster is a digital solution that is designed to provide individuals with the ultimate tool to ensure they achieve a good health and fitness from their diet through advanced nutrition management. This proposed application provides users with simple tracking of their caloric intake, detailed macronutrient breakdowns, including those that are sugar-derived, as well as total sugars, and innovative graphics displaying easy-to-understand statistics on daily dietary habits. Features include a large food database, easy and simple tracking of foods, personalised meal plans based on weight loss goals and eating preferences, and dynamic progress monitoring with interactive charts. CalorieMaster's user interface and user experience are assessed in this paper, considering navigation, functionality and aesthetic design through a user-centred perspective. The outcomes of the evaluation include, for instance, high user satisfaction with respect to ease of use and intuitive interaction design on the one hand, as well as positive statements towards personalised meal recommendations and progress tracking. In addition, limitations were observed in the search feature and food database.

Introduction

The prevalence of non-communicable diseases (NCDs), obesity, and poor dietary habits has become a priority in global health concern in the 21st century (World Health Organization, 2024). Moreover, sedentary lifestyles and poor nutrition have contributed to a disquieting escalation in the number of obese individuals since 1975 (World Health Organization, 2025). Siddiqui et al. (2020) stated that people often consume food with high calories but low nutritional value. This led to the persistence of issues related to malnutrition and nutrient deficiencies. Malnutrition is defined as a dual burden, which, as recognised, is a critical public health menace that promotes the development of diseases such as diabetes, cardiovascular diseases, and certain cancers (Saxena et al., 2025).

Modern lifestyles often lead to complications, characterised by hectic and sedentary habits, which provide quick access to processed food, making it challenging for individuals to maintain balanced diets and healthy lifestyle patterns (Calella et al., 2024). In addition, dietary management or guidance is typically provided using in-person consultations but faces limitations regarding adherence, long-term efficacy or access to health services (Spinean et al., 2024). Therefore, new approaches that are creative, low-threshold, user-centric, and easy to use are necessary to provide the general public with opportunities to make healthier diet choices (Fitzpatrick, 2023). In response to this challenging estimate, various mobile health applications (mHealth) have been proposed as a promising approach that uses technology to provide support and education for individuals, as well as real-time monitoring of health or dietary behaviour. Furthermore, the potential of mHealth depends on its ability to reach a vast population at relatively low cost, making it a useful way to encourage healthy lifestyle behaviours and help manage chronic diseases (Spinean et al., 2024).

In this study, CalorieMaster has been designed as one of the mHealth applications or digital solutions aimed at promoting good health and well-being, aligning with Sustainable Development Goal 3 (SDG3). The design of CalorieMaster includes features to track the user's calorie intake, monitor their nutrition and set personalised health goals tailored to their individual needs. Beyond these features, CalorieMaster is expected to act as one of the educational platforms in raising awareness about the importance of balanced diets and the role of preventive health practices in reducing the risk of diet-related diseases.

Furthermore, an effective User Interface (UI) and User Experience (UX) play an important role in a user's acceptance of using an app. A well-designed UI provides clarity, aesthetic appeal, and consistency, allowing users to interact with and navigate an app easily. At the same time, UX ensures that apps function properly, are accessible, and meet the needs of users. Therefore, poor UI/UX designs can lead to user frustration and low adoption rates (Durgekar, 2024). Additionally, a user-centred approach to UI/UX is employed to benchmark CalorieMaster, and the System Usability Scale (SUS) is used for a systematic measurement of usability to pinpoint areas that require improvement. This study is anticipated to assist, specifically in identifying

key features among mHealth app developers and designers, for improving the UI/UX in the future.

Literature Review

mHealth applications are developed in conjunction with addressing the problems of obesity and diet-related issues (Scarry et al., 2022). Therefore, mHealth applications aim at encouraging people to adopt healthier lifestyles. mHealth applications offer real-time solutions for managing nutrition or dietary intake, tracking physical activity, and monitoring health outcomes (Ferrara et al., 2019). The most popular types of mHealth applications in this intervention segment are calorie-counting and nutrition management applications, which track dietary intake and help users achieve their personal health goals (Ferrara et al., 2019, Kim 2025).

