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# User Experience Design for Nutrition Information Applications using Design Thinking

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***Abstract*****—** A healthy diet serves as one of the aspects of one's fitness and understanding of caloric value. The present study aims to design a user experience for mobile nutrition apps using Augmented Reality technology. Solutions are designed using design thinking stages, including empathize, define, ideate, prototype, and testing. Data related to reasons, frustration, goals, and target users are collected at the empathize stage. At the define stage, the empathy map and Personas are created. A prospective user journey map and information architecture are generated in the ideating stage. Wireframes and mockups are generated in the prototype stage. Finally, usability testing (i.e., task scenarios) evaluates the learnability (100%) and efficiency (0.067 goals/sec) aspects, and SUS assesses the satisfaction aspect. The satisfaction aspect score was 85, indicating a high acceptability level, B grade scale, and excellent adjective rating.

***Index Terms*****—UX Design, Nutrition App, Design Thinking**

## I. Introduction

A healthy lifestyle is a prerequisite for good health and is indispensable for people to maximize their potential [1]. A healthy lifestyle reduces the risk of a range of diseases and can be achieved, among others, by fulfilling daily fluid and nutritional needs, regular exercise, and a good diet [2]. Unfortunately, people are increasingly suffering from chronic diseases due to an unhealthy lifestyle [3]. From 2013 to 2018, Indonesian public health data issued by the Indonesian Ministry of Health stated an increase in the number of people with hypertension from 25.8% to 34.1%, obesity rate from 14.8% to 21.8%, and diabetes mellitus from 6.9% to 8.5% [4].

People on a diet need the proper calorie intake daily [5]. Without a specialization in health & nutrition-related fields, remembering the caloric values of foods is cumbersome [6]. Nowadays, mobile nutrition apps are available in App stores to help monitor food intake or calories consumed daily [7]. For example, nutritional calculators have been useful in calculating calories, and supporting diet programs. However, the applications require users to register food components manually. Furthermore, mobile nutrition apps that use image processing to provide information on calories from captured images or apps that display calorie data from databases are also available.

Augmented Reality (AR) technology can support the community in exercising their diet program [8], [9]. AR is a technology that places computer-generated images in the real world by adding a programmed layer on top of actual reality to create a dynamic third level of augmented experience. AR on mobile is possible [10], [11]. Smartphones can visualize virtual objects and real objects via the camera. With AR apps, instead of just viewing information, users interact with them and receive immediate feedback about their actions [12], [13]. For example, users may obtain food nutritional values on their smartphone screens by pointing their smartphone camera to real foods.

Good mobile applications consider users' needs [14]. User experience (UX) research plays a vital role in discovering and designing solutions in meeting user needs [15]. UX research enables a design for a simple application with adequate features and can be used anytime and anywhere on various platforms [16], [17].

Design thinking has been useful in designing user experience for mobile applications [18]. Design Thinking is instrumental in tackling obscure or unknown problems by reframing the problem in a human-centered focus, generating ideas in brainstorming sessions, and adopting a hands-on approach to prototyping and testing [19]. Design thinking allows designers to empathize with users, define core problems, facilitate idea generation, guide prototyping processes, and advise testing mechanisms [20].

The present study aims to design user experience for a mobile nutrition application with AR technology using design thinking. This study contributes to literature related to designing mobile application user experience using design thinking. Using the mobile app, users can monitor daily and long-term food intake and calories.

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## II. RESEARCH METHODS

### A. Design Thinking

Design thinking refers to a way to solve a problem practically and creatively and primarily focuses on users [19]. It enables innovation and improvement in business strategy through iterative observation, collaboration, fast learning, visualization of created ideas, prototyping concepts, and business analysis [21]. Design thinking has five stages: Empathize, Define, Ideate, Prototype, and Test, as seen in Fig. 1.

Empathize, the first design thinking stage seeks to explore problems and understand the target users, actors, and the application's environment. At this stage, researchers engage with or interview potential application users and Nutritionists to extract data related to problems and needs.

