Department of Computer Science

Faculty of Computing

UNIVERSITI TEKNOLOGI MALAYSIA

PROJECT TITLE : SMART CAMPUS DATA SOLUTION - IMPROVING STUDENT EXPERIENCE THROUGH DATA

SUBJECT CODE/COURSE NAME : SECP1513/TECHNOLOGY & INFORMATION SYSTEM

SEMESTER : Sem 1 – 2025 2026

GROUP MEMBERS : 1. Name : QISTINA BATRISYIA BINTI NOOR MOHD AZLAN

Matric No : A25CS0340

2. Name : MURSYIDAH BINTI JAHIDI

Matric No : A25CS0286

3. Name : NOR AIN FAHIRA BINTI MUHAMAD FARIQ

Matric No : A25CS0295

1.0 Introduction

As a student, attendance is important in our academic performance as well as to keep track in students discipline towards overall study progress.The issues towards the attendance are commonly found in students where they commit attendance fraud to maintain their attendance record.

Thus, our sole purpose in this project is to improve the efficiency in attendance taking. It also helps to propose a suitable solution based on the users requirements. Moreover, it helps to gain experience working in a team and relate course knowledge to real life situations.

2.0 Detailed step & description in design thinking

2.1 Empathy

The purpose of this Empathy phase is to have a deeper understanding about user problems and challenges during completing attendance requirements.

2.2 Define

The purpose of this Define phase is to analyze the information from the previous phase to identify the problems faced by users. This phase will help us to gather ideas to solve the problems.

2.3 Ideate

Our objective of this project is to improvise on the current digital attendance system. Since we have identified the problem regarding the current system attendance taking,thus we can pinpoint and correct each flaw to further improve the system's efficiency,ideating a project ideal to combat the flaws found in the current system.

2.4 Log Journal

Week	Description
1	Our lecturer gave an explanation on the design thinking project. We agreed that our project them is ‘Digital Attendance Improvement’ which is use the data to track and encourage attendance patterns of students.
2	We started the empathy phase by creating a Google Form and collecting the responses from students. Questions included are about the problem they faced and the users needs.
3	We analyzed the data from the conducted survey and discussed. From the results, students faced problems when they tried to scan the attendance QR code.
4	Based on the findings, we started the define phase by defining the problems of the current system of attendance. These steps help us to clearly understand what we should do as the solution.
5	We brainstormed a few ideas on how to solve the problems. Each of us gives suggestions and after that we choose the best idea for our project.
6	We started to develop the prototype by designing it. Then we started to create the basic flow and features of the prototype.
7	The prototype is tested and gathers the feedback to make sure the produced prototype is functioning. We also identify the pros and cons of the prototype for improvement.

3.0 Detailed description

3.1 Problem

After conducting the survey, we listed out the problems that students faced. The problems are unnecessary effort to overcome the problems, poor mobile experience, the system itself doesn't work consistently, device dependency and data and feedback problems.

3.2 Solution

We brainstormed ideas that may solve the problems listed out from the previous process. Each person gives suggestions, trying to find the best option. We considered all aspects in order to avoid problems when conducting this project. After taking a look at all of the ideas, listing all the strengths and weaknesses of the ideas, we came up with one best idea that all of us agreed on. We agreed on the idea of the big screen with biometric devices for physical class and a new features on UTMSmart apps for online class

3.3 Teamwork

We conducted several physical meetings to discuss the project. We also had a discussion in the telegram group in order to follow up the flow and process of the project. Time by time all of us update and ask questions regarding the project in the group so that we can help each other. Each of the team members gives full contributions and effort to make sure our Design Thinking Project is a success.

