



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**SECP1513-02 TECHNOLOGY AND INFORMATION SYSTEM**

**Design Thinking Project Report**

**Product Name : e-DISCUSSION ROOM BOOKING SYSTEM**

**Group Name : Group 5**

**Prepare for: Dr.Aryati binti Bakri**



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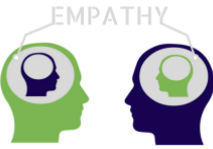


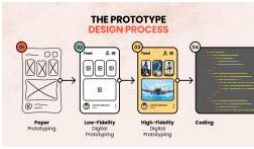

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## 1.0 Introduction

Design thinking is an iterative, non-linear process that teams use to understand users, challenge presumptions, reframe issues, and develop creative prototype and test solutions. It consists of five stages and is most effective when applied to problems that are unclear or unidentified:

	<p>Empathy stage when we try to understand user needs and problems need to be addressed. We can conduct surveys to understand problems faced by user. We also can interview users to know about user requirements. Empathy is very crucial in developing a human-centred process because it allows us as thinkers to think logically and set aside our own assumptions.</p>
	<p>On this stage, we will analyse information gathered in the previous stage. This stage helps us to develop a deep understanding of users' problems and come up with actionable plans to solve the problem.</p>
	<p>Ideate stage where we process as much as idea we can come up with for user problems. We can use various brainstorming techniques such as, mind map to organize solutions.</p>
	<p>In this stage, we will make our idea into the physical world solution. Prototype can be anything that takes physical form from fully functioning models to sketches.</p>
	<p>Testing stage where we will try to test our solution and gather feedback from users to make our solution better and meet users' requirements.</p>

## **2.0 Detail steps**

In October 2024, our group was given a task to create a prototype based on our assigned topic which is e-Discussion Room Booking System. After discussing our given topic, we have come up with one potential client that is a student who wants to book a discussion room or carrel room for their assignment discussion without going to the library in advance to book the room and worrying whether there is room available. In order to do this, we need a more accurate and interactable model to check the room availability and book the room before going to the library. This helps students to save their time.

### **2.1 Empathize**

The first step we took is by holding an interview with students that study at UTM, so we can have better insight on the problems faced as a student while booking discussion rooms or carrel rooms in the library. The interview was held with Lee Pei yuan and Auni Sofia who usually use the library's discussion room. We managed to ask our questions and find out the problems faced by students. The information gained in the interview alone has helped us a lot in the next step.

### **2.2 Define**

After the empathizing stage, we discuss the information gathered from the interview session together. In our discussion, we managed to come up with 2 problems with the current method of using the traditional booking system which requires you to go to the library counter and book the room. The problems are students don't know whether the discussion room is available or not, and they only can book if there is room available which is time consuming for the students.

### **2.3 Ideate**

Since we already have a clear problem statement after listing and categorizing the problems from the last stage. We can put our heads together and brainstorm various ideas to generate new solutions for the problems. There are several solutions for the problems that we are able to find.

## **2.4 Prototype**

In this stage, we finally design and make our prototype. After deciding the features and functions, we distributed the task among ourselves and designed the prototype. The prototype was based on the ideate stage.

## **2.5 Test**

In this stage, we have finally finished designing our prototype. We tested some of the features of the prototype such as checking the availability of the discussion room and booking function, so we can examine its functions and features and get their opinions on our prototype to know if there are any flaws.

### **3.0 Detailed Description**

#### **3.1 Problem**

Library is the top place where students go to complete their assignments, have group discussions and to have a quiet place to study together. In order to do so, students are likely to book a discussion room or carrel room in the library. The rooms are highly demanded during exam seasons which are at the end of the semester. The student has to manually book a room through the staff at the library. The students have to go to the library and book the room in advance or else the rooms will be fully booked by other students especially during exam seasons.

The major problem is that the booking system is via a library staff. In order for students to know which rooms are still available for them to book, the students had no option other than to go to the library and see the list of room booking from the library staff. It will be much more convenient for them if the booking system is updated to a website or app, so the students can know which rooms are still available for them to book. They also can know the capacity for each room and real time room availability updates from the library.

### **3.2 Solution**

After recognizing the main problem that the students face during the booking procedure or process at the library, we have reached a solution after brainstorming together. This solution could potentially lead to a better booking system at the library and it is much more convenient for both students and library employees.

We introduced our prototype which is the upgraded version of the existing booking system at the library. We design a website for the students to book a room at the library. We add features such as the limit time for each booking and real time updates on room availability. The students only need to fill in the details of themselves on the website, book a slot that they prefer and it will display the room number and the time slot that they have chosen.

It may seem simple but it is very convenient for both the students and library staff, the students can know the real time updates anytime and anywhere with the website. It also won't be a hassle for the library staff to take every student's details who wants to book a room in the library and key in their details for each of them.

