SECP1513-09 : TEKNOLOGI DAN SISTEM MAKLUMAT

(TECHNOLOGY AND INFORMATION SYSTEM)

SEMESTER 1, 2024/2025

FACULTY OF COMPUTING, UNIVERSITI TEKNOLOGI MALAYSIA

GROUP ASSIGNMENT : DESIGN THINKING

THEME : BIG DATA AND ARTIFICIAL INTELLIGENT NEW INNOVATION

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1.0 INTRODUCTION

What is Design Thinking ?

Design thinking is a collaborative approach that uses iterative testing to create innovative solutions that will resolve complex or unknown problems and provide a satisfying solution for the client. It is a "human centered" approach that involves five core phases which is empathize, define, ideate, prototype, and test. Iterative means that the designer repeatedly cycles through these cores instead of viewing them as a linear path to continuously improve and adapt the solution ensuring it is viable and effective.

Design thinking is important because of its emphasis on user experience, thus ensuring the final solution meets the client's need and preference. This approach will not overlook the possibility of cutting some unnecessary steps but will also encourage diverse perspectives by thinking outside the box and collaborative effort. Consequently, it reduces the risk and cost by identifying the potential problem in the early stage, resulting in higher user or client satisfaction and loyalty.

In conclusion, design thinking not only guarantees a well rounded solution, it also has the potential to transform industries and society by accelerating the development of innovative solutions. As we begin to understand more, major problems will no longer take a long time to resolve, increasing the likelihood of potential business success.

2.0 METHODOLOGY

2.1 Empathy

To understand something, one must experience it firsthand. By immersing oneself in user daily routine and experience, we gain accurate data to improve our product. For instance, missing or skipping breakfast due to lack of time is very common, especially for university students with tight schedules. This is mostly because they prioritize sleep and save money for lunch and dinner. Little did they know, this can lead to major health problems in the future. Therefore, to grasp the problem, we conducted interviews and an online survey to gain insight.

2.2 Define

Based on the insight gathered in the empathized stage, we found the core problem and the need of our target audience. From there, we establish specific, measurable goal and objective of the project. After that, we created user personas representing different segments based on our target audience, then highlighted the key points and opportunities for improvement.

2.3 Ideate

During the ideation stage, we brainstorm various ideas to address the problem together, exchanging suggestions to bring out all of the possible solutions. The ideas were then grouped into a common theme to identify features for the solution. After that we create rough sketches to visualize it.

2.4 Prototype

At this stage, we make a prototype based on the ideas to explore their viability. We started by coming up with a concept and deciding on the material to use. Based on the feedback, we improve the prototype to become more detailed and realistic.

2.5 Test

In the final stage, we evaluate the effectiveness and usability and check whether we fulfill our criteria. We conducted a user testing session upon completion to gain accurate data. That way we collected on what's working, what doesn't, and what's to improve.

3.0 DETAILED DESCRIPTION

3.1 Problem Background

 Based on our research and survey, people face many challenges in meal planning and grocery management, especially students and housewives. They find that meal planning is stressful due to a tight budget and lack of time to prepare it. The need for a solution that offers personalized meal plans that take less time to prepare and budget-friendly options is the key to alleviating this stress.

Budgetary constraints are another significant concern due to inflation. Most people find it hard to stick to a budget while shopping, leading to financial strain and inadequate meal planning. Therefore, a solution that integrates budget-friendly meal options along with grocery lists and store locations can increase efficiency.

Furthermore, accurate portion control and calorie tracking are important to maintain a healthy lifestyle. Most people struggle to diet due to overconsumption or excessive calorie intake. There are also others who suffer from nutrient deficiency because they think eating less food is equal to less calorie intake. Hence, a tool that can guide users on appropriate portion size and calorie intake would make their lives better.

3.2 Solution

After a lot of brainstorming sessions, we decided to address the significant challenge by creating a mobile application, a meal planning and grocery shopping app using AI that integrates with a smart food scale that sends weight data to the app. This way, the user can accurately control portion size and calorie intake while getting the best personalized meal plan based on their diet as well as custom recipe recommendations for those with dietary restrictions.

Furthermore, we also add past purchase detection and price selection that can filter recipes and items based on users budget to ensure they can have wide range budget-friendly meal options while keeping track of their transaction. Additionally, users can use the interactive shopping list and nearest supermarket feature to enhance efficiency and save valuable time.

3.3 Team Working

Before we started the project, we assigned a role for each member to make sure it's fair. We chose the leader, Nurin based on her behavior and qualifications to make sure she will lead the project smoothly. After that we decide on what to create based on the theme given. We decided to make a mobile application and from there we apply five core of design thinking to determine the target user, features for our product, and the impact from creating it.