5.0 Design thinking evidence

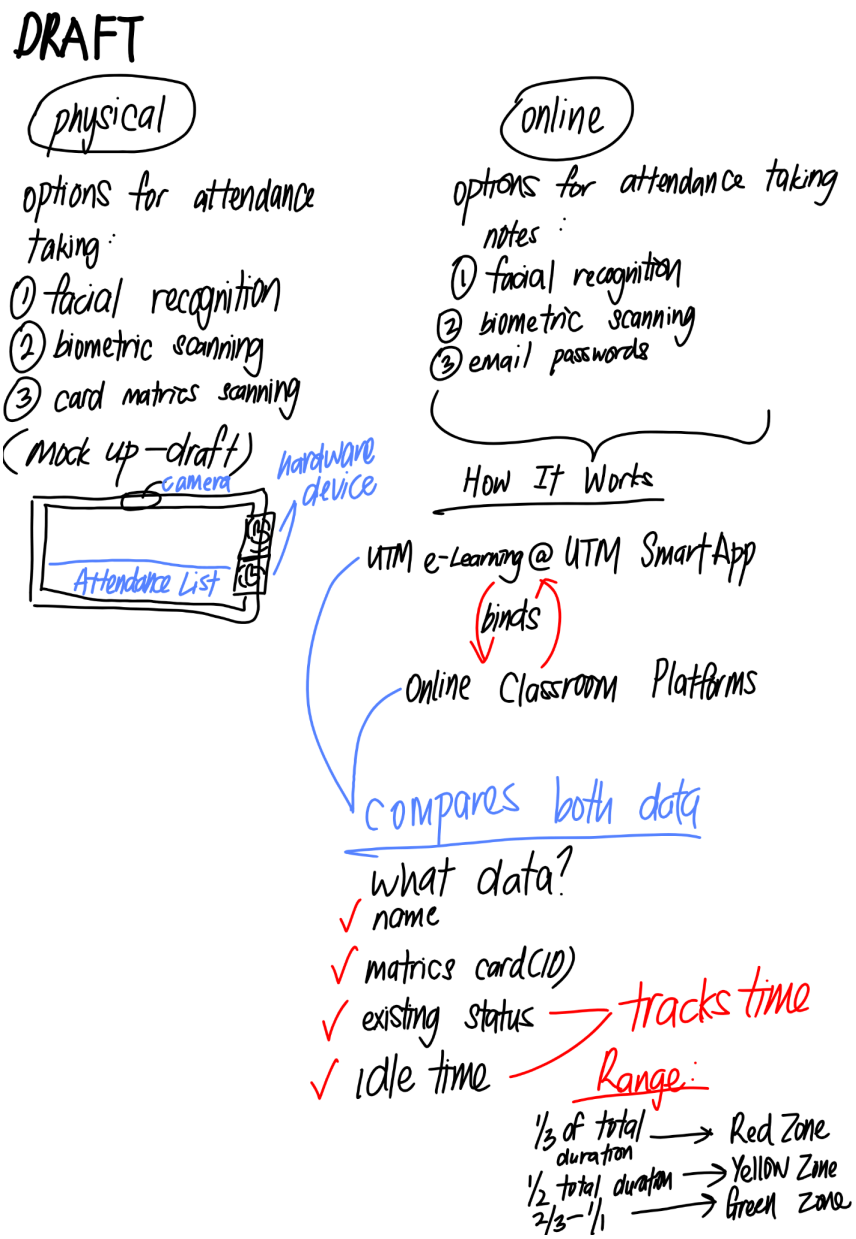
[Observation evidence]

Problems faced by students when scanning the QR code.

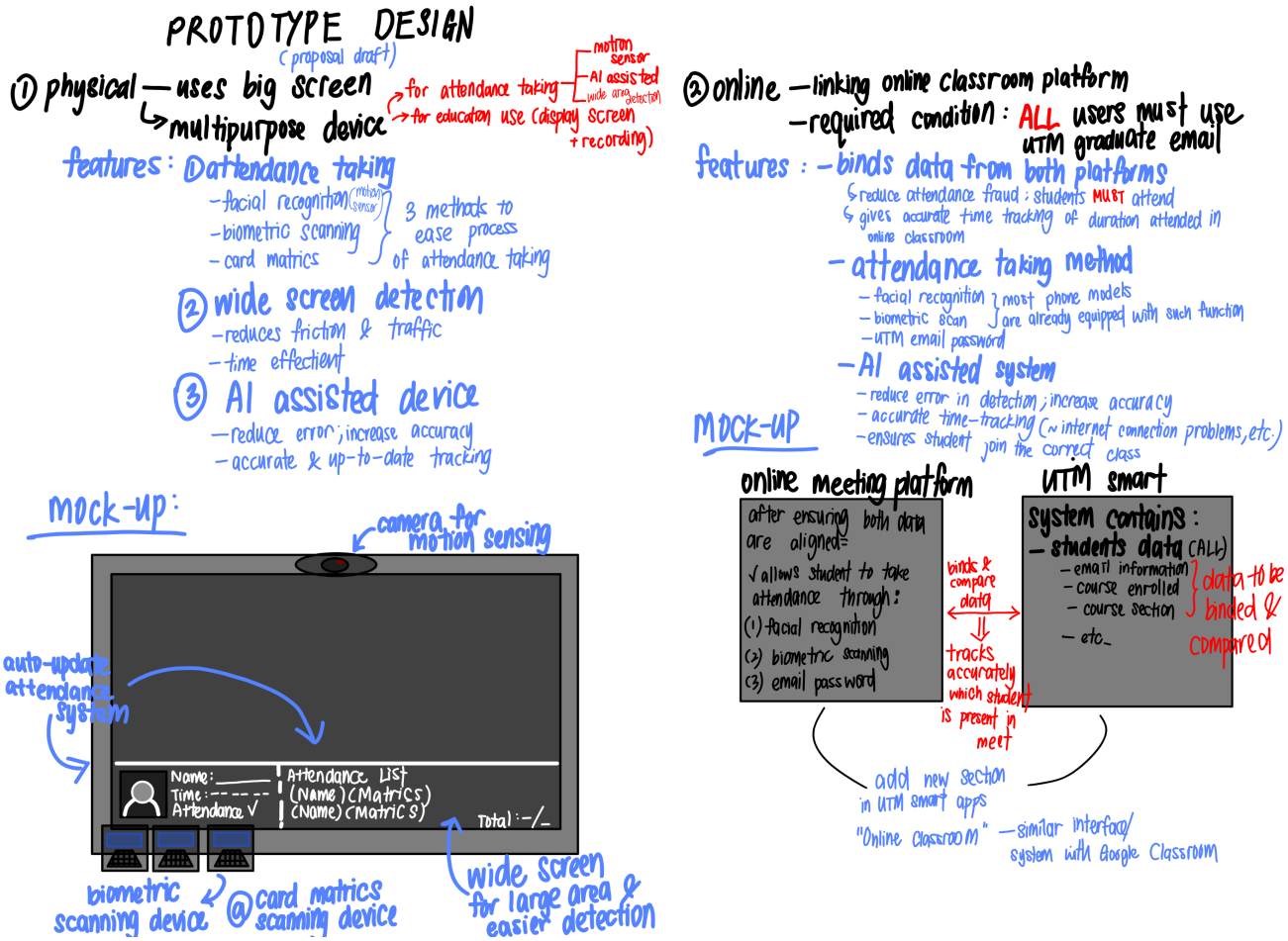
[Team Meetings]