According to Carter et al. (2013), paper-based tracking methods were less effective compared to the mobile platform. Mobile applications can help individuals stay on track with their calorie targets. Several studies confirm the efficacy of calorie-tracking apps in promoting weight reduction and sensitivity to personal diet. Additionally, features on mobile applications, such as personal dietary feedback and visualisation of evaluation, can enhance end-user engagement (Chen et al., 2020). Besides that, features such as a food database, barcode scanning, personalised meal planning, and dynamic progress charts are commonly integrated into mHealth applications to improve usability and sustain long-term engagement.

On the other hand, previous studies have highlighted that the success of mHealth applications is largely influenced by the design of the user interface (UI) and user experience (UX). Navigation that is not very intuitive, limited search options, and inaccurate food databases are some issues that can prevent continued use (Tang et al., 2015). Usability evaluation is thus important in determining the effectiveness of mHealth applications. The System Usability Scale (SUS) is one of the most commonly used instruments for measuring usability across different digital platform types, including nutrition and fitness apps (Brooke, 1996; Bangor et al., 2008).

Among calorie-counting applications, research indicates that the level of satisfaction is closely tied to intuitive designs, straightforward logging procedures for food intake, and personalised recommendations (Helander et al., 2014). Applications that manage to be both functional and simple tend to have a higher outcome in terms of long-term engagement and positive health behaviour effects. Gaps remain in optimising search functions, expanding culturally diverse food databases, and integrating adaptive recommendations tailored to meet individual dietary needs (Rahim et al., 2025).

Methodology

This study employed the Design Thinking (DT) process to achieve its goals. The DT is a design-based idea that emphasises solving problems by creating an innovation based on a human-centred problem (Fadilah & Sweetania, 2023; Fajarwati, Hamdi, & Gautama, 2023). It consists of several processes that start by asking the user and gathering their requirements, developing a new idea or solution of interest, preparing a representation version of that solution, and testing the solution to obtain feedback (Fadilah & Sweetania, 2023; Fajarwati et al., 2023). The DT consist of five stages known as emphasis, define, ideate, prototype and test.

Empathise

This stage focuses on gaining an in-depth understanding of the user through observation and interview. Therefore, the requirements and behaviours of end-users, such as individuals tracking their health and administrators, need to be studied. As the focus of the evaluation is on the UI/UX of CalorieMaster, a small sample size is required (Nielsen et al., 2020; Eva et al., 2025; Soegaard, 2025). Due to this matter, only seven respondents participated in this study.

Define

Next, the 'How-Might-We' (HMW) technique is employed to define the problem. The HMW technique can synthesise the information gained from the Empathise stage. This stage aims to define the key features that must be presented in the application, including user-specific requirements. For CalorieMaster, the features include the effectiveness of calorie tracking, personalised meal suggestions, and the ability to set clear objectives. Figure 1 shows an example of the HMW technique.
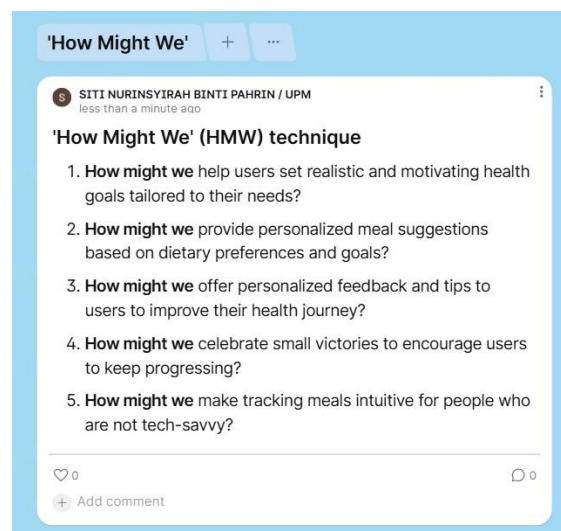