### **3.3 Team Working**

In this project, teamwork was important to ensure everything proceeded according to plan and was submitted before the deadline. First, we held a physical meeting to determine the design thinking topic we wanted to work on. We decided to implement the E-discussion room booking system at UTM. We applied five phases-empathy, define, ideate, prototype and test to address the problems. Then, we conducted interviews with two individuals and created a Google Form survey to gather feedback on our projects and identify problems on the current discussion room booking method.

Since there were four members on our team, we divided tasks according to each member's strengths. We regularly held meetings to ensure everything was going well and to address challenging issues together. Each member contributed unique insights that help achieve the project goals. Our teamwork resulted in a successful project that fulfilled all objectives by the deadline. This experience highlighted the importance of communication and flexibility in achieving group success.



## **4.0 Design Thinking Assessment Points**

Assessment is essential in design thinking to ensure the project stays aligned with its objectives and user needs. The objective of the e-discussion room booking system in UTM was to create a solution that would improve efficiency in reserving discussion rooms.

During the empathize phase, we explored how to design a system that would serve a large number of users, ensuring it was user-friendly and simplified the booking process. We conducted interviews with individuals who regularly used the current room booking system to gather feedback on the challenges they faced, such as uncertainty about room's availability and library-imposed time limits for discussions.

In the define phase, we analysed, categorized and documented problem statements to clarify the system requirements. This phase was crucial for verifying the accuracy of our findings and ensuring we had a well-defined problem statement before moving forward.

During the ideate phase, we brainstormed various solutions to address the identified problems. Techniques such as team discussions helped us integrate features like real-time room availability and a simple user interface. At the end of this phase, we selected the best solution that aligned with user needs and project objectives.

In the prototype phase, we designed a system that allowed users to easily book discussion rooms. The system included features such as selecting the type of room, choosing dates and times through a straightforward interface, and addressing the problems identified in earlier phases. This prototype aimed to enhance the user experience and streamline the booking process.

In the testing phase, we gather user feedback on the prototype's functionality and usability. Users interacted with the system and identified problems related to its interface or room availability. This feedback enabled us to simplify the user interface and address technical problems, ensuring the system met the user expectations.

## 5.0 Design Thinking Evidence

### 5.1 Empathy Phase

Our group conducted an interview session with Lee Pei Yuan and Auni Sofia who are UTM students. We also conducted a survey through Google Form to get information from the customer side. From here we are able to get to know what are the challenges and problems of the current booking system.



Figure 1 : Interview with Lee Pei Yuan and Auni Sofia

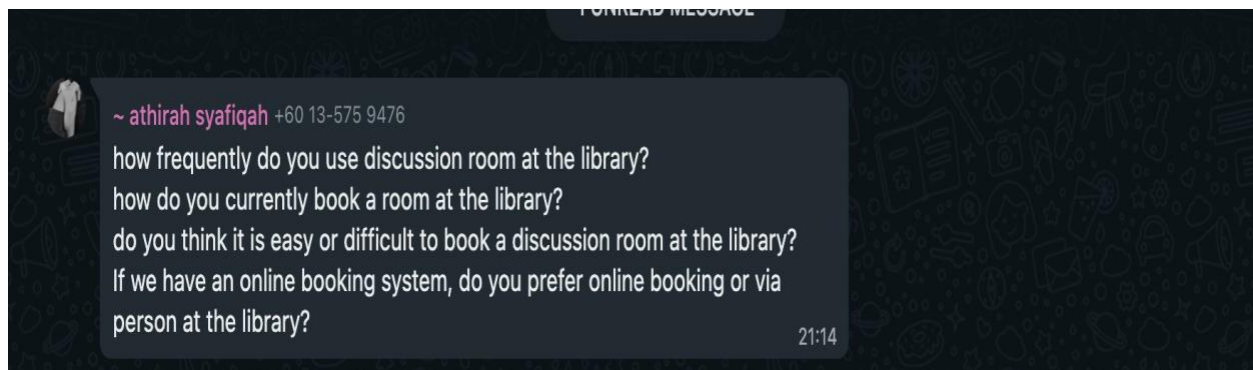


Figure 2 : List of questions during the interview

# Discussion Room Booking System

We're conducting a survey to improve the process of booking discussion rooms at the library using AI system. Your feedback will help us understand your needs and preferences, so we can create a better booking experience for all library users. The survey should only take a few minutes to complete. Thank you for your input.