Define is the second stage in design thinking. At this stage, researchers seek to analyze data collected at the empathize stage. From the collected data, empathy maps and Persona are derived. An empathy map is generated to understand what is needed and questioned by actors. The empathy map reflects what actors say, think, do, and feel, and actors' frustration and goals [22]. Persona is a user representation in an imaginary individual that briefly summarizes user characteristics, experiences, goals, tasks, pain points, and environmental conditions. Next, a problem statement is proposed to set the point of view. Next, How Might We (HMW) questions are used to shift from the problem to a solution-based perspective.

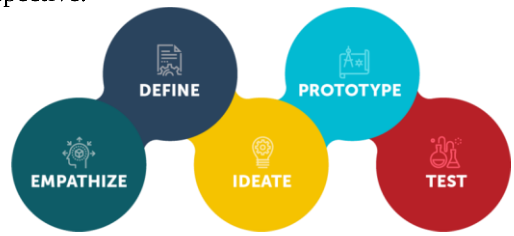


**Fig. 1.** Design thinking stages (Hoover, 2018)

Ideate is the process of generating ideas to move from identifying problems to finding solutions for users. Ideate begins with an exploration of exploring a wide solution space. From the vast arsenal of ideas, several ideas are selected to be made into prototypes. In the ideate stage, a prospective user journey map and information architecture are created. A user journey map is a diagram that illustrates the steps that users perform while interacting with products. Further, information architecture defines how content is structured and presented to a user when they are interacting with applications proposed. It is necessary to design content structures that effectively convey meaning to users within the context of their experience to ensure users' satisfaction when they interact with the products offered.

Prototype is the fourth stage in design thinking. At this stage, prototypes are generated. An information architecture that maps the information of the application is made at this stage. Information architecture is used to organize the information contained in this application to help users to meet their needs effectively [23]. Wireframes (low-fidelity prototypes) are also made. Wireframes are an initial design reference of a system [24]. Wireframe supports the generation of mockups (high-fidelity prototypes). Next, mockups are created in the prototype stage. Mockups are static visualization of finished product designs with a touch of color, fonts, logos, images, and shapes to provide a clearer picture to users and assist team members in visually reviewing the application's design [25]. Mockups can be visualized in the prototype form. Mockups in the prototype form represent final products with additional interaction or animation to simulate and test the design for users.

Finally, test is performed to obtain feedback from users at the evaluation stage. The goal is to evaluate whether the design solutions made have overcome existing problems. The prototype is evaluated using usability testing and the System Usability Scale (SUS). Usability testing is used to assess the learnability and efficiency aspects, and the SUS questionnaire is used to evaluate the satisfaction aspect [26].

### B. Data Collection

Interviews were performed with the nutritionists to understand the requirements for the mobile app. The questions were related to the reasons, goals, system requirements, and target users of the mobile application. Two respondents were interviewed to gather the requirements for designing the application. Respondents are nutritionists and lecturers of the Nutrition Study Program, Faculty of Health Sciences, Esa Unggul University Jakarta. Questions about the reasons, goals, and target users were explored during interviews.

### C. Usability Testing

Table 1 shows task scenarios used for usability testing. A task scenario is an action the participant performs on the tested interface. Task scenarios need to provide context to bolster users' engagement with the interface [26]. While performing user testing, users pretended to perform business or personal tasks as if they were at home or in the office. Seven tasks were assigned to users to understand the users' satisfaction with the application. The tasks were related to registering users' profiles, searching food in the app database, obtaining detailed nutrition information, scanning using the AR feature, observing daily drinking habits, and monitoring statistics on nutrients and daily nutrients. The learnability and efficiency aspects of the app are evaluated using task scenarios. The respondents' success rate and time-based efficiency (goals/second) are measured to represent the learnability and efficiency aspects, respectively. Five respondents were selected for evaluating the mobile application prototype. Five people are sufficient to capture problems in system design and locate more than 80% of usability problems [22].