[Sample Work]

Initial Draft for Prototype



Finalized Prototype



5.1 Empathy

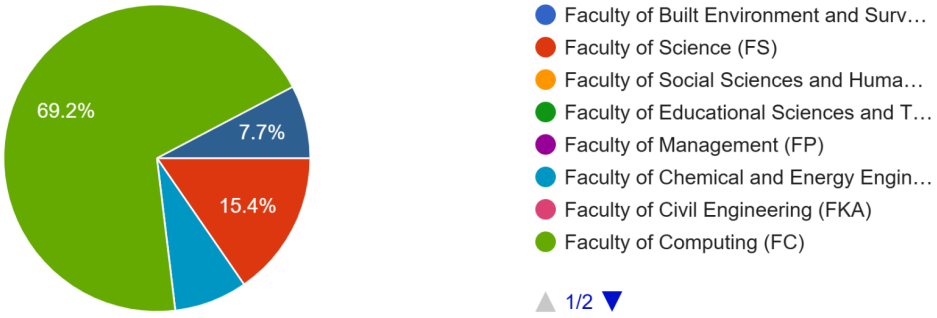
5.1.1 Data Collection Method

- Google form survey completed by 13 respondents
- Observation of users' using UTM digital attendance system (UTMSmart) to scan qr code at the beginning of each class.

<u>Responses from Google Form</u>

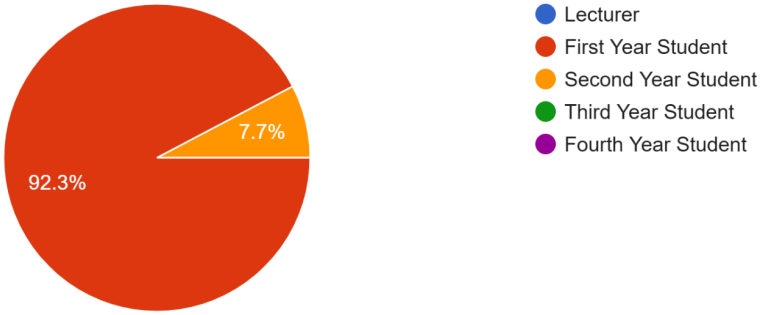
Which faculty are you from ?

13 responses



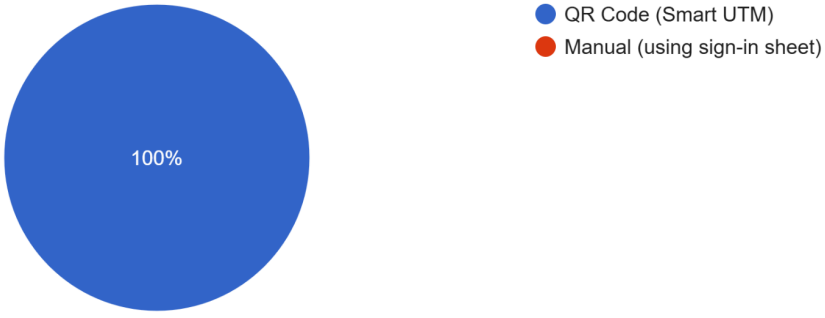
Occupation

13 responses



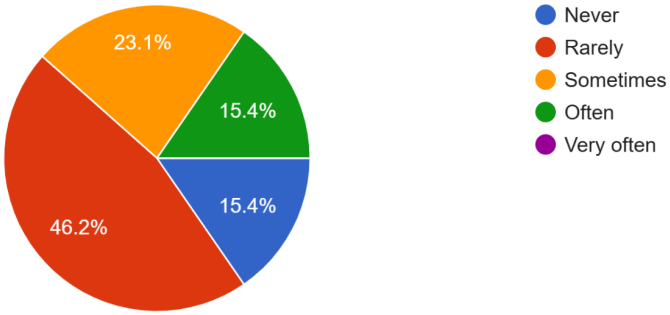
How do you usually record attendance in your classes ?