We use Webex or Google Meet to hold a meeting for discussion and WhatsApp to share important information and documents relating to the project. We also had an interview session with Balqis, a student from UTM. After we collected the data needed, we began to create the prototype and keep improving it based on the feedback until perfection.

Overall, thanks to everyone's cooperation and collaboration, everything went well without a problem.

4.0 DESIGN THINKING ASSESSMENT POINTS

First and foremost, we begin with outlining the objective and other highlighted content to effectively create a design thinking assessment.

Throughout the transition between design thinking phases, our team ensured a seamless progression from one phase to another. Starting with empathizing with the user, we conducted a meeting session to compile all the insight we gained. We then contemplated whether the product we decided on would be beneficial to people and our company in terms of investment or not.

On to the define phase, we analyze the problem statement and assess how serious and impactful it is to figure out the need of our target audience.

Next, we move on to the ideation session where we gather each other's suggestions and opinions. We brainstorm together to bring out-of-the-box ideas to enhance our product's uniqueness. Unrelated or unclear ideas were cut off immediately to avoid wasting time and to increase efficiency. We decide by majority which solution and ideas were the best.

Our team then moved to prototyping, where we refined the product and tested it repeatedly to make sure it fulfilled our user need.

Finally, the mobile application is ready for demonstration. Upon completion, we evaluate the final product and receive feedback from the client and user. In addition, we measure the satisfaction rate to grasp the overall success of the project in meeting its goals.

5.0 DESIGN THINKING EVIDENCE

5.1 Emphatize Phase

 To understand user preference, we conducted an online survey through Google Forms and an interview session with a student. This way we can immerse ourselves, gain experience, and know what the challenges are more accurately

What is your primary role in managing meals and groceries? *
- ◯ Housewife/Stay-at-home parent
- ◯ Working parent
- ◯ Student
- ◯ Individual with specific dietary needs
- ◯ Fitness enthusiast focused on calorie and nutritional tracking
- ◯ Single professional with limited time for meal planning

How often do you plan your meals in advance? *
- ◯ Weekly
- ◯ Occasionally
- ◯ Daily
- ◯ Never

What is your primary role in managing meals and groceries? *
- ◯ Housewife/Stay-at-home parent
- ◯ Working parent
- ◯ Student
- ◯ Individual with specific dietary needs
- ◯ Fitness enthusiast focused on calorie and nutritional tracking
- ◯ Single professional with limited time for meal planning

How do you typically shop for groceries? *
- ◯ In-store
- ◯ Online
- ◯ Combination of both

What makes grocery shopping challenging for you? *
- ☐ Sticking to a budget
- ☐ Remembering everything I need
- ☐ Finding deals or discounts
- ☐ Managing time
- ☐ Other: _____

How helpful would you find an app that provides personalized meal plans and grocery lists?

	1	2	3	4	5	
Not helpful	◯	◯	◯	◯	◯	Very helpful

What are your biggest challenges in meal planning? *
- ☐ Sticking to a budget
- ☐ Finding healthy recipes
- ☐ Time constraints
- ☐ Managing dietary restrictions
- ☐ Deciding what to cook

What tools or methods do you currently use for meal planning? *
- ☐ Paper and pen
- ☐ Online recipes/blogs
- ☐ None
- ☐ Mobile apps
- ☐ Other: _____

Which features would you use in a meal planning app?

- [ ] Personalized meal plans
- [ ] Recipe recommendations
- [ ] Budget-friendly options
- [ ] Smart food scale integration
- [ ] Calorie tracking
- [ ] Shopping list management

Which features would you use in a meal planning app?

- [ ] Personalized meal plans
- [ ] Recipe recommendations
- [ ] Budget-friendly options
- [ ] Smart food scale integration
- [ ] Calorie tracking
- [ ] Shopping list management

What features would you suggest to improve the app?

- [ ] More personalized recommendations
- [ ] Integration with more local supermarkets
- [ ] Better recipe variety
- [ ] Improved shopping list organization
- [ ] Enhanced nutritional analysis features
- [ ] More focus on sustainability (e.g., reducing food waste)
- [ ] Other:

What is the most important benefit you expect from such a tool?

- [ ] Saving time on meal planning and shopping
- [ ] Eating healthier with portion control and calorie tracking
- [ ] Staying within a grocery budget
- [ ] Reducing food waste
- [ ] Discovering new recipes
- [ ] Other:

What features would you prioritize in an ideal meal planning and grocery shopping tool?