*\* Indicates required question*

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1. How frequently do you use the library's discussion rooms? \*

*Mark only one oval.*

- ☐ Never
- ☐ Rarely
- ☐ Occasionally
- ☐ Frequently
- ☐ Very frequently

2. **What is the primary purpose for which you use the discussion rooms?** \*

(Select all that apply)

*Check all that apply.*

- ☐ Group study
- ☐ Collaborative work
- ☐ Meetings or presentations
- ☐ Quiet study or reading

3. How do you currently book a discussion room? \*

*Mark only one oval.*

- ☐ In-person at the library
- ☐ Via the library website or app
- ☐ Through email or phone request
- ☐ I do not book rooms

4. How easy or difficult is it for you to book a discussion room? \*

*Mark only one oval.*

- ☐ Very easy  
☐ Somewhat easy  
☐ Neutral  
☐ Somewhat difficult  
☐ Very difficult

5. What aspects of the room booking process do you find most frustrating? \*  
(Select all that apply)

*Check all that apply.*

- ☐ Option 1 Availability of rooms  
☐ Complicated booking interface  
☐ Length of time to reserve a room  
☐ Limited booking hours  
☐ Lack of room information (e.g., amenities, capacity)

6. Which features would improve your experience when booking a discussion room? (Select all that apply) \*

*Check all that apply.*

- ☐ A clearer online booking system  
☐ Real-time room availability updates  
☐ Ability to book rooms in advance or for longer periods  
☐ Option to select room amenities (e.g., whiteboard, projector, chairs)  
☐ Group size recommendations based on room capacity  
☐ Email or SMS confirmation/notifications

7. Would you find it helpful if the library offered the ability to reserve a room for specific time slots (e.g., 30 minutes, 1 hour, etc.)? \*

*Mark only one oval.*

- ☐ Yes  
☐ No  
☐ Maybe

8. Do you prefer to book rooms online or in-person at the library? \*

*Mark only one oval.*

- ☐ Online  
☐ In-person  
☐ Either is fine

9. What is your preferred method of receiving reminders or notifications about your room booking? \*

*Mark only one oval.*

- ☐ Email  
☐ Text message (SMS)  
☐ Push notification through the library app  
☐ In-person reminder  
☐ I prefer no reminder

10. How important is it to you that the room booking system integrates with other tools, such as your calendar app? \*

*Mark only one oval.*

- ☐ Very important  
☐ Somewhat important  
☐ Not important

11. Overall, how satisfied are you with the current discussion room booking process at the library? \*

*Mark only one oval.*

- ☐ Very satisfied
- ☐ Satisfied
- ☐ Neutral
- ☐ Dissatisfied
- ☐ Very dissatisfied

Figure 3: List of questions from Google Form

## 5.2 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:

How frequently do you use the library's discussion rooms?

22 responses

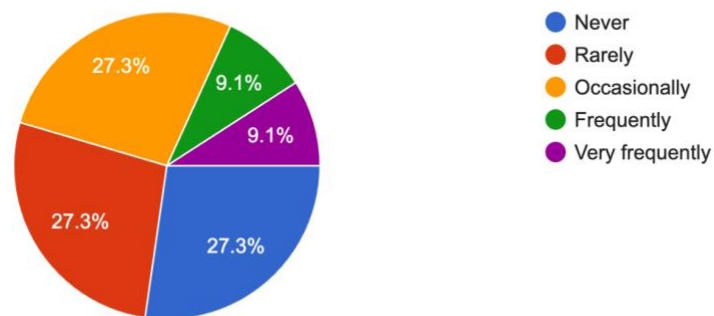


Figure 4.1

What is the primary purpose for which you use the discussion rooms? (Select all that apply)

22 responses

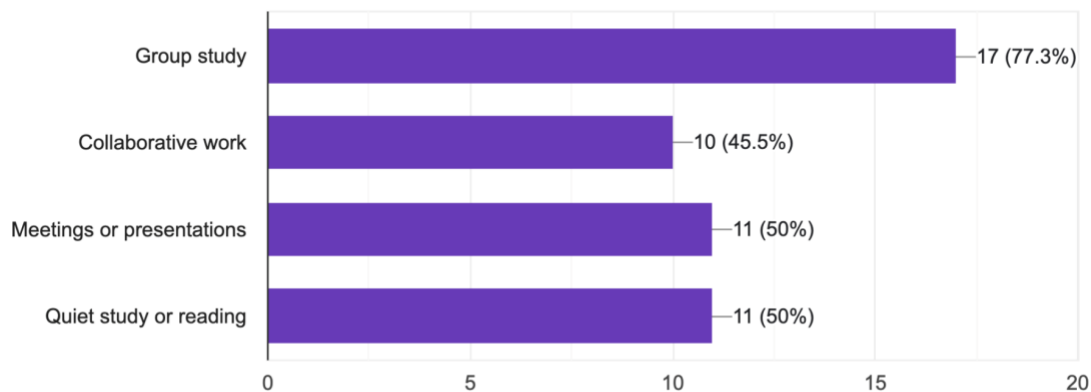


Figure 4.2

How do you currently book a discussion room?