13 responses



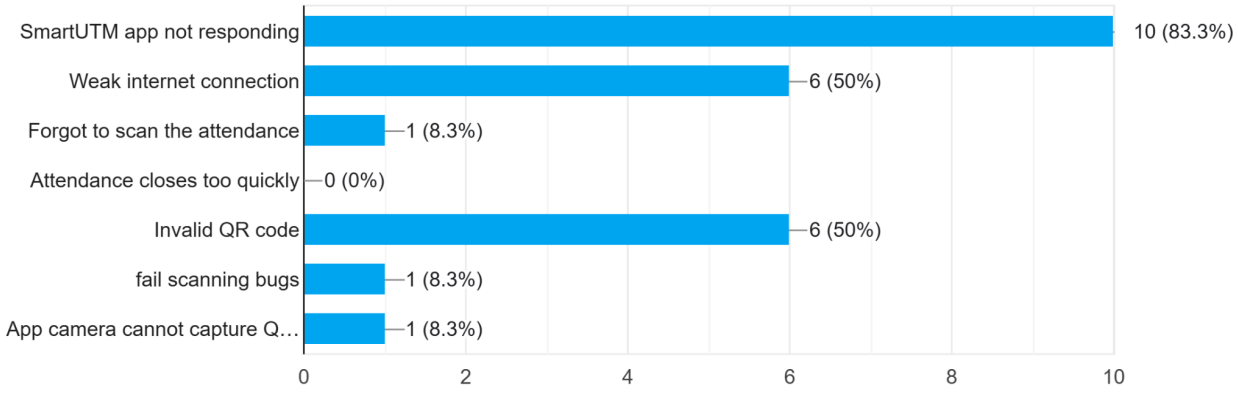
How often do you face problems when recording attendance ?

13 responses



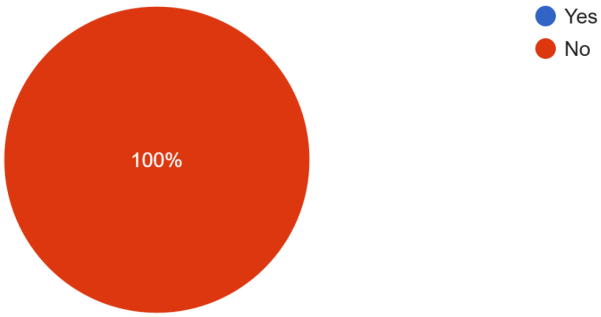
What issues have you faced? (Select all that apply)

12 responses



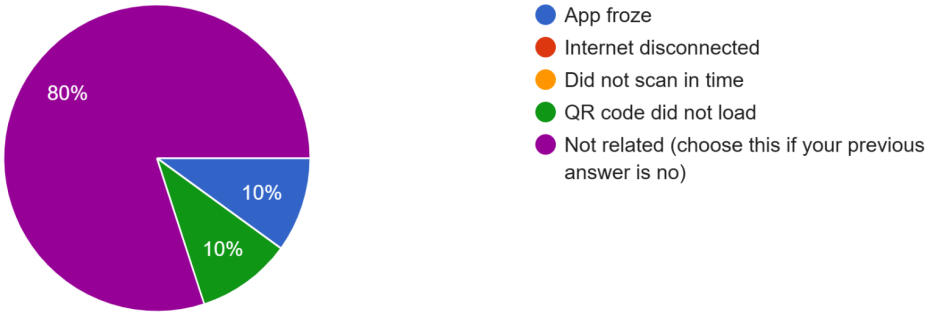
Have you ever attended class but your attendance was not recorded ?

13 responses



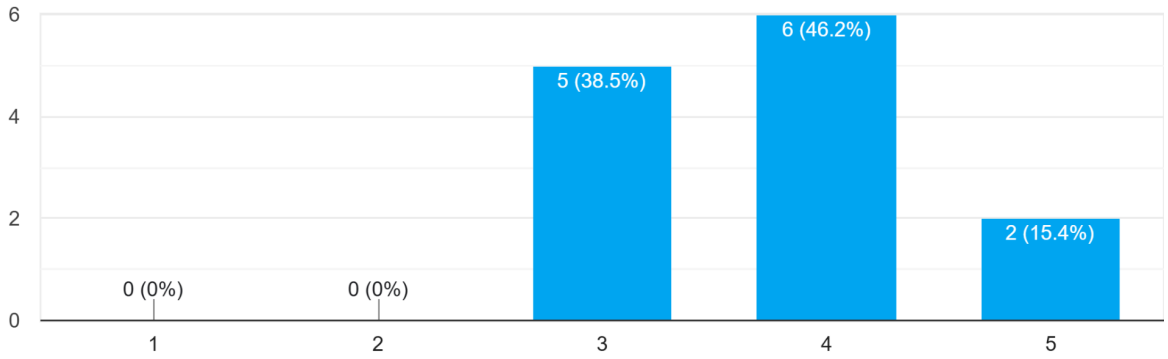
If yes, what was the main reason ?