**Table 1.** User task scenarios

| | Instruction |
|---|---|
| T1 | You are currently on the application's home page, and you want to register and enter personal information such as age, height, and weight. What would you do? |
| T2 | You are currently on the application's main page; then, you want to add food to the "Breakfast" section by searching for available foods in the application database. What would you do? |
| T3 | You are currently on the main page of the application; then, you want to see the detailed nutritional |

| | |
|---|---|
| | information of the food that has been entered in the "Breakfast" section. What would you do? |
| T4 | You are currently on the main page; then, you want to know the recipe information for the "Chicken Porridge" menu and the food's nutritional information. What would you do? |
| T5 | You are currently on the main page; then, you want to scan food using the AR feature to add food to the Lunch. What would you do? |
| T6 | You are currently on the application's main page; then, you want to know your daily drinking consumption and add one more drink. What would you do? |
| T7 | You are currently on the application's main page; then, you want to know statistics on your daily nutrient intake and macronutrients. What would you do? |

### D. *System Usability Scale*

System Usability Scale (SUS) is used to test the overall experience of the designed application (Barnum, 2010). SUS is used to estimate the satisfaction aspect of the app. SUS is a questionnaire to measure usability from the point of view of users. It was developed by John Brooke while working at Digital Equipment Corporation in 1986 [26]. SUS consists of 10 statements and uses Likert scale responses (i.e., "Strongly disagree", "Disagree", "Neutral", "Agree", and "Strongly agree") [27]. Each response is assigned a score between one (Strongly disagree) to five (Strongly agree). Odd questions (i.e., 1, 3, 5, 7, and 9) and even questions (i.e., 2, 4, 6, 8, and 10) are treated differently. Using the corresponding value for each answer, the researcher tabulates the overall SUS score. First, the researcher adds up the total score for all odd-numbered questions, then subtracts five from the total to get (A). Then, the researcher adds up the total score for all even-numbered questions, then subtracts that total from 25 to get (B). Finally, the researcher adds up the total score of the new values (A+B) and multiples by 2.5. The SUS score ranges from 0 to 100. The SUS score of the application is obtained by averaging each SUS score of respondents [27]. Table 1 shows the SUS instrument. The SUS questionnaire is distributed online using Google Form. Table 2 shows the SUS assessment criteria.

**Table 2.** System Usability Scale (SUS) questions

| No | Question | Scale | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1 | I think that I would like to use this system frequently. | | | | | |
| 2 | I found the system unnecessarily complex | | | | | |
| 3 | I thought the system was easy to use | | | | | |
| 4 | I think that I would need the support of a technical person to be able to use this system | | | | | |
| 5 | I found the various functions in this system were well-integrated | | | | | |
| 6 | I thought there was too much inconsistency in this system | | | | | |
| 7 | I would imagine that most people would learn to use this system very quickly | | | | | |
| 8 | I found the system very cumbersome to use | | | | | |
| 9 | I felt very confident using the system | | | | | |
| 10 | I needed to learn a lot of things before I could get going with this system | | | | | |

**Table 3.** System Usability Scale (SUS) assessment criteria

| SUS Score Ranges | |
|---|---|
| Acceptability Ranges | Acceptable (High): 62 – 100; Acceptable (Low): 50 – 61; Not Acceptable: 0 – 49 |
| Grade Scale | A: 91 – 100; B: 81 – 90; C: 71 – 80; D: 61 – 70; E: 0 – 60 |
| Adjective Ratings | Best Imaginable: 86 – 100; Excellent: 73 – 85; Good: 53 – 72; OK/Fair: 39 – 52; Poor: 26 – 38; Worst Imaginable: 0 – 25 |

## III. Result And Discussion

### A. *Empathize*

Table 4 shows the questions and interview results with nutritionists. It is expected that the app can provide information related to food nutrition management to help communities maintain good health through a healthy diet.

**Table 4.** Interview questions and results

| No | Question | Result |
|---|---|---|
| 1 | What are the reasons for designing the application? | • Public awareness of maintaining a healthy lifestyle through a healthy diet is lacking<br>• The high prevalence of diseases due to overeating. |
| 2 | What are the goals of the application? | Providing information on food nutrition to help communities maintain good health. |
| 3 | What are the system requirements of the application? | Providing information on food nutrition based on the food scanned by smartphone cameras (AR). |
| 4 | Who are the target users of the application? | Society in general. People in a diet health program in particular. |

### B. *Define*

At the Define stage, results from the empathize stage were analyzed, synthesized, and expressed in a human-centered problem statement. Some information derived from the interviews with stakeholders are a) increasing public health awareness on a healthy diet is crucial; b) users avoid dangerous diseases and the risk of being overweight by exercising a healthy diet; c) monitoring healthy eating can be performed using a smart device.