22 responses

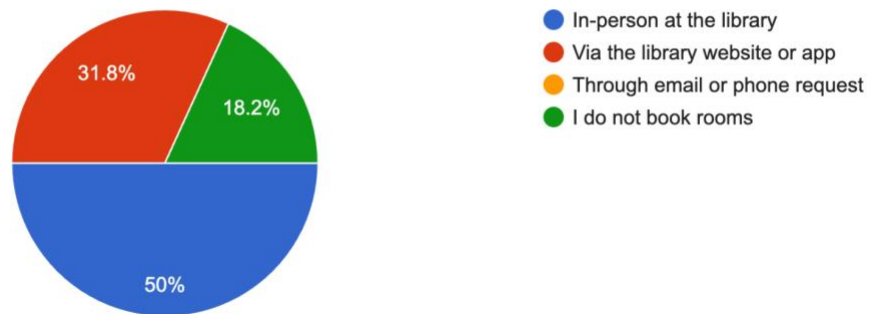


Figure 4.3

How easy or difficult is it for you to book a discussion room?

22 responses

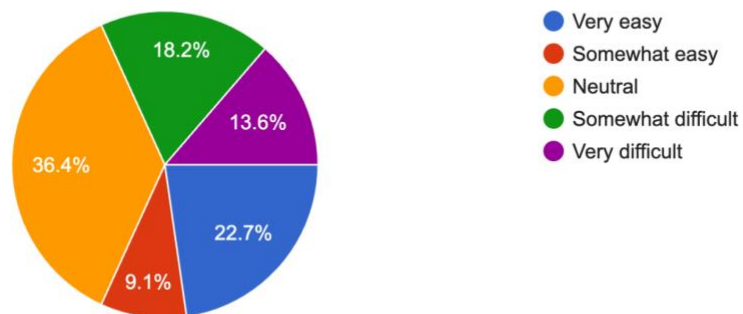


Figure 4.4



What aspects of the room booking process do you find most frustrating? (Select all that apply)

22 responses

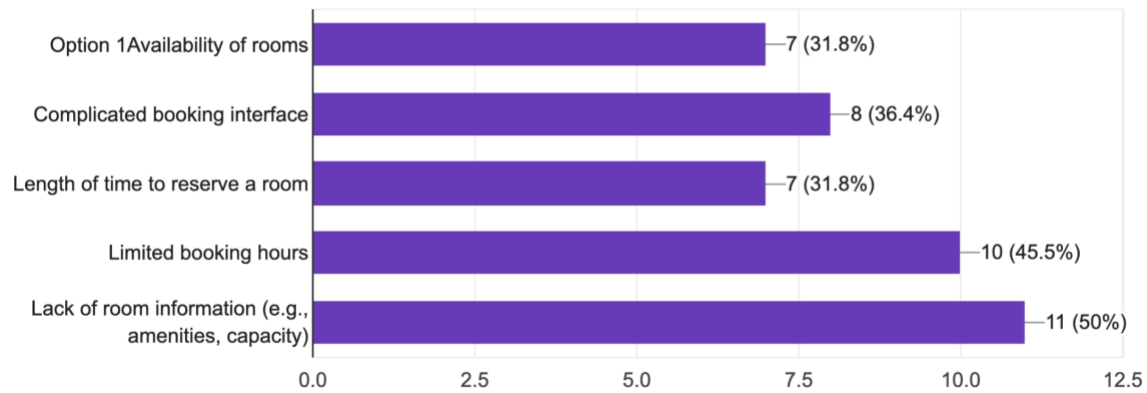


Figure 4.5

Which features would improve your experience when booking a discussion room? (Select all that apply)

22 responses

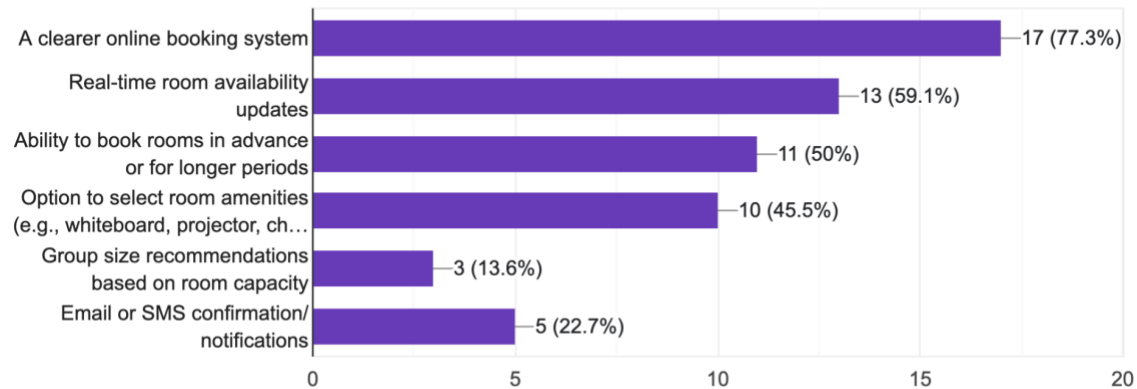


Figure 4.6

Would you find it helpful if the library offered the ability to reserve a room for specific time slots (e.g., 30 minutes, 1 hour, etc.)?