- [ ] Personalized meal plans
- [ ] Recipe recommendations tailored to dietary restrictions
- [ ] Budget-friendly grocery suggestions
- [ ] Smart food scale integration for portion control
- [ ] Shopping list management
- [ ] Local supermarket deals and discounts
- [ ] Calorie and nutritional tracking
- [ ] Other:

Would you recommend a meal planning and grocery app to others if it met your expectations?

- ( ) Yes, definitely
- ( ) Maybe, depending on the features
- ( ) No

Do you think this tool would improve your daily routines?

- ( ) Yes, significantly
- ( ) Yes, but only slightly
- ( ) No, I don't think it would help

Would you use a smart food scale to track portion sizes and calories?

- ( ) Yes
- ( ) No
- ( ) Maybe

What is the most important benefit you expect from such a tool?

- [ ] Saving time on meal planning and shopping
- [ ] Eating healthier with portion control and calorie tracking
- [ ] Staying within a grocery budget
- [ ] Reducing food waste
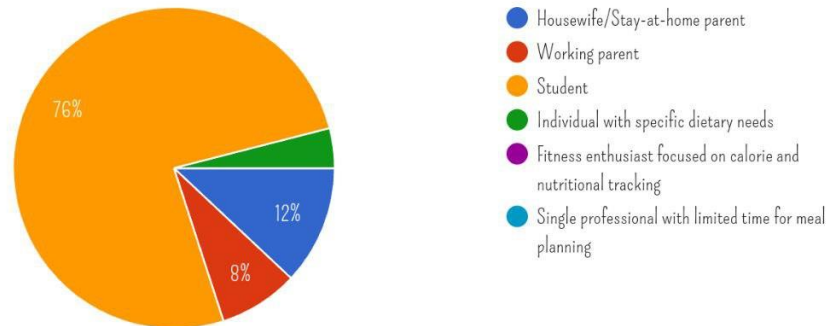- [ ] Discovering new recipes
- [ ] Other:

9
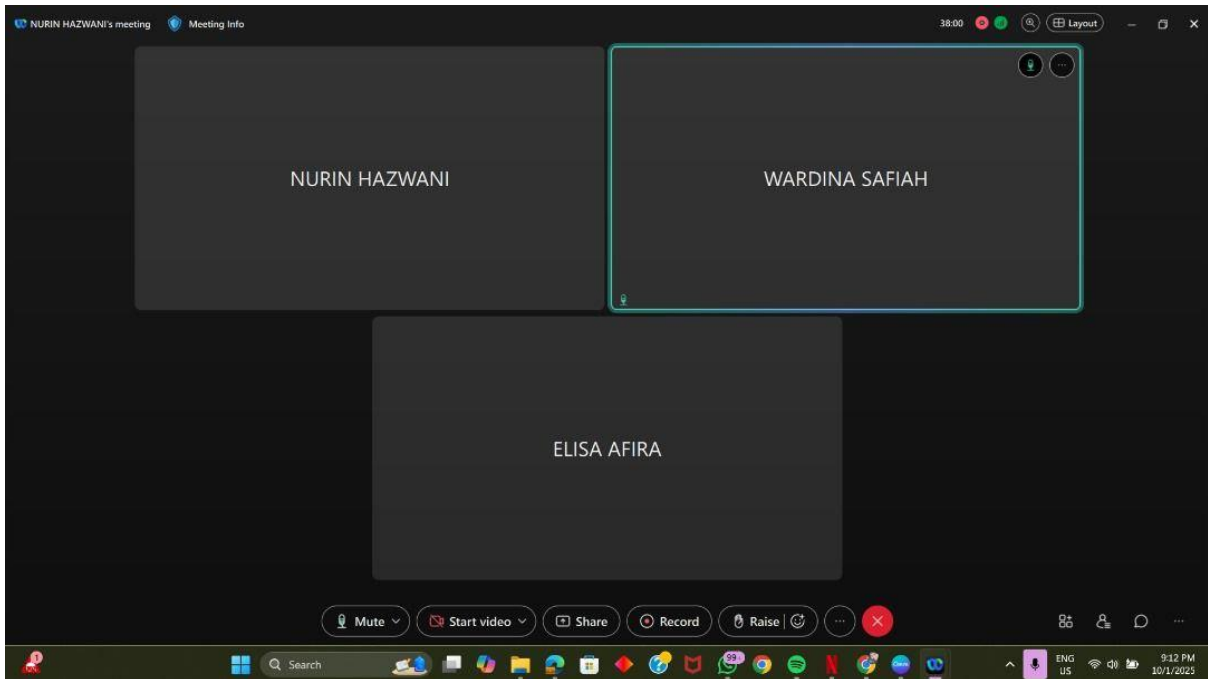
5.2 Define Phase

In the defined phase, we compile all information and organize it into several categories to enhance efficiency. We were able to understand the problem more clearly based on the answers of the survey and interview session.