Actors involved in designing a nutrition app process include nutritionists and users. Nutritionists play a vital role in recommending required information, providing data, and calculating nutrition/calories. Users have a significant role in determining the required information. The user characteristics of this nutritional information application are both male and female, have the age of

17-50 years, have a desire to gain or lose weight, want to maintain a healthy lifestyle, love to take photos of food and share them on social media, and are Indonesian who have Android-based smartphones.

Empathy maps and Persona were created to enhance the understanding of target users and stakeholders [15], [23]. Table 5 and Table 6 show empathy maps of nutrition experts and users, respectively.

**Table 5.** Empathy maps of nutritionists

| No | Aspect | Information |
|---|---|---|
| 1 | Says | • People are not aware of the importance of good health<br>• Difficult to monitor the nutrition in food<br>• Difficult to disseminate information on food nutrition value<br>• People have the habit of taking photos before eating foods |
| 2 | Thinks | • How to increase public awareness about the importance of good health?<br>• How to monitor nutrition in foods?<br>• How to provide information on food nutritional values?<br>• How can take photos of food simultaneously educate people? |
| 3 | Does | • Providing information on the food nutrition values<br>• Educating the public through information on the food nutrition<br>• Knowing the amount of food nutrition information directly through AR technology<br>• Monitoring the number of calories consumed |
| 4 | Feels | • Confused<br>• Difficulty |

**Table 6.** Empathy maps of users

| No | Aspect | Information |
|---|---|---|
| 1 | Says | • Difficult to control the amount of food consumed<br>• Do not know the nutritional value of the food consumed<br>• Do not know what the ideal amount of nutrition should be consumed every day<br>• No time for sports |
| 2 | Thinks | • How to control the amount of food consumed?<br>• How to find out the nutritional information of each food?<br>• How to know how many nutrients/calories should be consumed every day? |
| 3 | Does | • Features to record eating patterns in a day<br>• Provides nutritional information on food<br>• Calculates and provides information on the number of nutrients / daily calories |
| 4 | Feels | • Confused<br>• Indecision<br>• Difficulty<br>• Ignorance |

Fig. 2 shows the Persona of nutritionists and users. Information provided in the Persona is name, occupation, demographics (age, status, and education), biography, motivation, frustrations, and goals.

**Fig. 2.** Persona: Nutritionists (top); Users (bottom)

A point of view is raised after analyzing the empathy map and Personas. The problem statement is, "People need to know the calories intake and nutrition of food consumed to support a healthy diet." Next, How Might We (HMW) questions are generated to trigger brainstorming in the ideate stage [28]. Some HMW questions are a) HMW inform people about calories intake from food consumed daily? B) HMW inform people about the nutrition of food consumed? c) HMW inform people about their dominant activity level daily? It should be reminded that HMW questions are meant to explore various possible solutions, not select and execute the first solution found.

### *C. Ideate*

Solution ideas were generated as many as possible in the ideate stage. Then, several ideas were selected as a basis for creating prototypes. It is proposed that the system can a) display users' data (age, gender, weight, and height); b) provide users' activity levels, ranging from sedentary to very active; c) calculate the food nutrition's; d) store and display users' food intake in a day (breakfast, lunch, dinner, and snacks); e) provide reminders related to food and drink intake; f) display food nutritional information directly using augmented reality technology.

A prospective user journey map and an information architecture are generated to reflect ideas selected in the ideate stage [23]. Fig. 3 shows the prospective user journey map for the application. The user journey map shows what users can perform, from signing up to visualizing food nutritional values. It is proposed that the application can a) register and complete account details; b) determine the purpose of using the application; c) determine daily activity level; d) system displays daily calorie recommendation information; e) scan food using the AR feature; f) system displays information on food nutritional values.

**Fig. 3.** Prospective user Journey Maps

Fig. 4 shows the information architecture proposed for the application. The information architecture contains Home tab, Menu tab, Scan food tab, Drink tab, and Statistics tab. The Home tab contains pages related to Macro nutrition and Calories in & calories left. Users can take notes of breakfast, lunch, or dinner daily in the Food and Drink Menu. Next, the Menu Ideas tab suggest ideas for breakfast, lunch, dinner, and snack.