10 responses



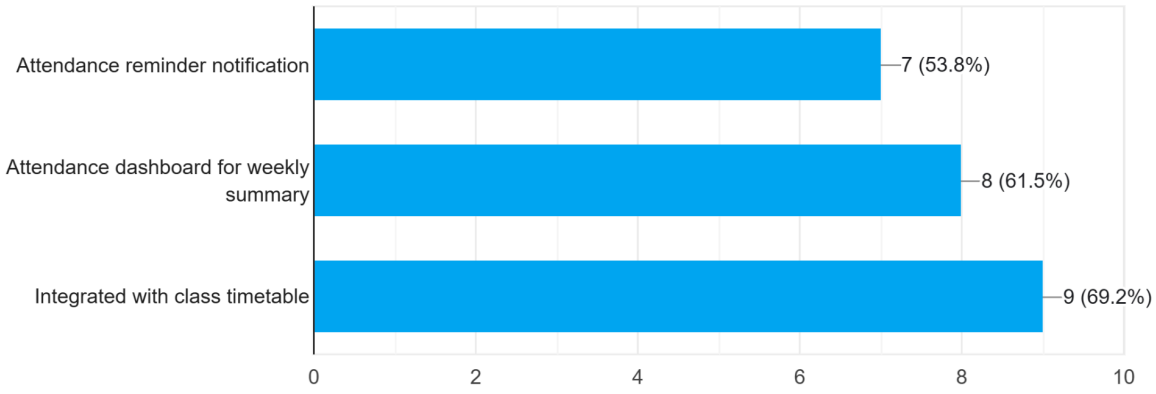
How would you rate the current UTM attendance system ?

13 responses



What features would you like in an improved attendance system ?

13 responses



If you encounter an issue with the attendance, how easy is it to correct the attendance mistake ?

13 responses

What is your worst experience related to the attendance system ?

8 responses

Qr code hard to be scanned

not too worse, just fail to scanning, it will be ok if try repeatly

When I dont have 2 device with me, i cannot scan attendance since utm smart cannot scan from gallery

Not knowing how many classes I've attended comparing to total classes done

Updated version of UTMSMART cannot scan QR attendance in class, need to login UTMSMART in devices which have not yet updated to scan the QR

Qr hard to scan

The QR code is hard to be scan by the UTM smart

-

What improvements would make the attendance system easier, faster, and more efficient for you ?

8 responses

Make the qr code more clearer and HD.

Allow scan QR by browsing picture in gallery, since it requires more than 1 device for display and scan seperately in taking attendence of online class

Please let utm smart can scan qr from gallery

Class attendance reminder

Make app camera more sensitive to capture QR

Easy

Enhance the scan system in the app

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5.1.2 List of Possible Questions and Answers

The following table summarizes the questions and the common responses from the users based on survey and observation.

Questions	**Answers**
What issues do students face when using the QR attendance system in UTMSmart?	Students experienced some problems such as fail in QR detection or invalid QR codes.
How does the QR system impact the efficiency of the attendance process?	Students spent more time scanning the QR code because of repeated errors, highlighting the inefficiency of the system.
Why does the timing of QR code displayed affect students?	Students had to rush scanning the QR due to the lecturer only presenting it at the beginning of the class.
How does internet connection disturb the attendance process?	Poor internet connection can cause the failure to access the UTMSmart app.
How do students react when technical errors happen?	Students show signs of frustration and distress especially when it requires a long time to solve.
What happens when attendance requirements are not met?	Students are unable to sit for the final examination which increases anxiety and pressure during the attendance process.

5.1.3 Composite Character

Name: Aisy
Age: 19 years old
Background: UTM student, uses smartphone for scanning QR code
Goals:

- Not missing any classes by complete attendance.
- Prevent stress and anxiety due to attendance error.

Problems:

- Failure to detect QR code
- Invalid QR code
- QR code only displayed at beginning of class
- Poor internet connection disrupt attendance process
- Time wasted to solve the technical issue

Reactions/ Behaviors:

- Shows signs of frustration and distress due to error
- Rushes to scan QR code

5.2 Define

5.2.1 Problem of the existing system

I. Scanning the UTM QR code as an attendance proof creates an unnecessary effort

When the QR code cannot be scanned, the students need to move to make sure that they can scan the displayed QR code.

II. Poor mobile experience

Some devices didn't have high quality cameras, which creates a problem which makes it hard to scan the QR code and sometimes they need to scan the QR from the lecturer's screen. The connection of the devices also leads to the problem that the apps cannot be open.

III. The system itself doesn't work consistently

The system might be down sometimes and maybe the QR shown is invalid. The students need to inform the lecturer and their attendance needs to be recorded manually.

IV. Device dependency

The students phone battery may die when they want to scan for the attendance and there is no alternative method.

V. Data and feedback problems

The data of the attendance is not truly trusted because some students actually did not come to the class. This case leads to dishonesty of the students but they still get to sit for the final exam.

5.2.2 Persona

Details
Name : Muhammad Hazri
Age : 19 years old
Occupation : Full time degree student at UTM

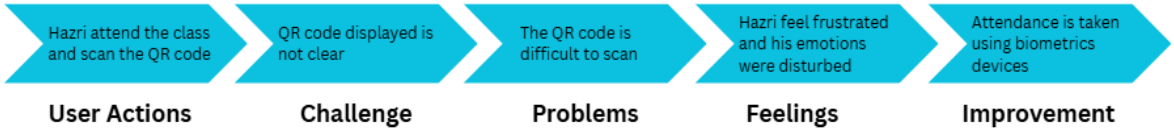
Background
Hazri is a full time student who always attends both physical and online classes. Methods of taking attendance are different depending on the lecturer. Hazri often faces issues with technical problems and causes late attendance submission.