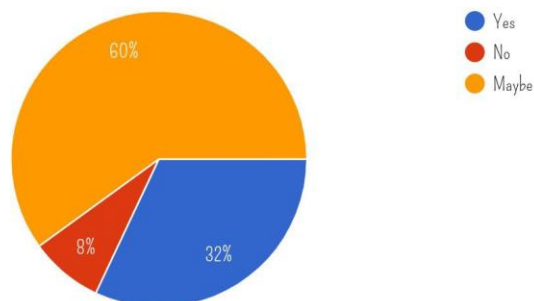What is your primary role in managing meals and groceries?

Copy

25 responses

- Housewife/Stay-at-home parent
- Working parent
- Student
- Individual with specific dietary needs
- Fitness enthusiast focused on calorie and nutritional tracking
- Single professional with limited time for meal planning

Would you use a smart food scale to track portion sizes and calories?

25 responses
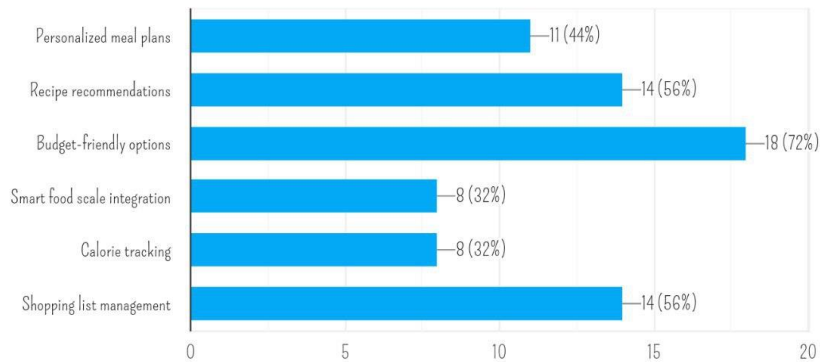
- Yes
- No
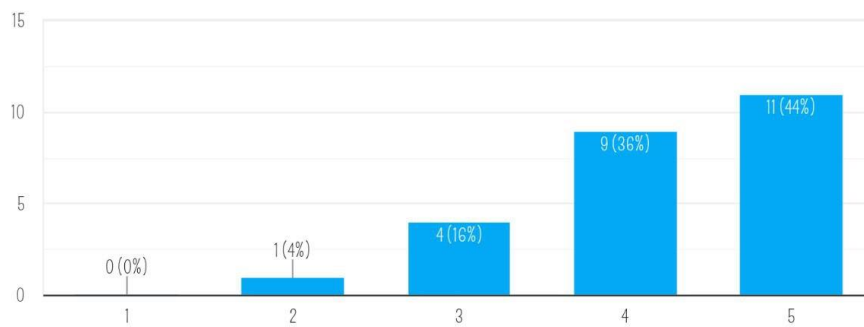- Maybe

Which features would you use in a meal planning app?

25 responses

Feature	Count
Personalized meal plans	11 (44%)
Recipe recommendations	14 (56%)
Budget-friendly options	18 (72%)
Smart food scale integration	8 (32%)
Calorie tracking	8 (32%)
Shopping list management	14 (56%)

How helpful would you find an app that provides personalized meal plans and grocery lists?

25 responses

Rating	Count
1	0 (0%)
2	1 (4%)
3	4 (16%)
4	9 (36%)
5	11 (44%)

What are your biggest challenges in meal planning?

25 responses

Challenge	Count
Deciding what to cook	12 (48%)
Managing dietary restrictions	10 (40%)
Sticking to a budget	19 (76%)
Finding healthy recipes	7 (28%)
Time constraints	12 (48%)

What tools or methods do you currently use for meal planning?

25 responses

- Paper and pen — 2 (8%)
- Mobile apps — 10 (40%)
- Online recipes/blogs — 12 (48%)
- None — 11 (44%)

None Count: 11

How often do you plan your meals in advance?

25 responses

- Daily — 40%
- Weekly — 20%
- Occasionally — 20%
- Never — 20%

What tools or methods do you currently use for meal planning?

25 responses

- Paper and pen — 2 (8%)
- Mobile apps — 10 (40%)
- Online recipes/blogs — 12 (48%)
- None — 11 (44%)
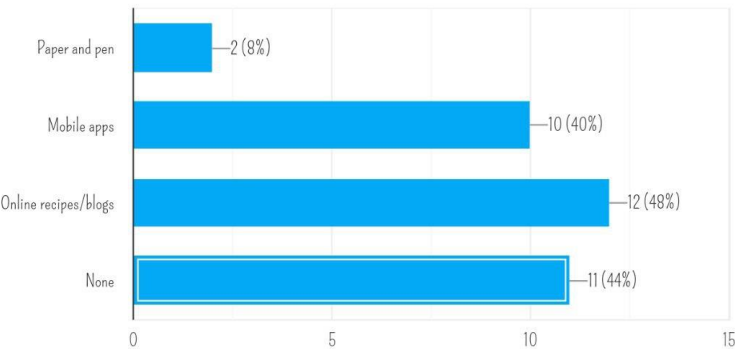
What makes grocery shopping challenging for you?

