SECP1513-02 STEM

Design Thinking Project Report-

Product Name : ADi (Food and Dine in service with AI)

Group Name : Bistro 2 Square Bytes (B4B)

Prepare for: Dr Aryati

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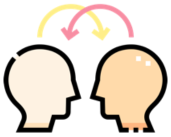
INTRODUCTION

What is Design Thinking?

Design Thinking represents a comprehensive problem-solving framework that seamlessly integrates with human-centred research, creative ideation, and iterative prototyping, ultimately enabling organizations to develop groundbreaking solutions by deeply understanding and empathizing with their end user's needs, challenges, and aspirations. While the precise procedures may differ depending on the source, the following is a widely used structure with five essential stages:

 Empathize	By deeply immersing yourself in the user's perspective, you gather valuable insights through various research methods to understand their unspoken needs, experiences, challenges and pain points. You can conduct interviews, surveys, or observations to gain insights into their behaviors and motivations.
 Define	Once you've gained insights, you can convert the raw insights and define the problem you wish to fix. You should frame the problem in a way that is specific, actionable, and relevant to the user's actual needs.
 Ideate	In this step, you unleash your imagination to create as many potential solutions as you can for the issue. You can use brainstorming techniques, such as mind mapping to come up with creative solutions.
 Prototype	Prototypes are made to test the concepts once the best ones have been chosen. Prototypes can be anything from fully functional models to sketches or quick mock-ups for hands-on. The objective is to improve the solutions and gather user input.
 Testing	In the final step, the user will test the prototype, and you gather feedback. This feedback will help you enhance the solutions and ensure that they meet genuine user's expectation.

DETAIL STEPS

In October 2024, our group was given a task to create a prototype based on our assigned topic which is big data and artificial intelligence. After discussing our assigned topic, there are several topics that we came out to represent the challenges related to big data and artificial intelligence which are healthcare system, e-commerce, smart cities and food care system. After a thorough discussion, we all agreed that the food care system under UTM Dining Section would be the best option to focus on. We have identified our main clients that represent the UTM Dining Section which are the students, food managers and food riders. Students has seen to be struggling while using the UTM Dining Section as the information is incomplete or missing in the system. Food manager has difficulties to update menus and prices time to time, while food riders face challenges to determine the exact location of the students and dealing with poor network connectivity. These challenges highlight the needed for a better user-friendly system to address their concerns while using the UTM Dining section.

2.1 Empathize

The first step we took was to create and distribute a Google Form for the students in order to get better analyse about the problems that they face while using UTMSmart. We collected responses over a period of 7 days, during those time 70 students have filled out the form. From their feedback, we have identified the specific needs of the students in the UTM Dining Section. After that, we conducted interviews with food rider and food manager, so we as a student can understand their perspectives as the individuals responsible for preparing and delivering food. The interviews were conducted face-to-face for food manager, but online platform, Google Meet for food rider during our mid-semester break. Throughout these interviews, we were able to ask questions to identify their challenges which helped us in the next step of our process.

2.2 Define

After the empathizing phase, we gathered the information from the Google Form and interview sessions together. During our discussion, we managed to come out the key problems faced by each individual. The main problems faced by students were frequent changes in operating hours by store owners, limited menu options along with unaffordable prices. For food managers, they are not familiar with this new technology whereas they might find it bothersome to update their menus and prices by manually regularly. On the other hand, food rider might have encountered some communication issues between the students regarding the exact delivery location, as well as dealing with poor network connectivity especially during rainy weather which can affect their efficiency.

2.3 Ideate

During this ideate stage, we finalized the problems faced by our clients while using the UTM Dining Section system. We brainstormed the ideas on how to improve system to meet the expectation for all the users. During our discussion, we unanimously agreed that adding a chatbot would be the greatest improvement as it can helps the students with instant access to menus and real-time updates for menus or operating hours changes as well as for food managers. Food riders aslo can use the chatbot to promote their delivery services and it will be easier and more flexible for them to update their delivery service information. An online ordering platform also become our improvement target as students prefer online delivery during busy days with assignment and assessment. In online ordering platform, we put a double verification which is live location and photo that upload from the user, so that AI can detect either the live location is synchronize with the uploaded photo. The purpose for this action is to make sure that food rider won't be scammed by the costumer after accept any order when using our app. Nutritional information and food tracker also under our list for improve the system. By combining our collective thinking and creativity, we get to provide innovative ideas and solution for the problems.

2.4 Prototype

In this stage, after we finalized the functions and features through ideation in our prototype, each member was assigned a task to design the prototype that has been planned for students, food managers and food riders.

2.5 Test

In this stage, upon finalizing our prototype design, we tested some of the features of the prototype such as AI and the chatbot, allowing us to access its functionality and features and get the user opinions regarding the potential improvement

DETAILED DESCRIPTION

3.1 Problem

In today's era of modern technology, people increasingly seek convenience in all aspects of life, including dining. This demand for ease has driven the development of innovative solutions at the intersection of technology and artificial intelligence. Based on a review of USDA data, Escoffier found that in 2023 Americans spent just 44.3% of their food budget on food at home (FAH) while their spending on food away from home (FAFH) reached an all-time high of 55.7%. Because of that, app developer needs to create an app that can fulfil user’s will. Many people face a lot of problem when they need to use an app like Food panda, Google Map, Menupage and more. It is not just only the one want to find a place for dine in but also the one wants to provide a best service and accurate information about the restaurant which food delivery rider and restaurant manager.

In Malaysia, citizens love to go food hunting, and students, particularly at educational institutions, often hang out with friends after class or at night. This is largely because Malaysia boasts a diverse array of unique and delicious cuisines that not only satisfy locals but also attract travellers from around the world. Therefore, when people want to find a place to dine in, they usually will not make an early preparation in finding a place to dine in. Moreover, people always have a problem when choosing a menu because human have a natural habit in craving a different food according to time. For food delivery rider, they sometimes facing an issue when doing a delivery such as address is not accurate, receive an order from someone that suddenly can’t reach out when arrive at the destination. All of this issues, make all the rider gain a bad experience in using the food service app and also make them loss a profit because they need to be responsible for the food that they buy for the costumer. Besides that, restaurant manager also facing an issue when using food service app. Restaurant manager didn’t know how to use the app because the app is too complicated to use. Therefore, they need to find another alternative by spreading all the information about their restaurant through Whatsapp and Telegram which is easier to use but need an effort because they need to promote their restaurant every day. It will indirectly give a user having a hard time when to make sure their restaurant reaches the target sales.