Figure 1. The example of the How-Might-We technique

Ideate

This stage encourages creativity and innovative thinking. Ideas or potential solutions are generated to solve the identified problems (Huda et. al, 2023). Therefore, this stage involves brainstorming ideas to improve CalorieMaster's user interface (UI) and user experience (UX), particularly in the areas of navigation, food logging and personalised insights (Huda et. al, 2023, Novia, Setiawan, & Matahari, 2023).

Prototype

After generating ideas, the next step is to create a prototype or a rough representation of the proposed solutions. For CalorieMaster, this includes sketching UI layouts, designing mock-ups of key features such as the food database and progress tracker, and developing a digital prototype that userscan interact with (Lu et al., 2025). This allows the process of visualising the concept and gathering initial feedback, refining the design iteratively based on user responses (dos Santos et al., 2021, Bostanchi, 2022).

Wireframe

During the initial design phase, a wireframe is used to outline the placement of essential elements, such as text, images, buttons, and content areas, without incorporating detailed visuals or real content (Yursal & Sari, 2023). Figure 2 shows the wireframe developed for CalorieMaster.
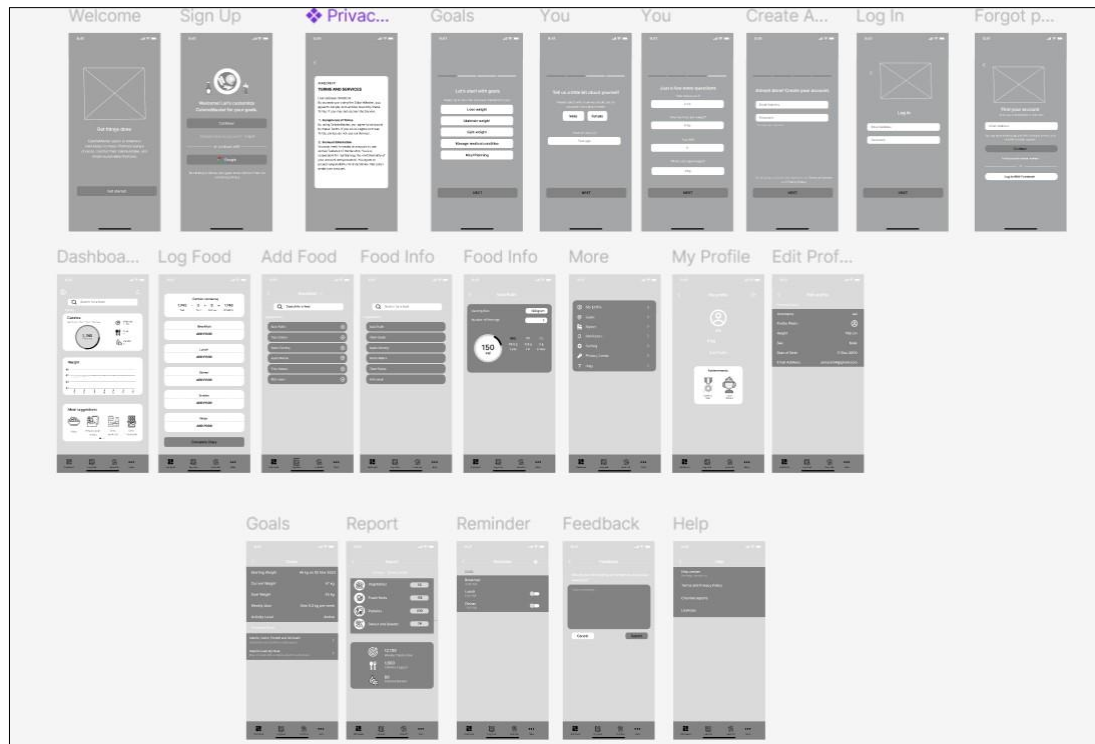

Figure 2. Wireframe CalorieMaster

Mock-up

Mock-ups are tools for visualising and refining the design and functionality of the CalorieMaster application before the development process begins (Bostanchi, 2022, Mardhiana et al., 2022). This process allows designers and stakeholders to evaluate layout, navigation, and usability early in the project. This ensures that CalorieMaster's design becomes more user-centric and aligned with user needs and preferences.