Goals
- To record attendance quickly and accurately
- To avoid being marked absent unfairly
- To have a simple and reliable attendance system

User issues
- Attendance system differs for each lecturer
- QR codes are not shared clearly
- Slow internet causes failed submissions

User needs
- A standardized digital attendance system
- Real time confirmation after attendance submission
- Low data mode support

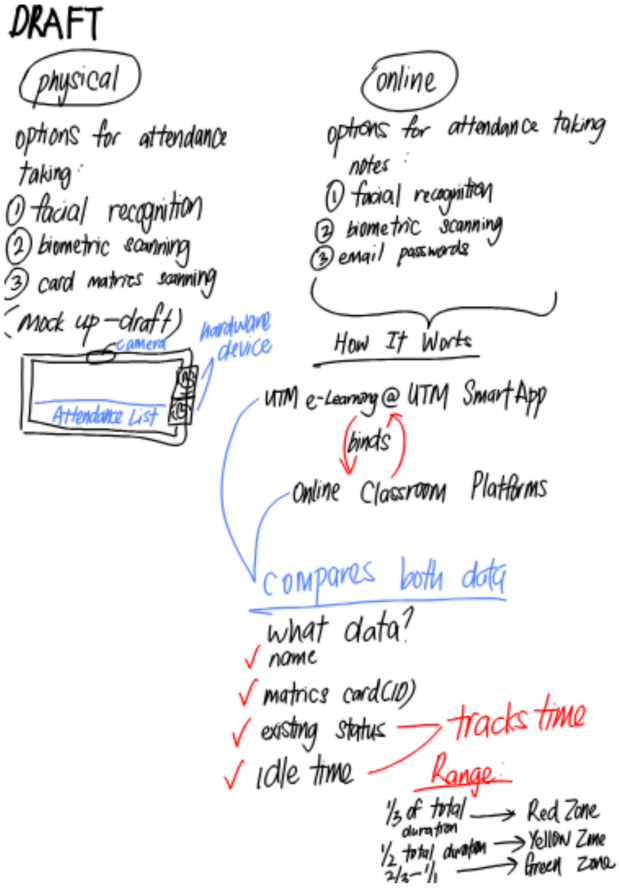
5.3.3 Journey Map



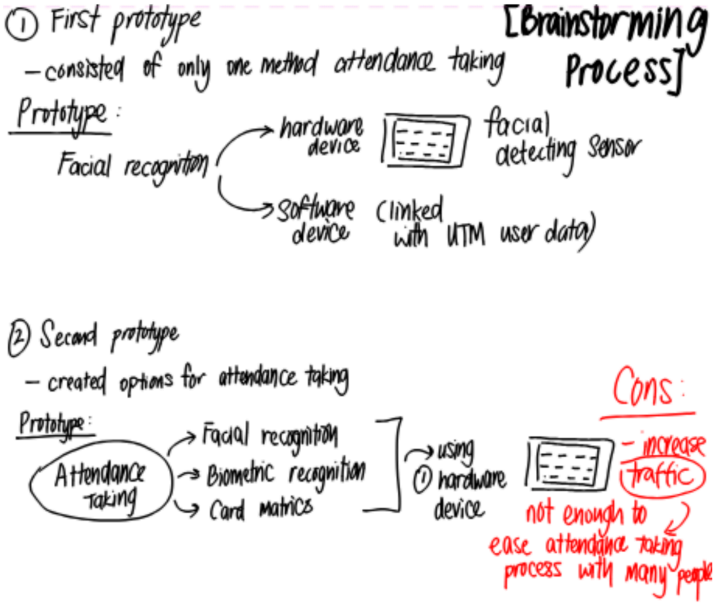
5.3 Ideate

At first,our prototype consisted of only one method of attendance taking.After brain storming,we finalized our idea into one final prototype.

(Selected solution)