3.2 Solution

After recognizing the problems and identified all potential solutions during ideate phase, we agreed that there must be a way to solve these challenges faced by our clients. Artificial Intelligence (AI) is the key factor that leads to trends of technology nowadays. Not only they can act as human-being in this modern era but it preserves the traditional ways on how we use the system. With Artificial Intelligence, clients are able to interact with the systems and customized according to their preferences as an individual.

Our product, ‘ADI’ uses Artificial Intelligence technology to enhance overall clients experience as it can analyse client's data such as past order and food tracking for the students. AI virtual assistants also make it easier for food managers since it helps them to upload their updated menus without involving third party, the person who create this UTM Dining Section system. AI enhance food rider’s communication as it can provide real-time updates or any changes in customer’s address.

3.3 Team Working

To make sure everything went smoothly as our plan, during our first meeting, we first discussed together on who would be the leader of our group. With one voice, we chose Aman because of his capable leadership quality. After that we jump to the topics about what our final app will look like. After few discussions and some researching, we finally get our absolute determination to do Artificial Intelligent, AI in our food service app. The five phases that we applied to solve the problems regardless our project is empathy, define, ideate, prototype and test.

After that, Auni and Umairah begin to make the Google Form and send it to all students for them to filled it through WhatsApp and Telegram group to gather as many responses as we can. Apart from that we also interview Encik Azamuddin who is one of experienced food rider and also Encik Danish who are food manager that interviewed by Aman to get some inputs on what problems that they get during their works in food services and ask for their perspective on our app. Furthermore, we also gather some data's such as locations, operating hours, menus and prices from in UTM's Arked facilities as a guide for our project enhancement.

Finally, we began to start our prototype design where we discuss and design the app together. At the same time, Aman and Haykal oversaw sketching the prototype on the papers. After that we ask user who act as customer to use our prototype app. Throughout this journey, every process flowed seamlessly thanks to our collaborative interaction, and everybody perform their assigned roles efficiently.

DESIGN THINKING ASSESSMENT POINTS

Creating a design thinking assessment involves a thoughtful process to ensure that it effectively evaluates the key aspects of design thinking. That's why we first and foremost clearly outline the objective of the assessment that is Artificial Intelligence in Food and Dine in service applications.

At the very beginning of the stage, the empathize stage, each of team members were having the conversation to give an idea about how we can create something as our project that can be beneficial not just for a small percentage of people instead for a large amount of people. We were also discussing this with our TIS lecturer which is Dr Aryati binti Bakri and we receive an idea from our TIS lecturer's suggestion and decide to make an interview with someone that have connection with one of our group members which is Auni Sofia's brother of friend that have a an experience as food delivery rider. Moreover, we also decided to interview a restaurant manager, and we are so lucky that one of our group members which is Aman that have a friend that been working as restaurant manager with 3 years experience. So, we decided to get in touch with them and have an interview session to get to know more insight in-depth and identify the problem which he was facing.

Next, we move to the define phase where were go over with a fine-tooth comb the problem statements which were mentioned by the restaurant manager and food delivery rider in the empathize phase. After doing some research on our own, we categorized the problems and listed them down.

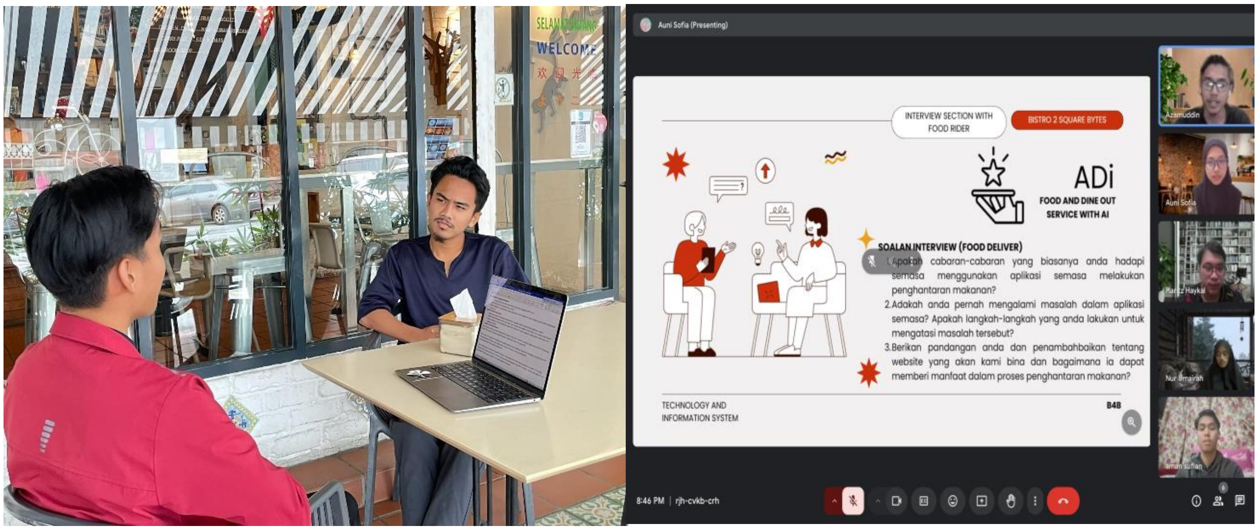
We then proceed to the ideate phase. During this phase, we brainstormed to figure out an ideas and solutions for the problems listed in the define phase. At this stage, the assessment process became essential in eliminating any irrational or irrelevant ideas and solutions. For the final phase, we all unanimously deciding the best solution for our project.

Lastly, we proceed to the prototype phase by using the solution created during the ideate phase. We designed our prototype which is a website that has an AI option on it. This feature allow user as costumer, food delivery rider and restaurant manager to utilizing the function that can help them in a virtual environment as fast. can use their smartphones or devices to virtually walk through spaces, assess dimensions. This technology enables a more in-depth understanding of property's layout, features, and potential and will make it easier for them to make decisions which will save a lot of time and energy for both agent and customer.