25 responses

Category	Value
Sticking to a budget	20 (80%)
Remembering everything I need	10 (40%)
Finding deals or discounts	10 (40%)
Managing time	9 (36%)
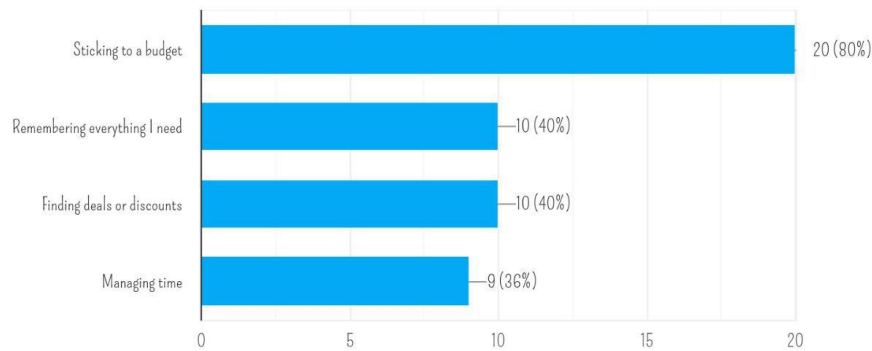
How do you typically shop for groceries?

25 responses

- In-store: 64%
- Online
- Combination of both: 36%
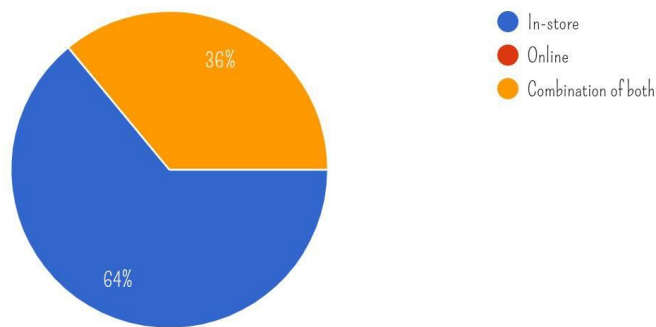
What is the most important benefit you expect from such a tool?

25 responses
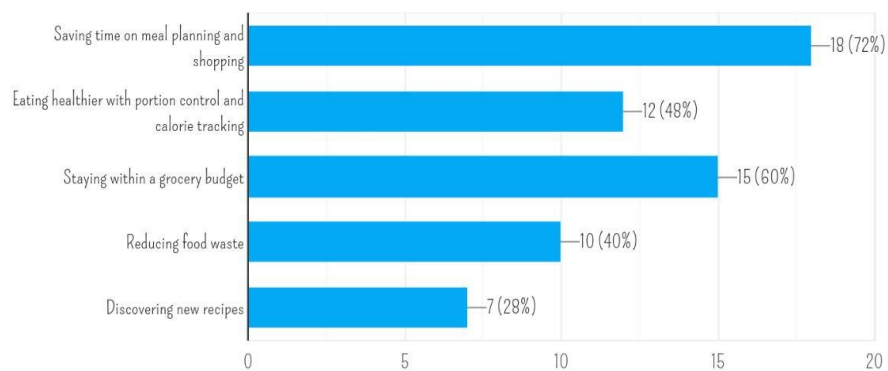
Benefit	Value
Saving time on meal planning and shopping	18 (72%)
Eating healthier with portion control and calorie tracking	12 (48%)
Staying within a grocery budget	15 (60%)
Reducing food waste	10 (40%)
Discovering new recipes	7 (28%)

Do you think this tool would improve your daily routines?   Copy

25 responses

- Yes, significantly
- Yes, but only slightly
- No, I don't think it would help

40%

56%
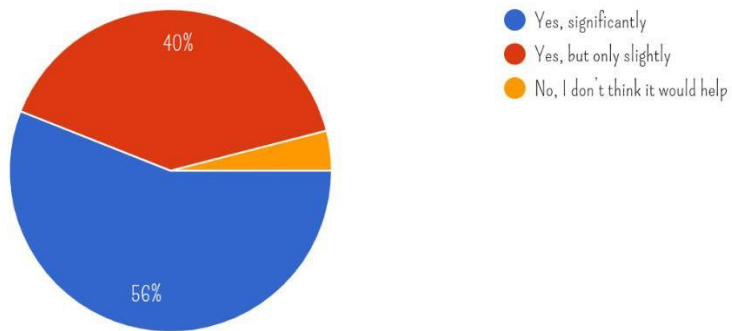
Would you recommend a meal planning and grocery app to others   Copy
if it met your expectations?