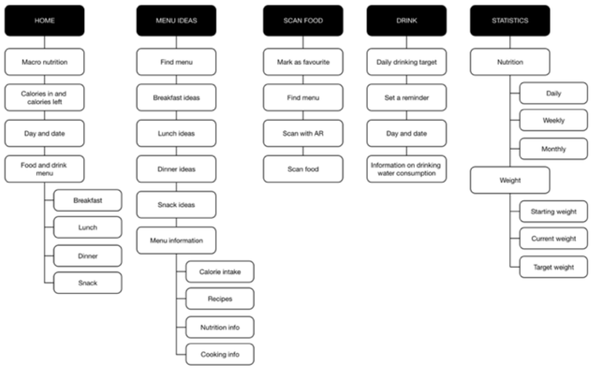



**Fig. 4.** Information architecture

Next, the Scan Food tab contains pages for scanning food using the search feature or a camera with augmented reality features. An option to mark favorite foods is provided. Next, The Drink tab contains pages of daily drinking targets, a reminder, and daily drinking consumption. In the Statistics tab, users view daily, weekly, and monthly nutritional values. It also contains weight information which includes starting, current, and target weight.

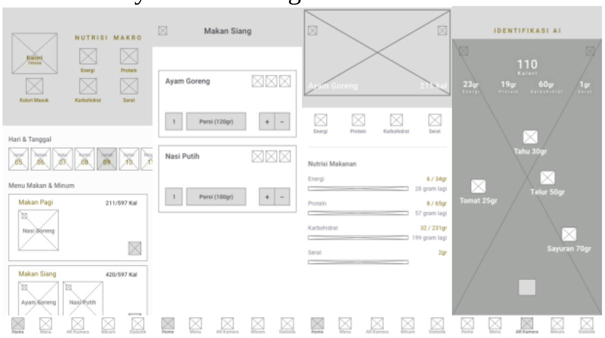
*D. Prototype*

Low-fidelity wireframes and high-fidelity mockups prototypes are generated in the prototype stage [25]. Wireframes are created using Sketch tools, and mockups are created using Adobe XD tools.

1. Wireframe

Wireframes are created as a low-fidelity solution to solve user needs. In total, twenty-one wireframe screens for users are generated. Fig. 5 shows wireframe examples created as the solution design. The examples show wireframes to a) monitoring total daily calories intake; b) planning daily food; c) inspecting food nutrients and calories; and d) employing Augmented Reality to detect foods and calories.

Fig. 6 shows the screen flows of the designed mobile app. Several screens are shown, including registering users' profiles, searching foods in the app database, adding foods as meals menu, obtaining detailed nutrition information on a particular food, scanning using AR feature, recording daily drinking habits, and monitoring statistics on nutrients and daily nutrients. To register, users can use their email account. Then users are expected to enter data about gender, age, height, weight, and the goal of using the app. Next, users can add varying foods for meals and view detailed information about calories for each food consumed. The app provides information on food recipes. Using the gamification approach, users are challenged to complete daily drinking needs. Users can employ AR technology to investigate food calories and add information about the scanned food to the app database. Finally, users can monitor daily calories using the statistics dashboard.



(a) (b) (c) (d)

**Fig. 5.** Wireframe. From left to right: a) Monitoring total daily calories intake; b) Planning daily food; c) Inspecting food nutrients and calories; d) Employing Augmented Reality to detect foods and calories.

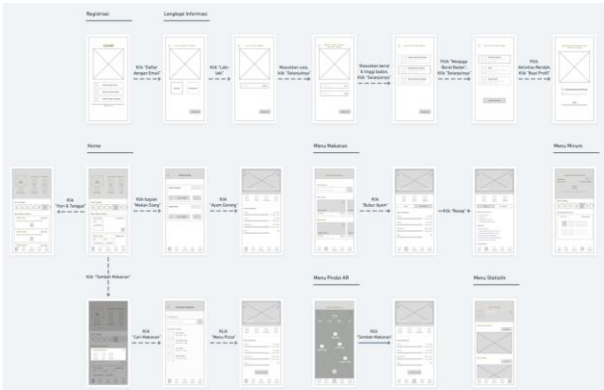
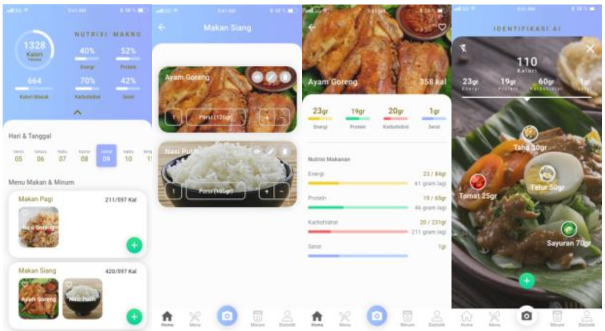