DESIGN THINKING EVIDENCE

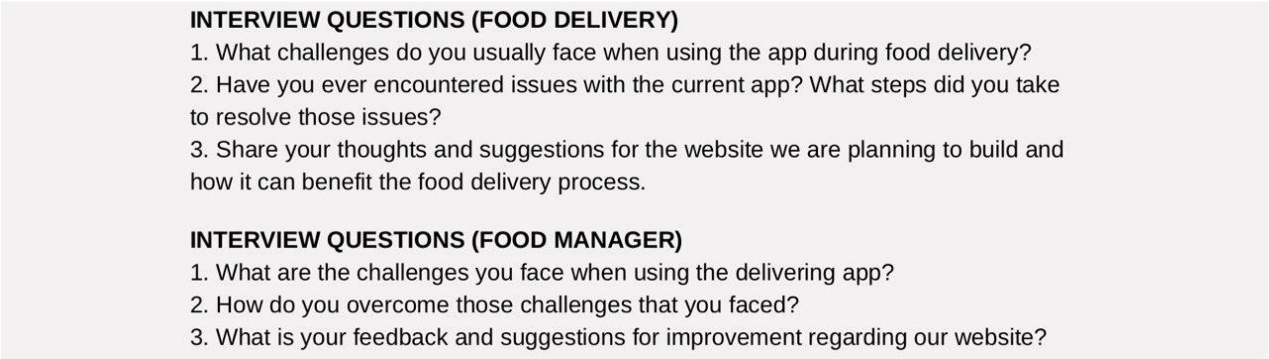
Empathy Phase

Our team conducted an interview session with Encik Azamuddin and Encik Danish who are professional food rider and food manager get their inputs and insight regardless the problems they faced and insight on out app. We also have conducted a survey through Google Form to gather information from the customer side. From all of the information's, we get to know what the challenges and problems of current ways are of how food service works. Lastly, we decide to survey each arked in UTM, so that we can know more information about menu, price and busy hour for each restaurant


SELAMAT DATANG
WELCOME
Auni Sofia (Presenting)
INTERVIEW SECTION WITH FOOD RIDER
BISTRO 2 SQUARE BYTES
ADi
FOOD AND DINE OUT SERVICE WITH AI
TECHNOLOGY AND INFORMATION SYSTEM
B4B
Azamuddin
Auni Sofia
Haikal
Nur Amirah
8:46 PM | rjh-cvkb-crh

SOALAN INTERVIEW (FOOD DELIVER)
1. Apakah cabaran-cabaran yang biasanya anda hadapi semasa menggunakan aplikasi semasa melakukan penghantaran makanan?
2. Adakah anda pernah mengalami masalah dalam aplikasi semasa? Apakah langkah-langkah yang anda lakukan untuk mengatasi masalah tersebut?
3. Berikan pandangan anda dan penambahbaikan tentang website yang akan kami bina dan bagaimana ia dapat memberi manfaat dalam proses penghantaran makanan?

Figure 1 : Interview with Encik Azamuddin and Encik Danish



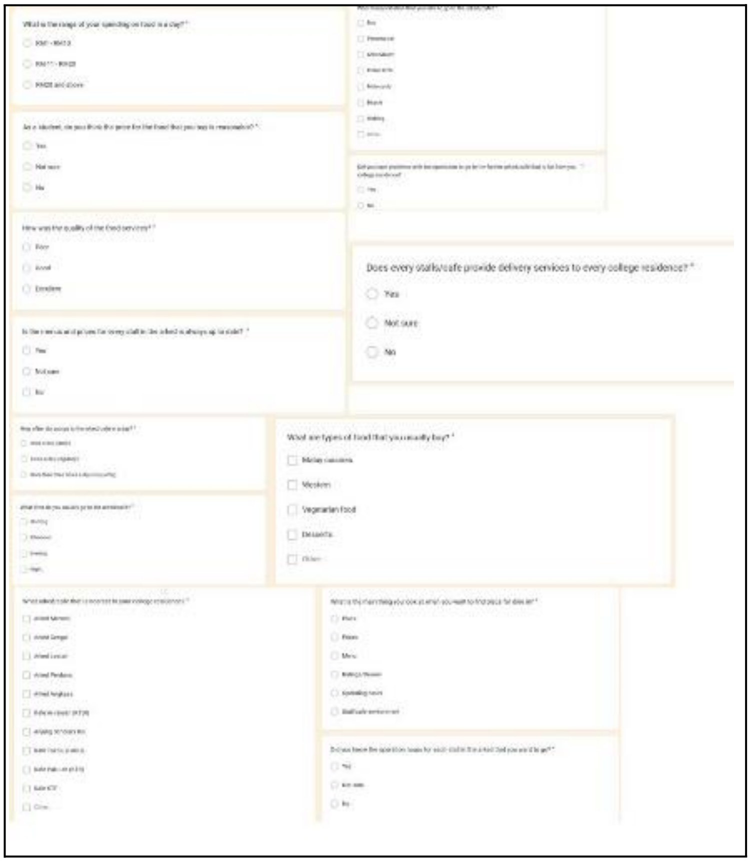
INTERVIEW QUESTIONS (FOOD DELIVERY)
1. What challenges do you usually face when using the app during food delivery?
2. Have you ever encountered issues with the current app? What steps did you take to resolve those issues?
3. Share your thoughts and suggestions for the website we are planning to build and how it can benefit the food delivery process.

INTERVIEW QUESTIONS (FOOD MANAGER)
1. What are the challenges you face when using the delivering app?
2. How do you overcome those challenges that you faced?
3. What is your feedback and suggestions for improvement regarding our website?

Figure 2: List of questions during the interview

Menu
LAYAN
AYAM CILI KERING
HARI INI ADA...