25 responses

- Yes, definitely
- Maybe, depending on the features
- No

36%

64%

What features would you suggest to improve the app?

25 responses

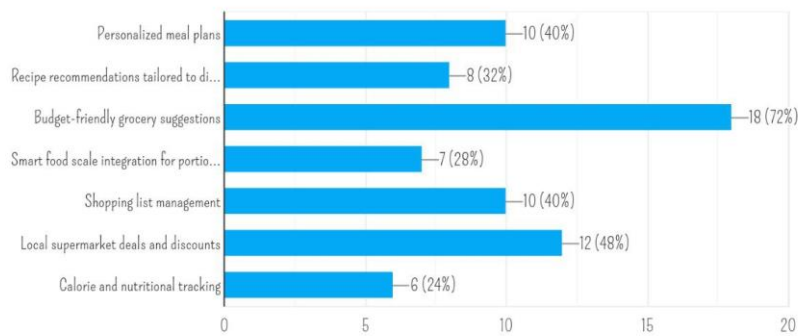| Feature	Count
More personalized recommendations	14 (56%)
Integration with more local supermarkets	11 (44%)
Better recipe variety	12 (48%)
Improved shopping list organization	8 (32%)
Enhanced nutritional analysis features	8 (32%)
More focus on sustainability (e.g., reducing food waste)	11 (44%)

What features would you prioritize in an ideal meal planning and grocery shopping tool?

25 responses

| Feature	Count
Personalized meal plans	10 (40%)
Recipe recommendations tailored to di...	8 (32%)
Budget-friendly grocery suggestions	18 (72%)
Smart food scale integration for portio...	7 (28%)
Shopping list management	10 (40%)
Local supermarket deals and discounts	12 (48%)
Calorie and nutritional tracking	6 (24%)

5.3 Ideate Phase

In this phase we come out with our app "MealMate" after a lot of discussion. We also sketch to visualize it easily.
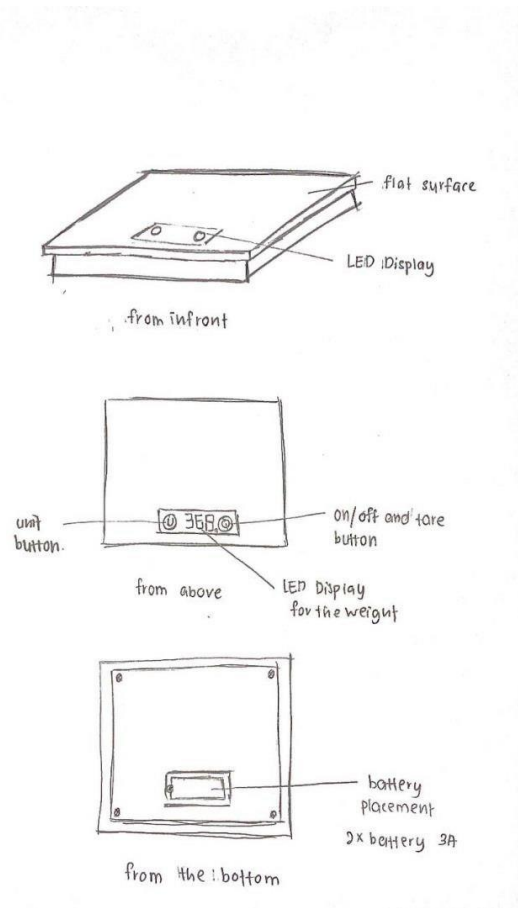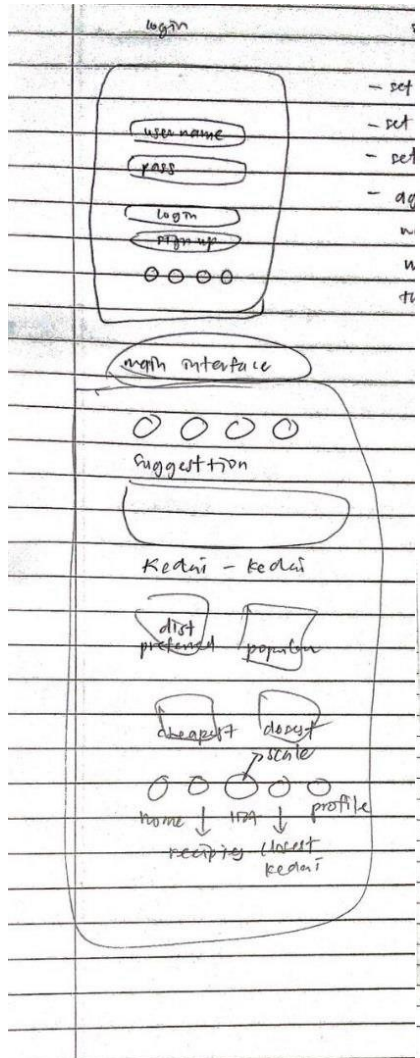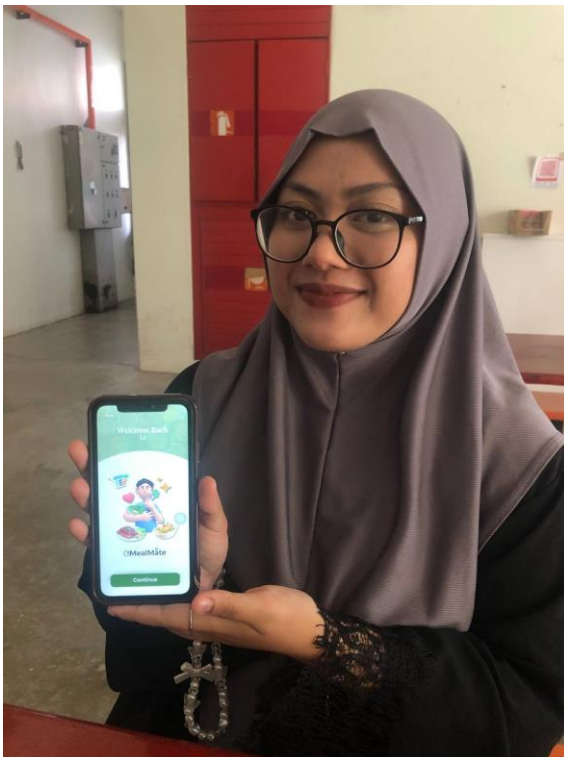
5.4 Prototype Phase