22 responses

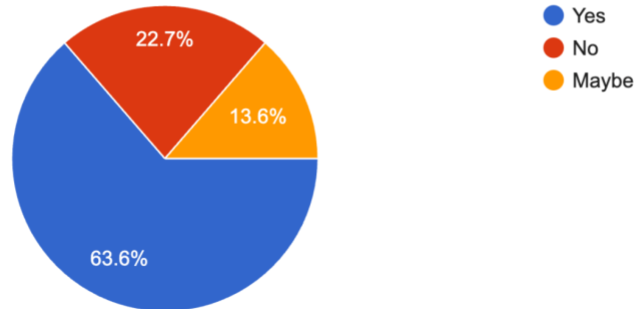


Figure 4.7

Do you prefer to book rooms online or in-person at the library?

22 responses

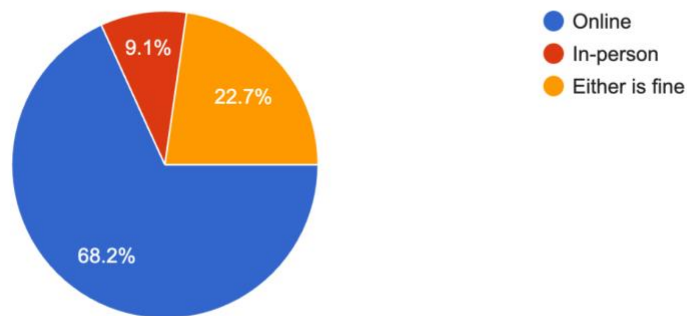


Figure 4.8

What is your preferred method of receiving reminders or notifications about your room booking?  
22 responses

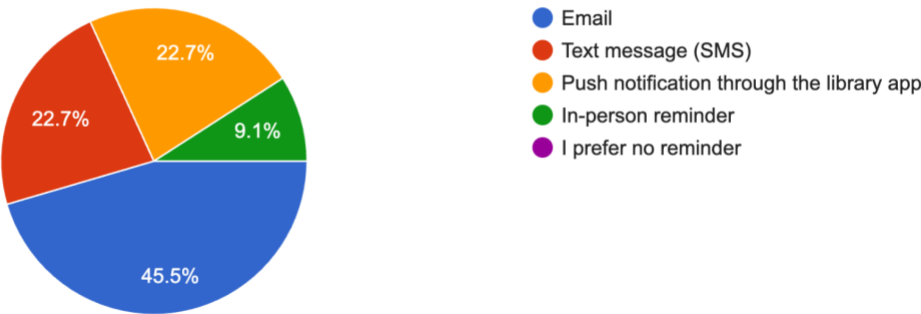


Figure 4.9

How important is it to you that the room booking system integrates with other tools, such as your calendar app?  
22 responses

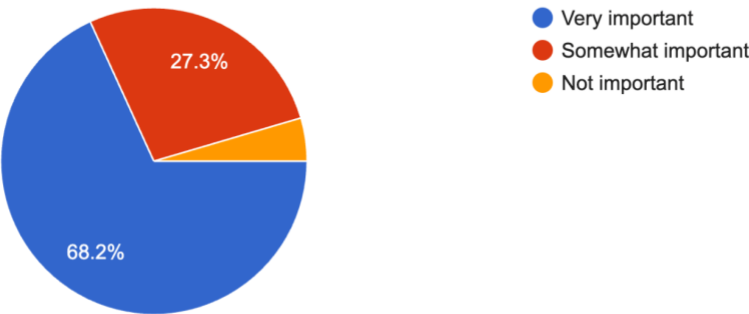


Figure 4.10

Overall, how satisfied are you with the current discussion room booking process at the library?  
22 responses

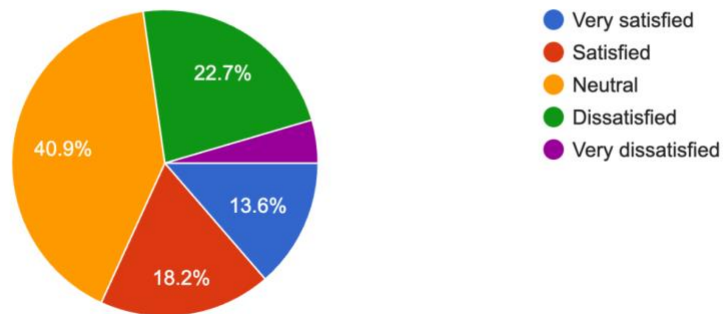


Figure 4.11

### 5.3 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 implement a website that shows availability of room and booking options.