Figure 3 : All of team members went to survey for each restaurant at UTM



Does every stalls/cafe provide delivery services to every college residence? *

○ Yes

○ Not sure

○ No

What are types of food that you usually buy? *

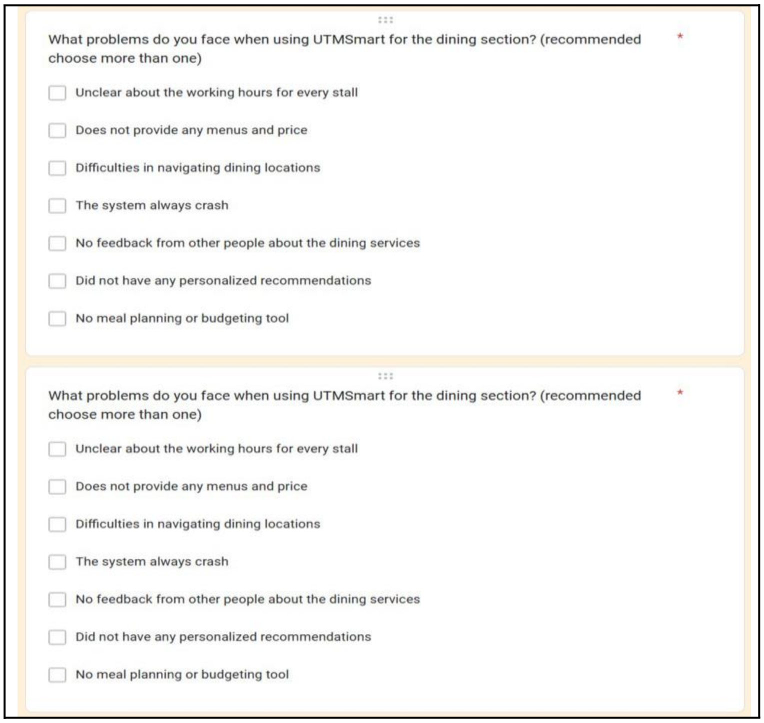
☐ Malay cuisines

☐ Western

☐ Vegetarian food

☐ Desserts

☐ Other:



What problems do you face when using UTMSmart for the dining section? (recommended choose more than one) *

☐ Unclear about the working hours for every stall

☐ Does not provide any menus and price

☐ Difficulties in navigating dining locations

☐ The system always crash

☐ No feedback from other people about the dining services

☐ Did not have any personalized recommendations

☐ No meal planning or budgeting tool

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☐ No feedback from other people about the dining services

☐ Did not have any personalized recommendations

☐ No meal planning or budgeting tool

Figure 3.1 and 3.2: List of questions from Google Form

Define Phase

During this phase, we gathered all the information we got from the interview session and from the google form. From there we were able to get a better understanding of problems faced by them which allowed us to tailor our solution more effectively to address their specific needs and challenges. Below here are the result from the Google Form:

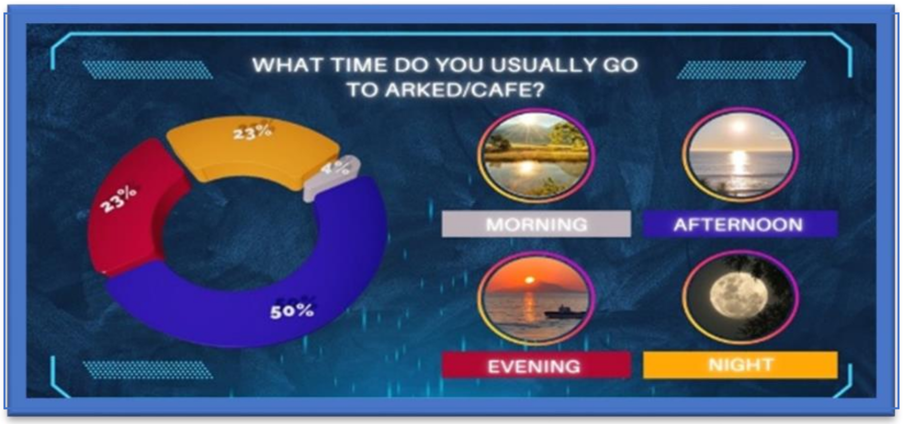


Figure 4.1

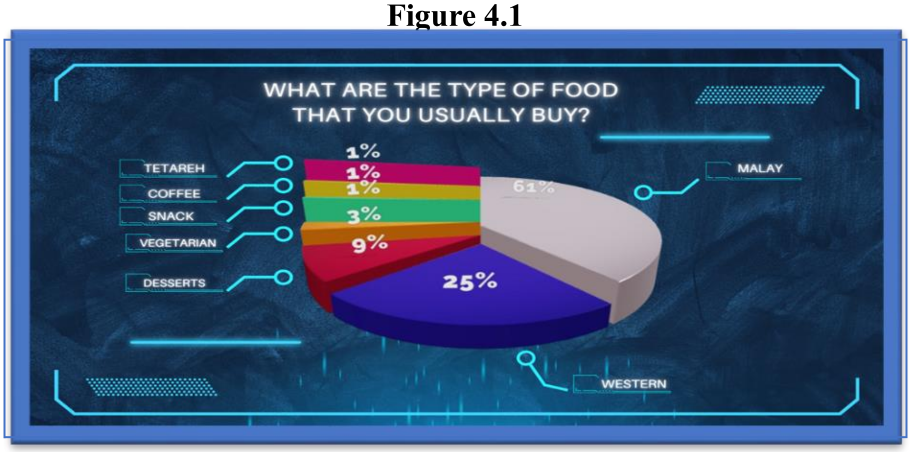


Figure 4.2

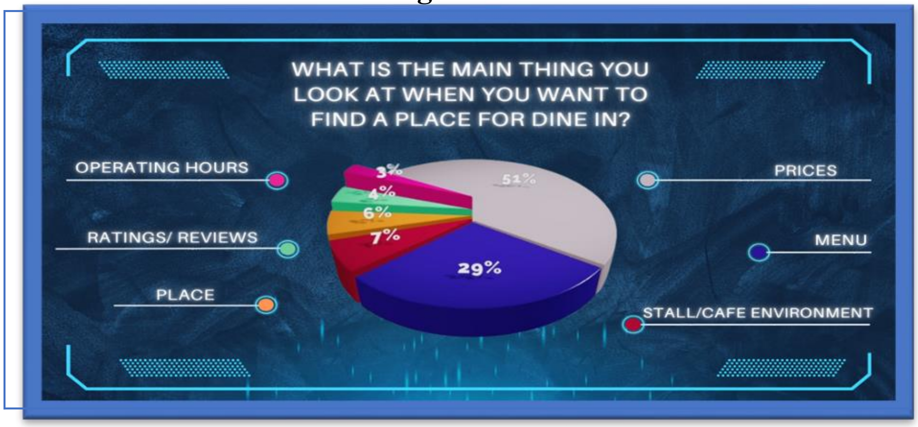


Figure 4.3

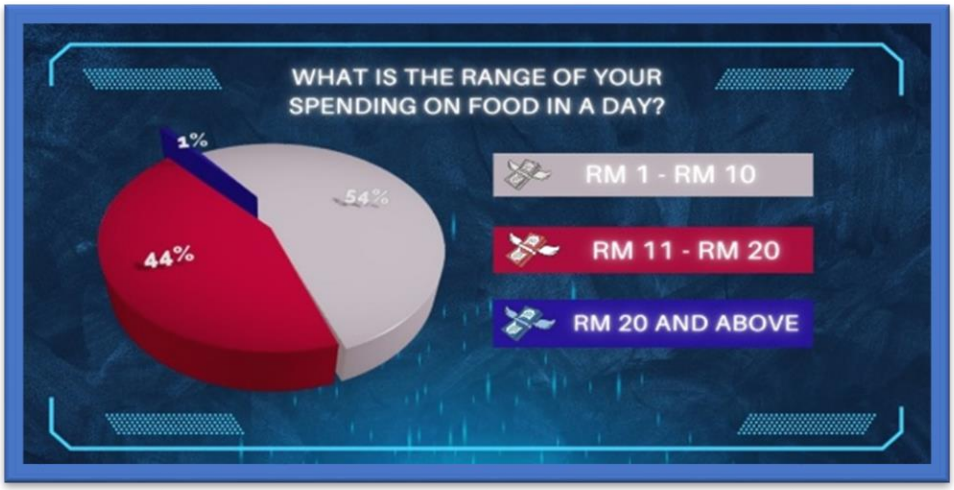


Figure 4.4

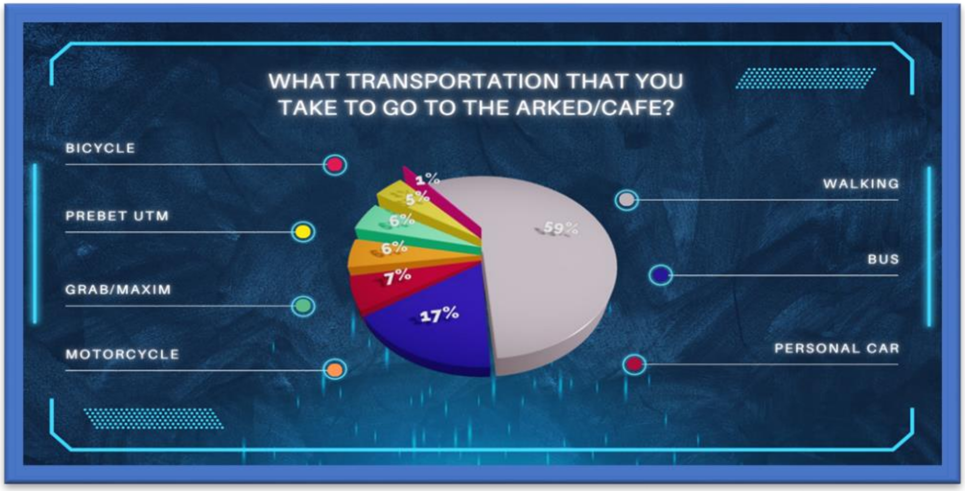


Figure 4.5

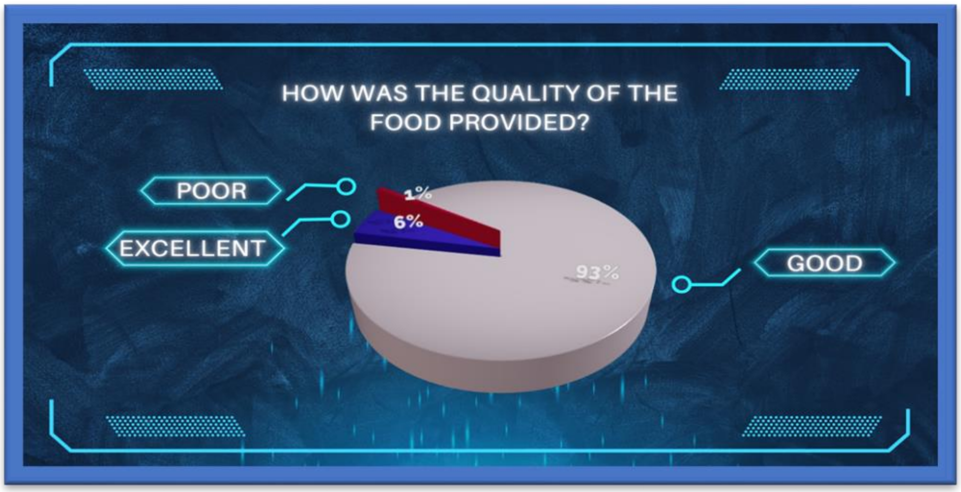


Figure 4.6

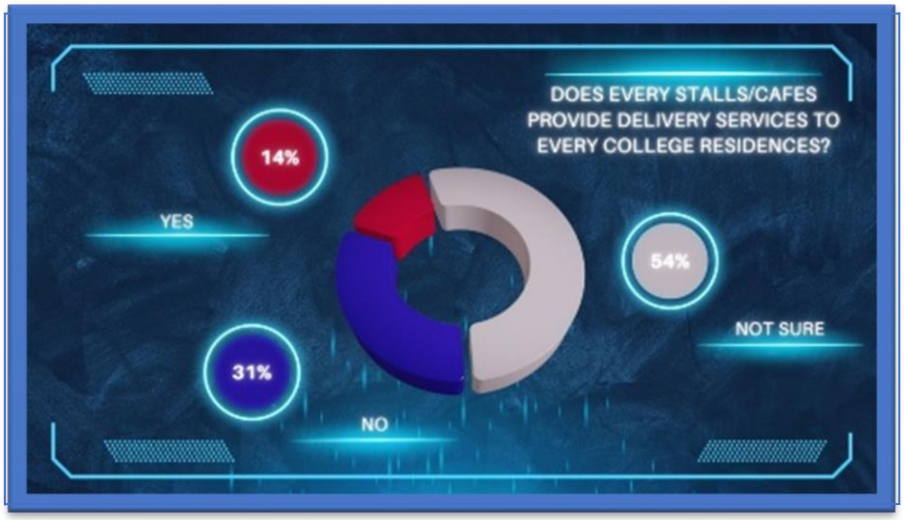
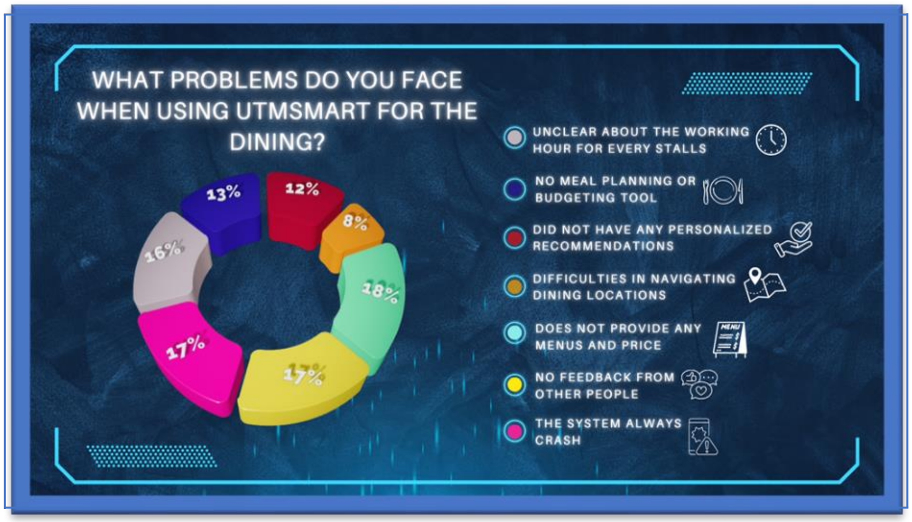
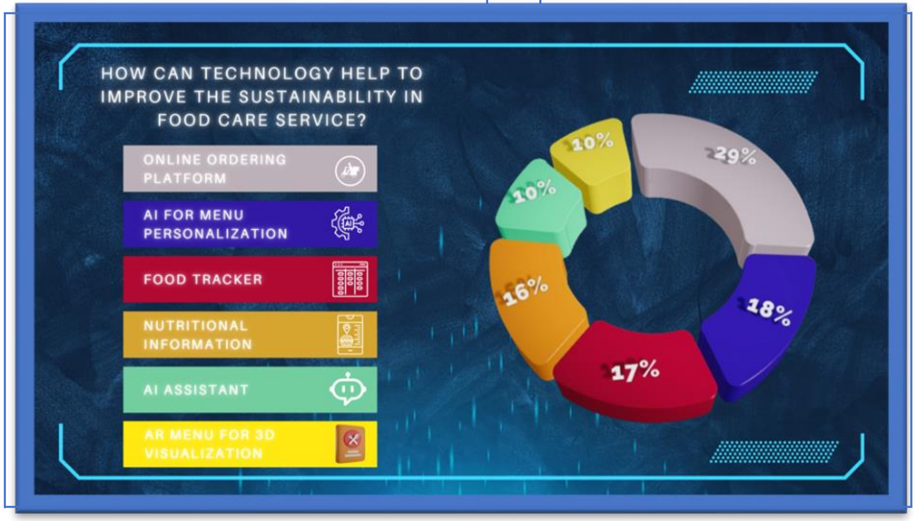

DOES EVERY STALLS/CAFES PROVIDE DELIVERY SERVICES TO EVERY COLLEGE RESIDENCES?

Figure 4.7


WHAT PROBLEMS DO YOU FACE WHEN USING UTMSMART FOR THE DINING?

- UNCLEAR ABOUT THE WORKING HOUR FOR EVERY STALLS
- NO MEAL PLANNING OR BUDGETING TOOL
- DID NOT HAVE ANY PERSONALIZED RECOMMENDATIONS
- DIFFICULTIES IN NAVIGATING DINING LOCATIONS