We build a prototype using the material we have to explore their efficiency and viability
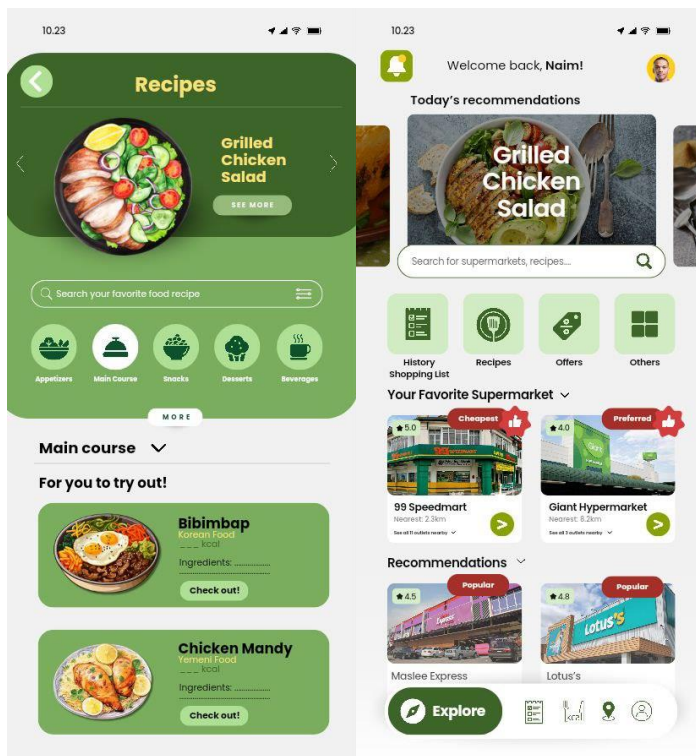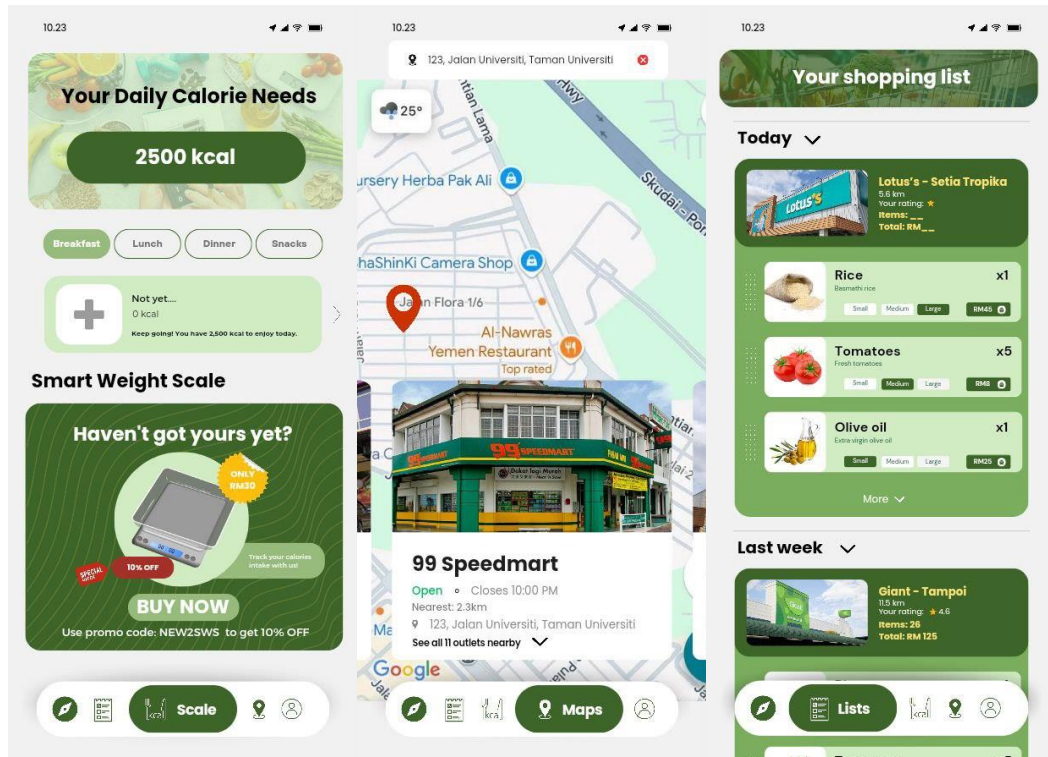
5.5 Testing Phase