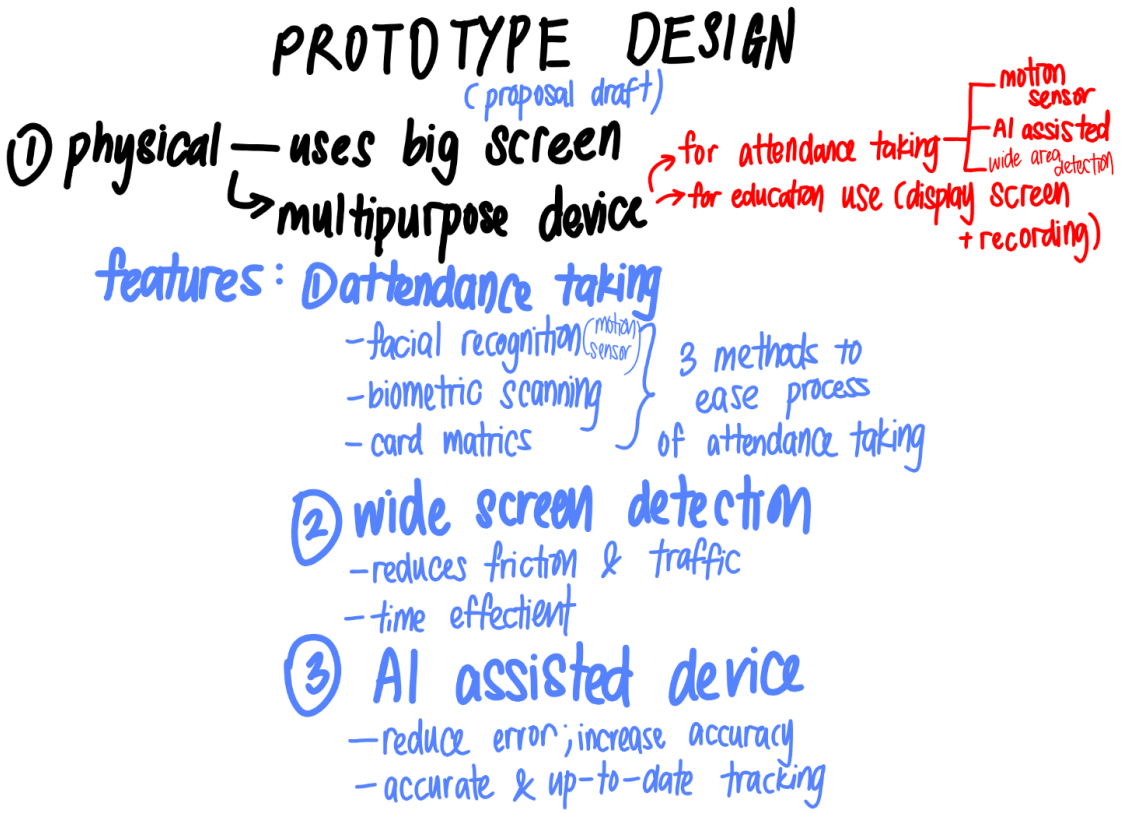


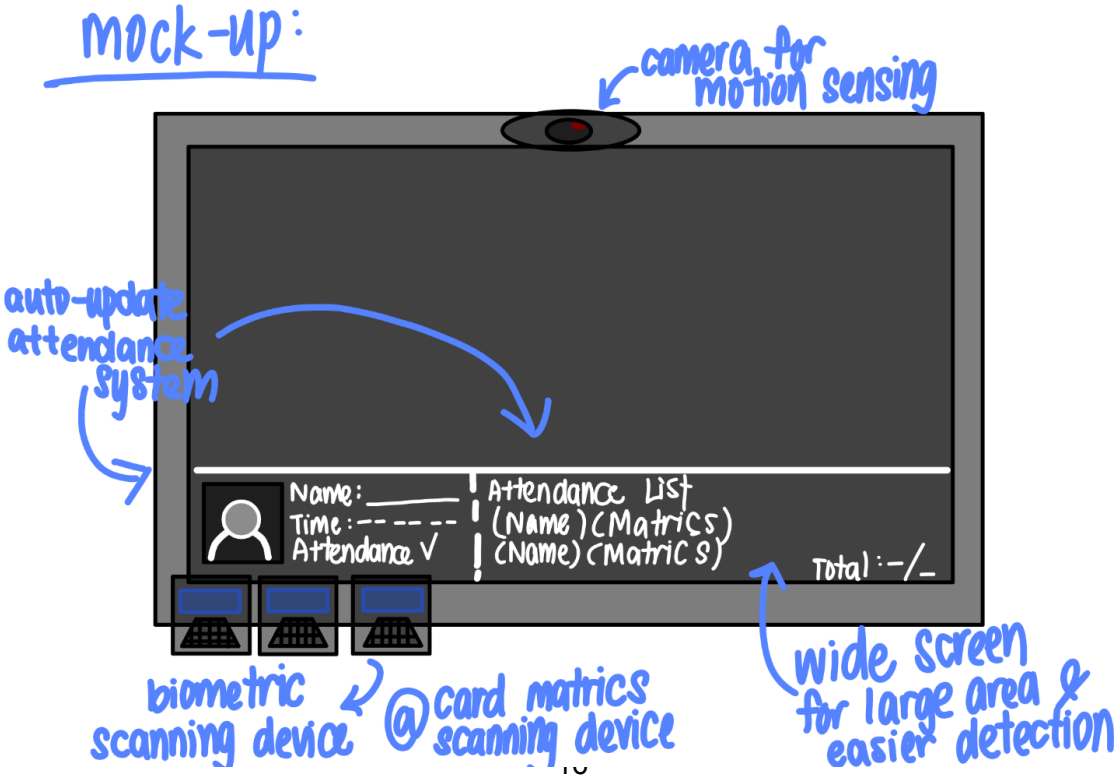
(Brainstorming Process)



5.4 Prototype

The prototype proposed consists of wide screen television (Smart TV),biometric scanning device and camera specialized in motion detection.These devices are to align with our updates on digital systems in e-Learning and UTMSmart.