- DOES NOT PROVIDE ANY MENUS AND PRICE
- NO FEEDBACK FROM OTHER PEOPLE
- THE SYSTEM ALWAYS CRASH

Figure 4.8


HOW CAN TECHNOLOGY HELP TO IMPROVE THE SUSTAINABILITY IN FOOD CARE SERVICE?

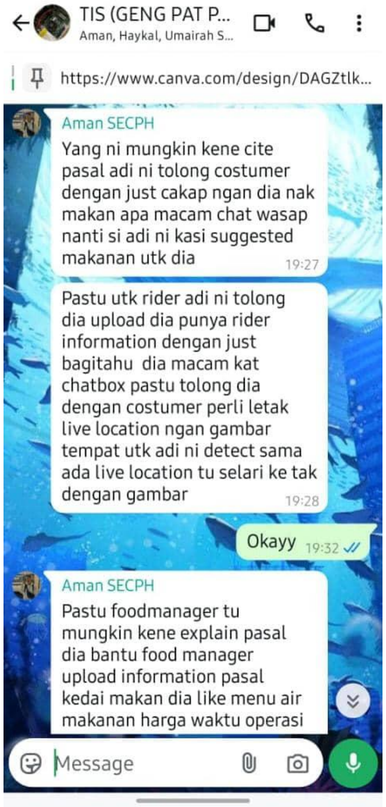
- ONLINE ORDERING PLATFORM
- AI FOR MENU PERSONALIZATION
- FOOD TRACKER
- NUTRITIONAL INFORMATION
- AI ASSISTANT
- AR MENU FOR 3D VISUALIZATION

Figure 4.9

Ideate Phase

In this phase, we discussed among ourselves to find the best solution to solve the problem we have gathered. We brainstormed and stated all the possible solutions and lastly, we came up with the idea to create an app using AI (Artificial Intelligent) that can help the user to order food easily, to help food rider to send food smoothly and to help food manager to manage the up-to-date menus and prices.