We ask several users to test our product to get feedback and accurate data on what to improve.

6.0 REFLECTION

1. NURIN HAZWANI BINTI HUSSIN (A24CS0171)

What is your goal/dream with regard to your course/program?

My goal is to become skilled in developing AI applications that solve real-world problems and improve people's daily lives.

How does this design thinking impact your goal/dream with regard to your program?

Design thinking helps me approach problems creatively and focus on user needs, which is crucial for developing AI solutions that are both innovative and practical.

What is the action/improvement/plan necessary for you to improve your potential in the industry?

I plan to improve my technical skills in AI and app development, enhance my knowledge of user experience (UX) design, stay updated with the latest technology trends, and practice my communication skills.

2. NUR ELISA AFIRA BINTI MOHAMAD NAZIR (A24CS0160)

What is your goal/dream with regard to your course/program?

I will improve my knowledge and skill as I plan to become a UI/UX developer at a prominent organization.

How does this design thinking impact your goal/dream with regard to your program?

Design thinking taught me how to organize projects and the importance of communication in teamwork. Exchanging ideas makes me realize that I have to think outside of the box to bring creativity and innovative solutions.

What is the action/improvement/plan necessary for you to improve your potential in the industry?

In order to improve myself, I plan to join any event or workshop that will help upgrade my skills. I will also improve my communication skills to expand my professional network to help me acquire the best industry best practices.

3. WARDINA SAFIAH BINTI HARUN (A24CS0209)

What is your goal/dream with regard to your course/program?

I want to become a skilled UI/UX designer and app developer, creating user-friendly applications that could help everyone's daily life to be easier and much better. My goal is to integrate AI into app development to improve user experiences.

How does this design thinking impact your goal/dream with regard to your program?

This design thinking process has made me realize the importance of user-centered design in creating a functional and visually appealing applications. It has pushed me to think more critically about solving a real problems and refine user experiences.

What is the action/improvement/plan necessary for you to improve your potential in the industry?

I plan to enhance my UI/UX design skills and improve my programming knowledge to build a strong portfolio. I will also seek internships in related departments, build strong networks with industry professionals, and stay updated with design trends.

7.0 TASK DISTRIBUTION

NO	NAME	TASK
1	NURIN HAZWANI BINTI HUSSIN (A24CS0171)	• Preparing Video • Sketching Prototype • Preparing Presentation Slide • Make Prototype (Product)
2	NUR ELISA AFIRA BINTI MOHAMAD NAZIR (A24CS0160)	• Write Full Report • Make Prototype (Product) • Act As Interviewer
3	WARDINA SAFIAH BINTI HARUN (A24CS0209)	• Sketch App Design • Make Prototype (Apps) • Make Prototype (Product)