**Fig. 6.** Screen flow representing the nutrition app features

2. Mockup

Fig. 7 shows examples of the application mockups. The app provides features to help solve problems related to nutrition management and calories intake monitoring. Using wireframes, twenty-one screen mockups are generated. Users can use the total calories intake screen to monitor daily eating habits. Users can also use the statistics screen to monitor calories consumed in the longer term. Combined with information on a healthy diet, the app can increase public awareness about good health. Furthermore, users can also plan their daily food.

Users can employ AR to detect foods and their calories. Users can add the food scanned to the app database and inspect detailed information of the foods. Not only providing information on food nutritional values, the AR feature simultaneously educates users on food calories while users document their daily culinary activities. It is expected that the feature can be easily adopted by users due to the fact that taking food photos is a common experience.



(a) (b) (c) (d)

**Fig. 7.** Screen mockups. From left to right: a) Monitoring total daily calories intake; b) Planning daily food; c) Inspecting food nutrients and calories; d) Augmented Reality to detect food calories.

### *E. Evaluate*

1. Learnability aspect

Table 7 shows the test results on the learnability aspect of the application. The assessment is based on the success or failure of the respondent in performing task scenarios. All respondents can complete all task scenarios assigned to them, obtaining a result of 100%.

**Table 7.** Respondent's success rate

| | R1 | R2 | R3 | R4 | R5 | Avg |
|---|---|---|---|---|---|---|
| Task Number (S) | 7 | 7 | 7 | 7 | 7 | 100% |
| Percentage (S) | 100% | 100% | 100% | 100% | 100% | |
| Task Number (F) | 0 | 0 | 0 | 0 | 0 | 0% |
| Percentage (F) | 0% | 0% | 0% | 0% | 0% | |

R: Respondent, S: Success, F: Failure

2. Efficiency aspect

Table 8 shows the efficiency aspect of the application. The efficiency test is calculated based on the time taken by each respondent in performing each task scenario. The time-based efficiency is 0,067 (goals/sec).

**Table 8a.** Matrix of Efficiency Test Results

| Task | R1 (sec) | R2 (sec) | R3 (sec) | R4 (sec) | R5 (sec) |
|---|---|---|---|---|---|
| T1 | 31.67 | 36.94 | 42.59 | 51.38 | 48.50 |
| T2 | 23.45 | 25.17 | 40.00 | 36.38 | 25.17 |
| T3 | 12.57 | 14.04 | 43.43 | 50.90 | 19.92 |
| T4 | 9.97 | 9.45 | 15.50 | 5.39 | 10.35 |
| T5 | 32.32 | 18.31 | 20.34 | 18.20 | 14.69 |
| T6 | 10.33 | 22.44 | 22.06 | 10.00 | 9.96 |
| T7 | 5.60 | 7.00 | 47.90 | 11.01 | 5.79 |

T: task; R: respondent

The time-based value of the application is measured using the formula:

$$Time-based\ value = \frac{\sum_{i=1}^{N}\frac{1}{t_{0i}}}{N}$$

**Table 8b.** Matrix of Efficiency Test Results (2)

| Task | TB1 | TB2 | TB3 | TB4 | TB5 |
|---|---|---|---|---|---|
| T1 | 0.032 | 0.027 | 0.023 | 0.019 | 0.021 |
| T2 | 0.043 | 0.040 | 0.025 | 0.027 | 0.040 |
| T3 | 0.080 | 0.071 | 0.023 | 0.020 | 0.050 |
| T4 | 0.100 | 0.106 | 0.065 | 0.186 | 0.097 |
| T5 | 0.031 | 0.055 | 0.049 | 0.055 | 0.068 |
| T6 | 0.097 | 0.045 | 0.045 | 0.100 | 0.100 |
| T7 | 0.179 | 0.143 | 0.021 | 0.091 | 0.173 |
| **TOTAL** | **0.560** | **0.486** | **0.251** | **0.498** | **0.548** |