Figure 5.1


TIS (GENG PAT P...
Aman, Haykal, Umairah S...
https://www.canva.com/design/DAGZtlk...
Message

Aman SECPH
Yang ni mungkin kene cite pasal adi ni tolong costumer dengan just cakap ngan dia nak makan apa macam chat wasap nanti si adi ni kasi suggested makanan utk dia 19:27

Pastu utk rider adi ni tolong dia upload dia punya rider information dengan just bagitahu dia macam kat chatbox pastu tolong dia dengan costumer perli letak live location ngan gambar tempat utk adi ni detect sama ada live location tu selari ke tak dengan gambar 19:28

Okayy 19:32

Aman SECPH
Pastu foodmanager tu mungkin kene explain pasal dia bantu food manager upload information pasal kedai makan dia like menu air makanan harga waktu operasi

Figure 5.1 and 5.2: shows the discussion process about the solution

Prototype Phase

In this prototype phase, we used all the ideas, insight, and information we collected from previous phases as the foundation and guidance in developing our prototype and ensuring that we meet all the needs of the users.

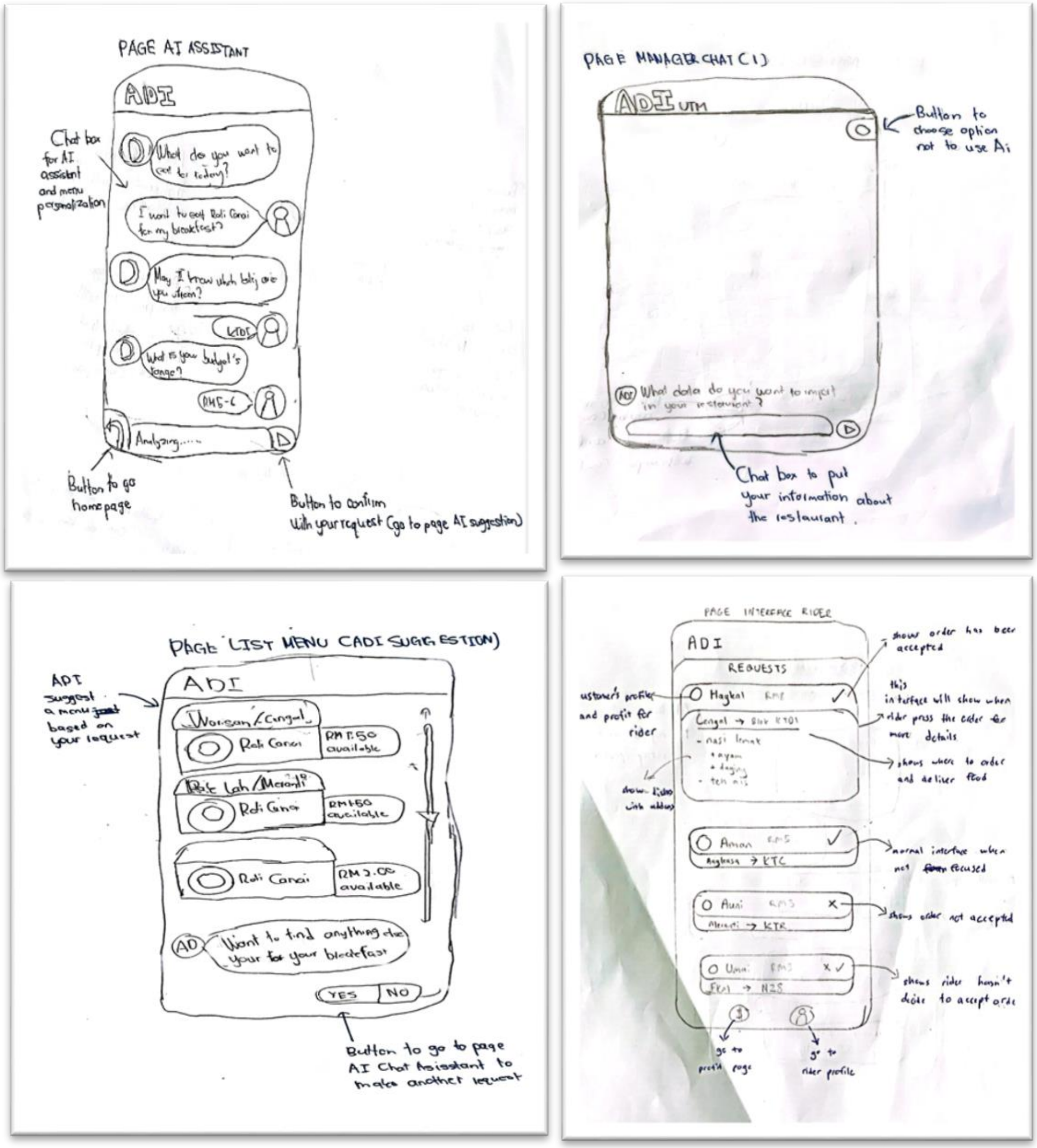
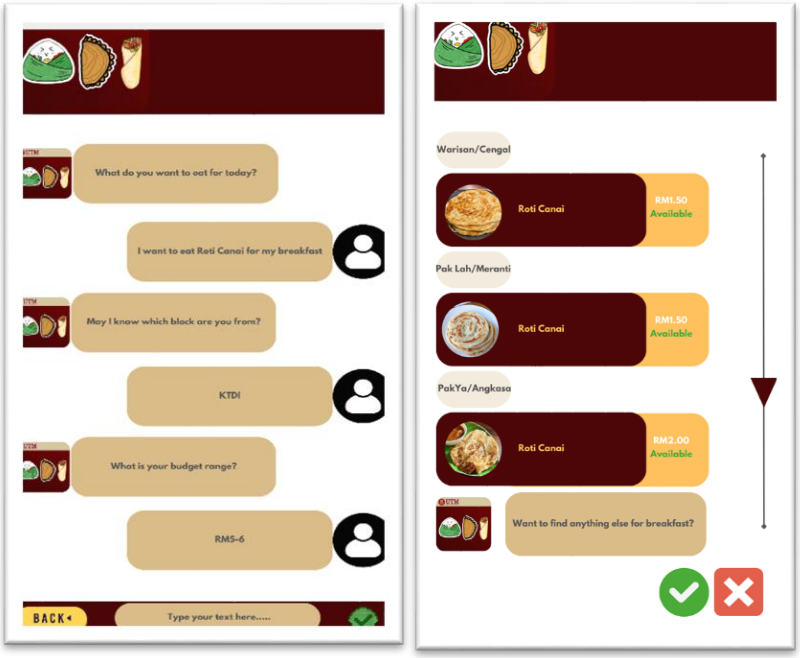