Figure 3 shows the mock-up of CalorieMaster. The design incorporates a built-in translation feature, enabling users to easily navigate and understand the app's functionalities. At the same time, contextual object overviews are included to provide clear insights and enhance comprehension. The mock-up emphasises simplicity and aesthetic appeal, ensuring the proposed interface is engaging and not complicated. The user-centric design makes CalorieMaster easy to use and enjoyable, providing users with a seamless and satisfying experience.
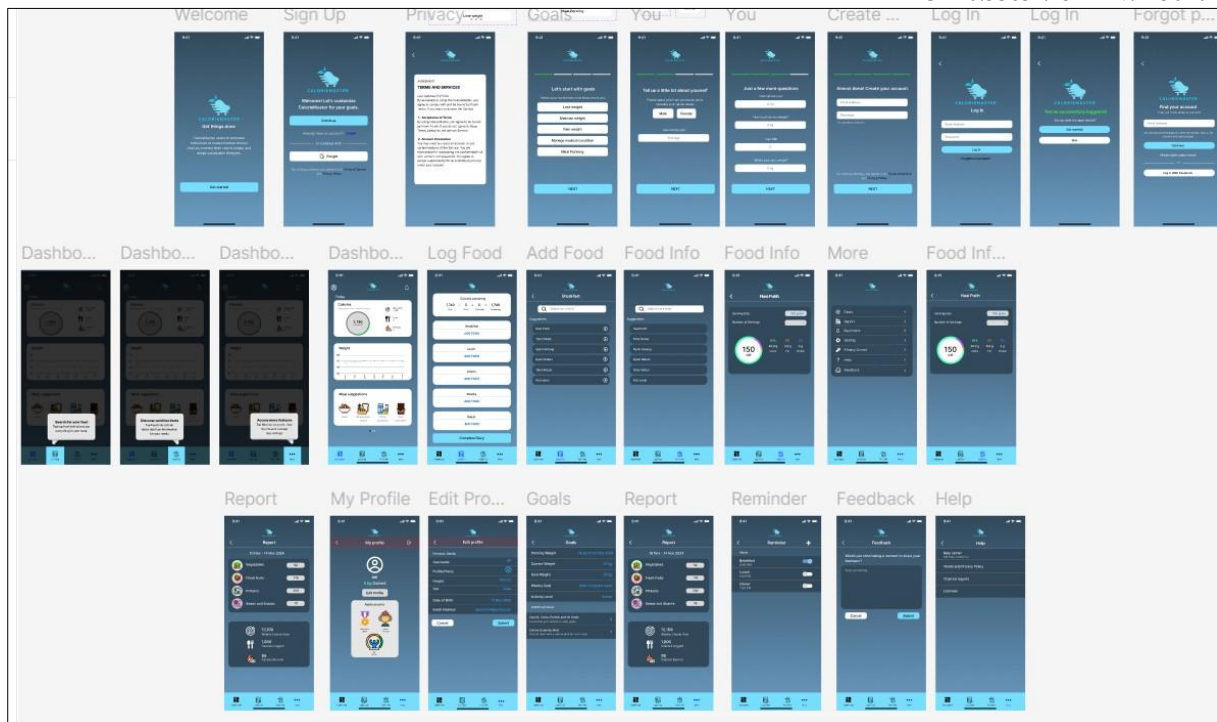
Figure 3. The Mock-up of the CalorieMaster

Test

The final stage involves testing the prototype with end-users to gather valuable feedback. For CalorieMaster, this stage is important because it involves understanding how the application's features work in practice. Table 1 presents the questionnaire used to evaluate CalorieMaster.