TB: time based

Finally, the overall time-based calculation is measured using the formula:

$$Time-based\ Efficiency = \frac{\sum TB1 + \sum TB2 + \sum TB3 + \sum TB4 + \sum TB5}{(\sum T \times \sum R)}$$
$$= \frac{(0{,}560 + 0{,}486 + 0{,}251 + 0{,}498 + 0{,}548)}{7 \times 5}$$
$$= 0{,}067\ (goals/sec)$$

3. Satisfaction aspect

Table 9 shows the System Usability Scale (SUS) result. The SUS is used to estimate the satisfaction aspect of the app. Most users are showing "neutral" and "agree" answers. Next, the final SUS score for each respondent is calculated by multiplying the total SUS value of each respondent with 2.5, resulting in values 85, 90, 85, 85, 80 for respondents 1-5, respectively. The average value of user satisfaction estimated using the SUS is 85, high in acceptance criteria, B in the rating scale, and excellent in adjective ratings (Table 10).

**Table 9.** SUS assessment results

| No | Assessment Aspect | R1 | R2 | R3 | R4 | R5 |
|---|---|---|---|---|---|---|
| 1 | I think I would like to use this system frequently | 3 | 4 | 3 | 3 | 3 |
| 2 | I found the system unnecessarily complex | 4 | 3 | 4 | 3 | 3 |
| 3 | I thought the system was easy to use | 3 | 3 | 4 | 4 | 3 |
| 4 | I think that I would need the support of a technical person to be able to use this system | 3 | 4 | 4 | 3 | 3 |
| 5 | I found the various functions in this system were well integrated | 4 | 4 | 3 | 4 | 3 |
| 6 | I thought there was too much inconsistency in this system | 4 | 4 | 3 | 4 | 3 |
| 7 | I would imagine that most people would learn to use this system very quickly | 3 | 3 | 4 | 3 | 4 |
| 8 | I found the system very cumbersome to use | 4 | 4 | 3 | 4 | 4 |
| 9 | I felt very confident using the system | 3 | 4 | 3 | 3 | 3 |
| 10 | I needed to learn a lot of things before I could get going with this system | 3 | 3 | 3 | 3 | 3 |
| **TOTAL** | | **34** | **36** | **34** | **34** | **32** |

R: respondent

**Table 10.** Satisfaction aspect using system usability scale

| **SUS Score** | **R1(85)** | **R2(90)** | **R3(85)** | **R4(85)** | **R5(80)** |
|---|---|---|---|---|---|
| Acceptability Ranges | Acceptable (High) | Acceptable (High) | Acceptable (High) | Acceptable (High) | Acceptable (High) |
| Grade Scale | B | B | B | B | C |
| Adjective Ratings | Excellent | Almost Best Imaginable | Excellent | Excellent | Almost Good |

## IV. CONCLUSION

The present study has successfully designed user experience for mobile food nutrition applications with Augmented Reality (AR) technology. Data related to reasons, goals, target users, and system requirements discovered at the empathize stage reveals the need to inform calories intake and nutrition of food consumed to support a healthy diet. Empathy maps and Personas created have been useful in the understanding of goals and frustrations of target users and guide solution ideas as a basis for creating prototypes. A prospective user journey map and information architecture are created to reflect the solution ideas and as a basis for building prototypes. Next, low-fidelity wireframes and high-fidelity mockup are generated as a solution to challenges faced by users. Usability testing is used to evaluate the learnability (100%) and efficiency (0.067 goals/sec) aspects, while SUS assesses the satisfaction (85) aspects. The satisfaction aspect reflects a high acceptability level, B grade scale, excellent adjective rating. The evaluation results indicate the mobile app has the potential to help users to control the amount of food consumed, recognize and learn about calories and nutrition from food consumed, understand the ideal amount of nutrition that should be consumed daily, record daily eating and drinking patterns, increase awareness of good health, and monitor calories consumed daily and in the long term, learn about food calories and nutrition, build habits of maintaining a healthy diet. Future studies related to nutrition apps that combined health records and calories intake are recommended.

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