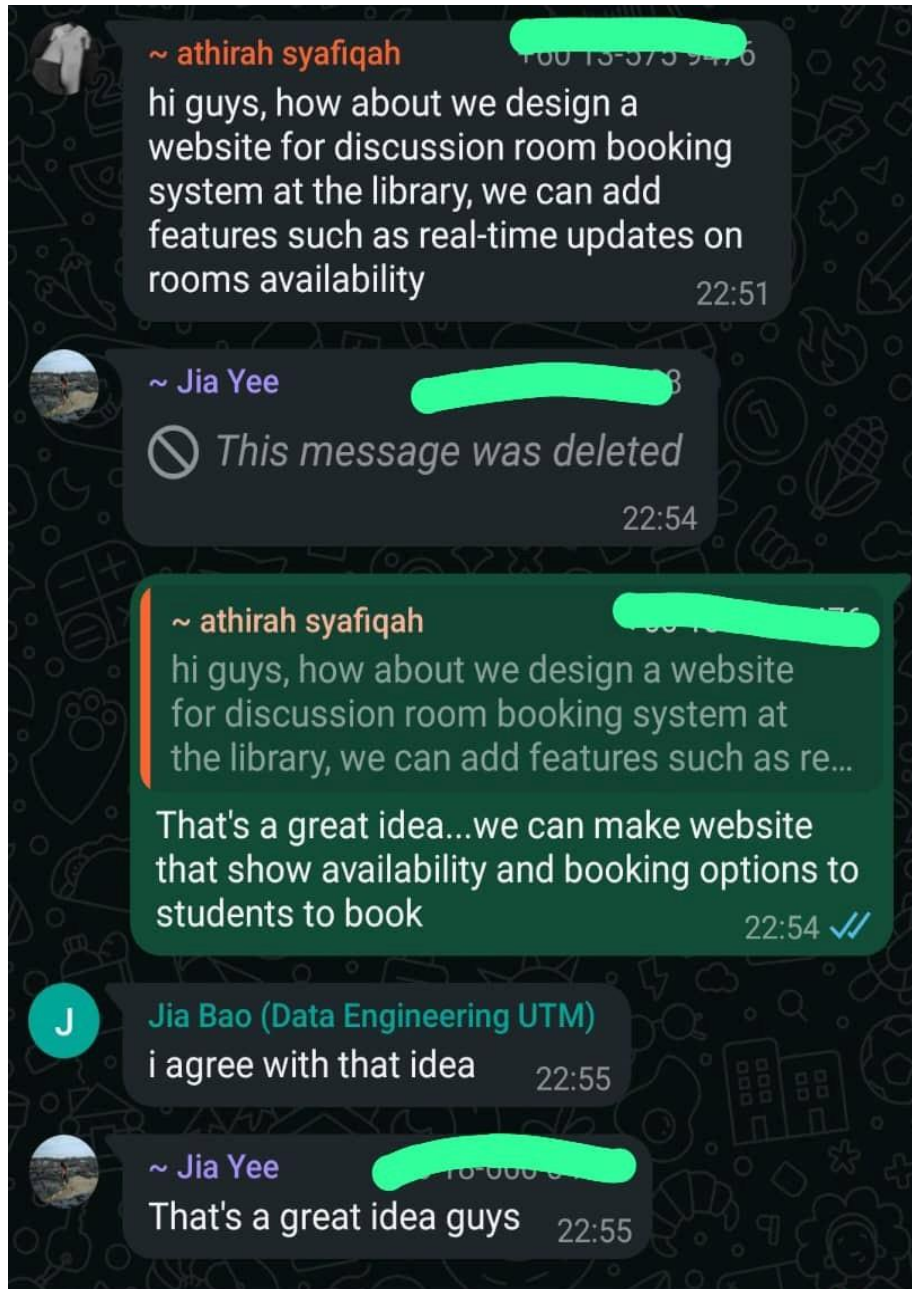
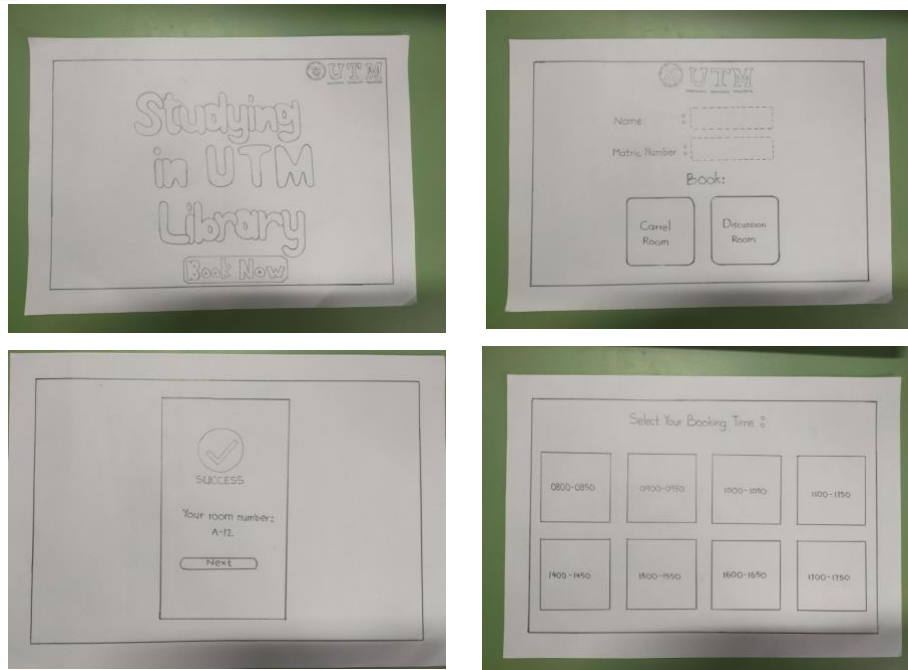