Table 1: The Questionnaire for CalorieMaster Assessment

No.	Question
1	I would use CalorieMaster frequently.
2	I find CalorieMaster unnecessarily complex.
3	I find CalorieMaster easy to use.
4	I think I would need the help of a technical person to use CalorieMaster.
5	I find the different features of CalorieMaster well-integrated.
6	I think there is too much inconsistency in CalorieMaster.
7	I imagine most people would learn to use CalorieMaster very quickly.
8	I find CalorieMaster very inconvenient to use.
9	I find CalorieMaster feel confident using CalorieMaster.
10	I needed to learn a lot of things before I could get going with

This study adopted the System Usability Scale (SUS) to evaluate CalorieMaster. The SUS is well-established because it is easy to use, straightforward, and provides overall user satisfaction (Mol et al., 2020; Vlachogianni & Tselios, 2022; Permatasari et al., 2025). This study was conducted with both pre-tests and post-tests. The pre-test can identify any early usability issues,

while the post-test assesses the effectiveness of changes or improvements (Peres, Pham, & Phillips, 2013). These scores provide valuable insights to evaluate the progress of application development and guide improvements for a better user experience. The following are the steps in analysing the SUS score:

1. The SUS is calculated by adjusting the responses to the questionnaire.
2. For odd-numbered items (Q1, Q3, Q5, Q7, Q9), 1 was subtracted from the original score.
3. For odd-numbered items (Q1, Q3, Q5, Q7, Q9), 1 was subtracted from the original score.
4. For even-numbered items (Q2, Q4, Q6, Q8, Q10), the adjusted score was obtained by subtracting the given score from 5.
   o Example: if Q1 was rated as 3, the adjusted score = 3 – 1 = 2.
   o Example: if Q2 was rated as 3, the adjusted score = 5 – 3 = 2.
5. The adjusted scores from all ten items were summed.
6. Then, the total was multiplied by 2.5 to obtain the overall SUS score.

Finally, the SUS score interpretation analysis for CalorieMaster was carried out based on Figure 4.
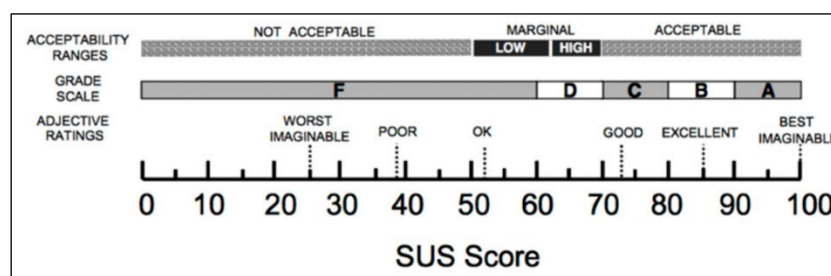

Figure 4. The SUS Score's Interpretation
Source: (Setiyawati & Bangkalang, 2022)

Results and Discussion
A total of seven respondents participated in both the pre-test and post-test usability evaluations of the CalorieMaster application. The same participants were involved in both sessions to ensure consistency in feedback and comparative analysis. Table 2 presents the raw score and Table 3 shows the adjusted SUS scores obtained from the pre-test. This study reveals that the average SUS score for the pre-test is 76.00. This indicates that the initial design of CalorieMaster falls within the range of Grade B and is categorised as "Good". In addition, there are several usability issues been addressed by respondents, such as the following:

i. Lack of Visual Content: Users recommended including more images of food items to improve clarity and visual appeal.
ii. Search Functionality Challenges: Participants frequently reported difficulty locating specific food items within the database.
iii. Navigation Flow Issues: Users reported inconsistencies in navigation, such as being redirected to unintended pages when returning to the home screen.