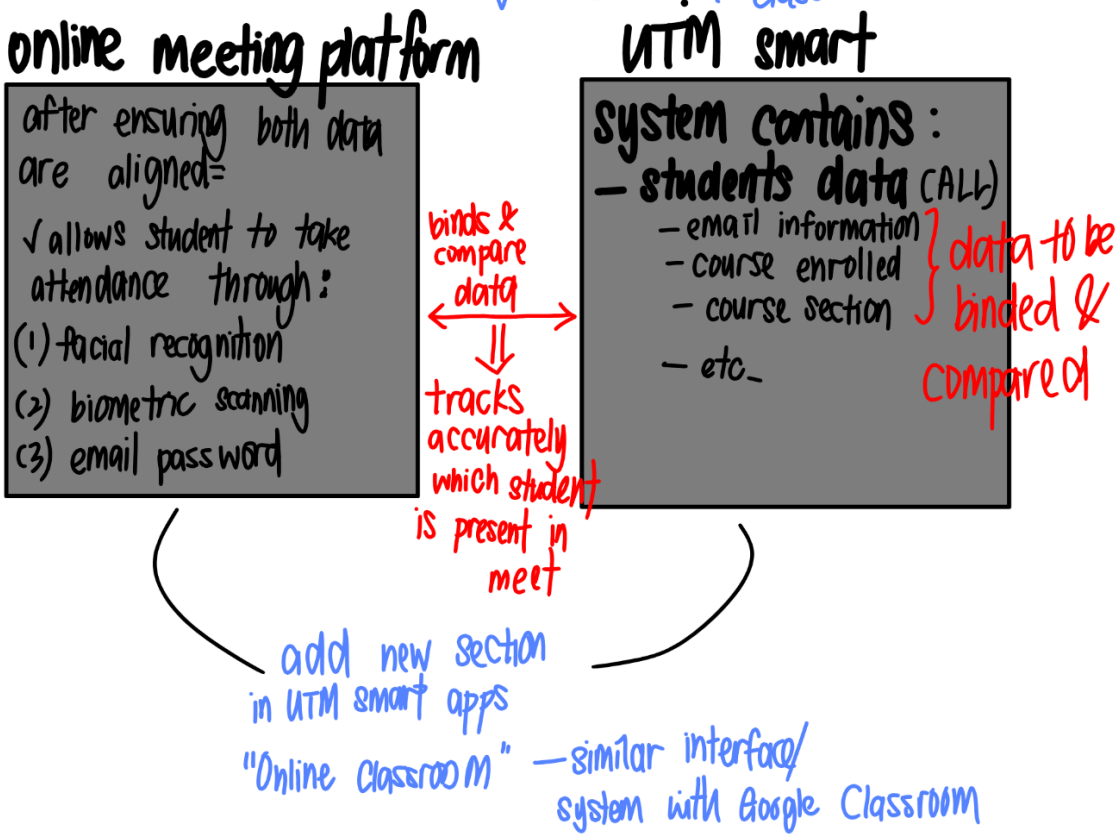
② online – linking online classroom platform
– required condition : ALL users must use UTM graduate email

features : – binds data from both platforms
↳ reduce attendance fraud : students MUST attend
↳ gives accurate time tracking of duration attended in online classroom

– attendance taking method
– facial recognition } most phone models
– biometric scan } are already equipped with such function
– UTM email password

– AI assisted system
– reduce error in detection ; increase accuracy
– accurate time-tracking (~ internet connection problems, etc.)
– ensures student join the correct class

MOCK-UP



5.5 Test

REFLECTION

Mursyidah binti Jahidi :
My goals regarding my course are to graduate with excellent grades and secure a career related to Data Engineering. Design thinking gives me the ideas how I can handle the real problem and improves my critical thinking skills which allow me to see a problem from the user's point of view. This skill is actually essential in the field of Data Engineering. I plan to improve my problem solving skills by implementing design thinking in every project I do so that I can enhance my potential in the industry.

Nor Ain Fahira binti Muhamad Fariq :
My goals for my course are that I hope that I will graduate with a Dean's List award and excellence. On the other hand, I want to build strong problem solving and critical thinking skills to prepare myself for the future work industry. This design thinking project has a big impact on me because it needs me to think more clearly when solving problems. Other than that, I can improve my communication during the discussion. My plan to improve my potential in the industry is that I need to study more on my own because I cannot depend only on class. I need to explore more how data engineering is used in real industries. I also have to make sure that I try to improve my technical and soft skills in order to become a graduate who has high potential to secure a job in the future.

Qistina Batrisyia Binti Noor Mohd Azlan:
My dream for this course is to broaden my knowledge as well as excel in data science fields to get an excellent job in the future industry.Design thinking has taught me how project timeline works, team communication,soft skills as well as essential project management skills.To improve my potential and secure job opportunities in the future, I must refine my coding techniques and explore more on coding knowledge to deepen my skill sets.Not only that,I will seek ways to improve my communication skills that is fitting for a professional standard.

CONCLUSION

Throughout this project, we have learned about the design thinking phases which helped us to clarify our vision and understanding problems to properly create an ideal solution to solve real world problems through each of its phases which are empathy, define, ideate, prototype and testing.

REFERENCE