Figure 5.1

## 5.4 Prototype Phase

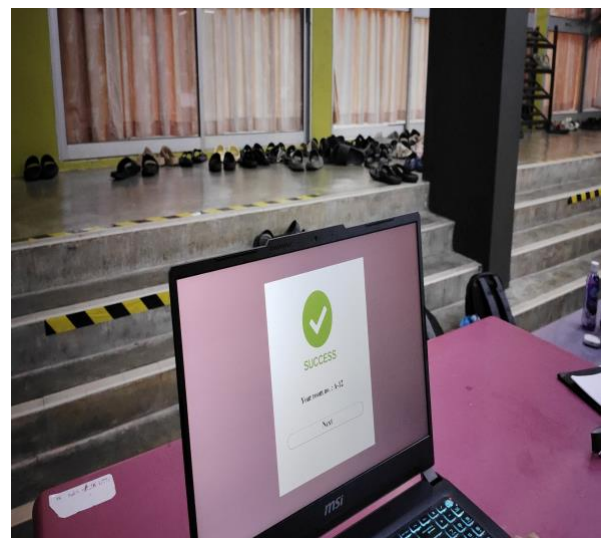
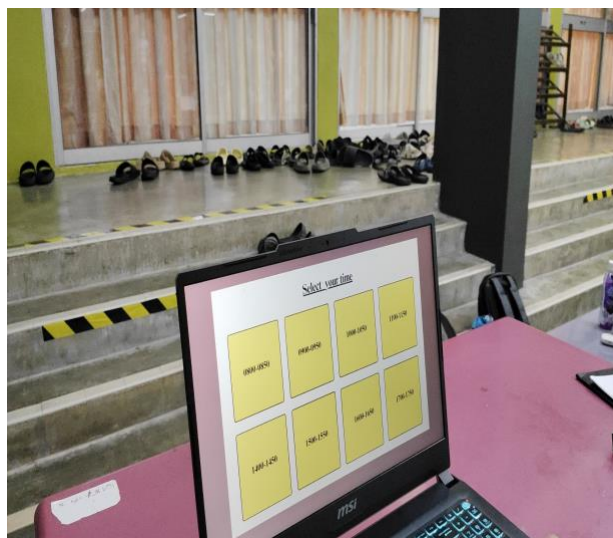
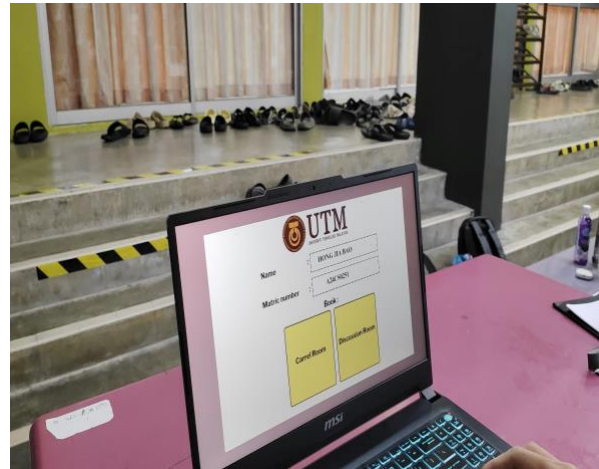
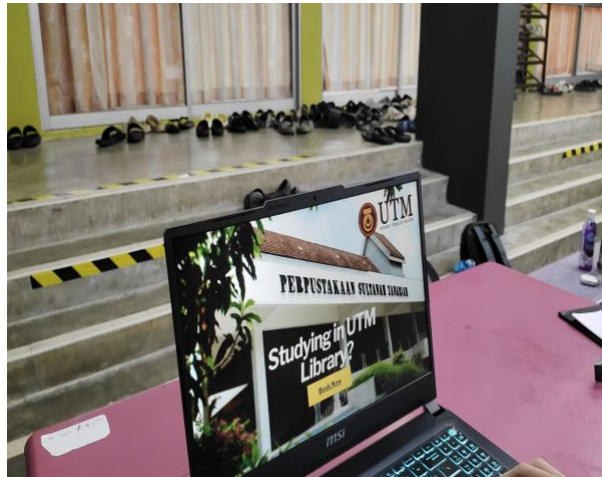
In this prototype phase, we used all the ideas and information that we collected from students as the guidance in developing our prototype.