These findings align with broader research emphasising the importance of intuitive navigation and visual design in mobile applications to enhance user engagement and satisfaction (Majumder, 2025).

Table 2: The Respondents' Scores (pre-test)

Respondent	Item (Question)									
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	5	3	4	3	4	2	3	3	4	3
2	5	5	5	4	5	1	5	1	5	2
3	5	4	5	3	3	3	5	2	5	3
4	5	5	5	3	5	1	5	1	5	3
5	5	5	5	1	5	1	5	1	5	1
6	3	3	5	1	5	3	5	1	5	1
7	4	3	4	5	4	2	5	5	5	4

Table 3. The Pre-test Results

Respondent	Item (Question)										Sum	Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	4	2	3	2	3	3	2	2	3	2	26	65.00
2	4	0	4	1	4	4	4	4	4	3	32	80.00
3	4	1	4	2	2	2	4	3	4	2	28	70.00
4	4	0	4	2	4	4	4	4	4	2	32	80.00
5	4	0	4	4	4	4	4	4	4	4	36	90.00
6	2	2	4	4	4	2	4	4	4	4	34	85.00
7	3	2	3	0	3	3	4	0	4	1	23	65.00
Average Score												**76.00**
Description / Grade												**Good/B**

Following the implementation of design improvements based on pre-test feedback, the post-test results (Tables 4 and 5) indicated a marked enhancement in usability. The average SUS score rose to 90.71, placing the application as Grade A, which is considered "Excellent". The point increase in the SUS score indicates a substantial improvement in user experience. Most respondents achieved scores above 90, indicating high satisfaction with the updated interface. Improvements included the enhanced visual presentation of food items, refined search functionality with better categorisation and streamlined navigation paths to reduce user confusion. These updates reflect best practices in adaptive UI/UX design, where user feedback is leveraged to personalise and optimise the interface for better usability outcomes (Liu et al., 2024; Lu et al., 2025).

Table 4: The Respondents' Scores (post-test)

Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	3	1	5	1	5	1	5	1	5	1
2	5	2	5	3	5	1	5	1	5	1
3	5	1	5	2	5	1	5	1	5	2
4	4	2	4	2	3	4	4	4	4	2
5	5	1	5	3	5	1	5	1	5	1
6	5	1	5	1	5	1	5	1	5	1
7	4	1	5	1	4	1	5	1	5	1

Table 5. The post-test results

Respondent	Item (Question)										Sum	Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	2	4	4	4	4	4	4	4	4	4	38	95.00
2	4	3	4	2	4	4	4	4	4	4	37	92.50
3	4	4	4	3	4	4	4	4	4	3	38	95.00
4	3	3	3	3	2	1	3	1	3	3	25	62.50
5	4	4	4	3	4	4	4	4	4	4	39	95.00
6	4	4	4	4	4	4	4	4	4	4	40	100.00
7	3	4	4	4	3	4	4	4	4	4	38	95.00
										Average Score		**90.71**
										Description / Grade		**Best Imaginable/ A**

The usability evaluation of CalorieMaster with the SUS method demonstrates that iterative design driven by user feedback can significantly improve the user experience. The transition from a "Good" to "Best Imaginable" in usability rating shows the effectiveness of targeted UI/UX enhancements. These findings support the continued use of SUS as a reliable tool for usability assessment in mobile applications, especially when combined with qualitative feedback mechanisms (Khan et al., 2025; Suria, 2024).

Conclusion

The CalorieMaster application provides calorie tracking and health management features, including monitoring dietary habits. The main feature of CalorieMaster is its simplicity and core functionality. Based on the SUS evaluation, this proposed application requires improvement in terms of navigation and layout, as these aspects can significantly impact overall usability. By addressing these concerns and implementing the suggested improvements, the application can deliver a more intuitive and engaging user experience. Enhancing these aspects has the potential to significantly increase user retention and satisfaction, ensuring that CalorieMaster remains a competitive and valuable resource for its audience in the long term.

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