PAGE AI ASSISTANT
ADI
Chat box for AI assistant and menu personalization
What do you want to eat for today?
I want to eat Roti Canai for my breakfast?
May I know which kolej are you from?
KTDI
What is your budget's range?
RM5-6
Analyzing.....
Button to go homepage
Button to confirm with your request (go to page AI suggestion)
PAGE MANAGER CHAT (1)
ADI UTM
Button to choose option not to use Ai
What data do you want to input in your restaurant?
Chat box to put your information about the restaurant.
PAGE LIST MENU (ADI SUGGESTION)
ADI suggest a menu ~~food~~ based on your request
ADI
Warisan/Cengal
Roti Canai
RM1.50 available
Pak Lah/Meranti
Roti Canai
RM1.50 available
Roti Canai
RM2.00 available
AD
Want to find anything else your for your breakfast
YES
NO
Button to go to page AI Chat Assistant to make another request
PAGE INTERFACE RIDER
ADI
REQUESTS
Haykal RM5
Cengal → Blok KT01
- nasi lemak
• ayam
• daging
- teh o ais
Aman RM5
Angkasa → KTC
Auni RM5
Meranti → KTR
Umni RM5
FKM → N25
customer's profile and profit for rider
shows order has been accepted
this interface will show when rider press the order for more details
shows where to order and deliver food
show list of order with address
normal interface when not ~~focus~~ focused
shows order not accepted
shows rider hasn't decide to accept order
go to profit page
go to rider profile

Figure 6.1: Website prototype



What do you want to eat for today?

I want to eat Roti Canai for my breakfast

May I know which block are you from?

KTDI

What is your budget range?

RM5-6

Warisan/Cengal

Roti Canai RM1.50 Available

Pak Lah/Meranti

Roti Canai RM1.50 Available

PakYa/Angkasa

Roti Canai RM2.00 Available

Want to find anything else for breakfast?

Figure 6.2: Product prototype

Prototype Testing Phase

During this phase which is to test the prototype, we ask several users to test our prototype. Most of them gave positive feedback toward the prototype and were impressed by it. One of them also stated that this could be useful for the manager to always update the menus and prices.

Figure 7.1: shows the user is testing the prototype

REFLECTION

1. Aman Sufian Shah bin Shamsuddin (A24CS0046)

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

My goal regarding my course which is computer science and data engineering is to make sure our modern technologies in digital systems secure and fully optimized and use my expertise to develop innovative solutions that protect data, networks and applications from any cyber threats that might be happen in the future.

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

While fully contribute to design thinking project, it enhances my ability and soft skills to produce innovative and effective solutions ensuring that the solutions address real-world challenges. It also inspire me to collaborate with other people so that I can find the a way to implement the best solutions .

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

To upgrade my ability in the industry, I plan to always learn more knowledge by continuously practice, keep on update with the latest technology system, join any program related with my major just to get relevant certifications, participate in hands-on projects and find a community that shares the same interest.

2. Haritz Haykal bin Hisham (A24CS0250)

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

My goal regarding my course/program is to acquire a deep and comprehensive understanding of the subject matter. I aspire to develop not only the knowledge but also the practical skills necessary to excel in my field and use these opportunities to leverage my mark on the industry in an impactful way.

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

This design thinking has allowed me to experience firsthand working together in a group and has instilled into me the importance of not only good teamwork, but also efficient leadership. This will certainly be useful in my upcoming endeavours to solve many problems in the future.

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

I must improve myself by studying and increasing my well of knowledge on the matter and also the trends circulating the industry so that I may apply it whenever the time comes. I should also improve my practical skills via practice so that I can get used to my application of knowledge.

3. Auni Sofia binti Abd Rahman (A24CS0051)

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

My goal is to learn and improve myself in many types of programming languages and I also want to learn and sharp my soft skills and critical thinkings to prepare myself to contribute in the innovative solution in the future and my career.

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

Through this immersive design thinking project, it has been helping me a lot in improving myself in social skills and developing collaborative abilities with my teammates and also other people who has been helping in this project. It also exposes me to various kind of ideas and point-of-views during discussion session that ultimately enhancing my critical reasoning skills.

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

To make sure I have a great value in industry, I will make sure to stay up-to-dates with the newest and trending technologies and engages myself in any industry events and online community.

4. Nur Umairah binti Zamri (A24CS0168)

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

My goal regarding my data engineering course is to gain knowledge and learn skills on how to solving problems using critical thinking. I'm trying to adapt to the frequent changes of technology for my better future preparation.

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

From this design thinking project, I learned a new knowledge after several discussion with my group members where it opens my perspective towards other. I'm also gain opportunity to interact with other people from different background and stories where helps me to improve my social and softskills.

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

For better future version oof myself, I'm planning to gain as much knowledge as possible and trying to build connections with senior which might able to help me for preparation in industry. Staying updated with the latest technologies and sharpen my skills definintely my plan throughout these 4 years in university.

TASK DISTRIBUTION

No	Members	Task
1.	Aman Sufian Shah bin Shamsuddin	1. Design Prototype 2. Report writing

	A24CS0046	3. Data collector
2.	Haritz Haykal bin Hisham A23CS0250	1. Design Prototype 2. Report writing 3. Data collector
3.	Auni Sofia binti Abd Rahman A24CS0051	1. Data collector 2. Report writing 3. Presentation slide preparation
4.	Nur Umairah binti Zamri A24CS0168	1. Online information searcher 2. Report writing 3. Video preparation

REFERENCE

1. *UTMSmart*. (2018, March 7). UTMDigitalUniversiti Teknologi Malaysia. https://digital.utm.my/apps-privacy-policy/utmsmart/