Website Prototype:



## 5.5 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 booking rooms in the library and will help them save their time.



## **6.0 Reflection**

1.Kavinessh Reddy A/L Gopalakrishnan.

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

My goal regarding my course which is data engineering is to develop expertise in designing and maintaining scalable, efficient, and robust data pipelines that process vast amounts of data seamlessly. I also want to increase my proficiency in working with big data technologies like Hadoop, Spark, and Kafka to manage and process data at scale.

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

Design thinking helps me to handle a real world problem that is faced by users and also helps to understand how to develop deep understanding in users' problems and find solutions. Its also make me collaborate with other members to develop solutions.

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

To improve my potential in the industry, I plan to always seek more knowledge by continuously learning, stay updated with the latest data trends, get relevant certifications, participate in hands-on projects and work with a community that shares the same interest as me.



2.Nur Athirah Syafiqah binti Norhisyam

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

My goal or dream regarding my course, which is computer science, is to become skilled in this field so that I can contribute to solving real world problems. I also wanted to improve my social skills and enhance my soft skills to become successful in this field.

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

Design thinking helps me to improve my communication skills and I also gain more confidence to embrace myself to share my opinions and ideas in a team. It also enhances our creative thinking to reach a final decision with innovative solutions to the problems that we are solving.

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

In order to improve my potential in the industry, I plan to join more programs that include hands-on practical projects such as hackathons. I also plan to stay updated on the latest industry trends.

3.Lee Jia Yee

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

After graduating, I aim to become a data analyst, contributing to data-driven decision-making in various industries. I aspire to work on analyzing large datasets, identifying trends, and offering practical insights to support business innovation and strategies.

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

Through this design thinking project, I have learned to collaborate effectively with my team members and share ideas, which has significantly improved my communication skills. Additionally, it has enhanced my problem-solving skills as I learned how to address various challenges in our project. Both of these skills are essential for succeeding as a data analyst in the organization.

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

I plan to develop skills that will strengthen my potential in the industry throughout these four years. I aim to learn programming languages such as Java, Python, and HTML and also gain proficiency in website development to showcase my technical expertise. Improving my fluency in English through regular practice and communication is also a priority. Furthermore, I plan to participate in coding competitions and attend workshops to enhance my knowledge in data analytics and stay updated on industry trends.

4.Hong Jia Bao

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

My goal with regards to data engineering is improving data quality and accessibility. For example, ensuring data accuracy and data security. In addition, I want to improve public service such as collaborating on government projects that use data to show societal challenges like climate changes, education inequality and more.

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

This assignment has benefited me a lot. For example, I have learned how to solve problems and make the prototype. Besides, I have learned to communicate and cooperate with my teammates so my project was successful and going smooth. This assignment also improved my time management skills. I learned how to arrange my time wisely and did it before the deadline that we had set. Then, this assignment also improved my leadership skills.

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

The action that can improve my potential in the industry is putting effort on the core technical skills such as SQL. Then, I also need to master the programming language. This is because a strong programming language can help me work efficiently. Then, I need to improve my time management skill so that I will not do the project last minute. Then, I need to set some short term goals when doing things so I can do the things efficiently and become more disciplined. I can do the jobs any time before the deadline which I set.

## 7.0 Task Distribution

No	Members	Task
1.	Name: Kavinesh Reddy A/L Gopalakrishnan Matric No: A24CS0092	<ul style="list-style-type: none"><li>● Report Writing (introduction, Detail Steps, Design Thinking assessment)</li><li>● Creating survey form</li></ul>
2.	Name: Nur Athirah Syafiqah binti Norhisyam Matric No: A24CS0159	<ul style="list-style-type: none"><li>● Report Writing (Detailed Description-problem and solution)</li><li>● Prototype sketch</li></ul>
3.	Name: Lee Jia Yee Matric No: A24CS0260	<ul style="list-style-type: none"><li>● Report Writing (Detailed Description-team working, design thinking assessment point)</li><li>● Interview people</li></ul>
4.	Name: Hong Jia Bao Matric.No: A24CS0251	<ul style="list-style-type: none"><li>● Prototype design</li><li>● Video editing</li><li>● Interview people</li></ul>

## 8.0 References

1. (Interaction Design Foundation - IxDF. (2016, May 25). What is Design Thinking (DT)?. Interaction Design Foundation - IxDF.  
<https://www.interaction-design.org/literature/topics/design-thinking>)