SECP1513-04 / SEM I

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Design Thinking Project Report :

UTM Digital Campus Security and Emergency Safety Response System

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VIDEO PRESENTATION: https://youtu.be/V4dSwsrJQz0?si=9gxQiiXEugjrKeMB

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1.0 Introduction

University campuses involve constant interaction among students, staff, and visitors, making safety and emergency management a critical concern (Abdullah et al., 2019). Incidents such as medical emergencies, security threats, and accidents require fast response and effective communication (Fischer & Green, 2020). However, many campus users are unsure of emergency procedures, and reporting systems are often slow and unclear, leading to delayed responses and increased risks (Rahman et al., 2021).

Therefore, this project aims to design a **UTM Digital Campus Security and Emergency Safety Response System** that provides a centralized and user-friendly platform for emergency reporting and communication. The system is developed using the **Design Thinking methodology**, focusing on user needs through the phases of empathy, define, ideate, prototype, and test. A non-functional prototype was created to showcase the interface design and user flow without backend implementation (Brown, 2008).

2.0 Design Thinking Phases & Evidence

2.1 Empathy phase

The empathy phase aims to understand the real experiences, concerns, and needs of campus users regarding safety and emergency situations. By gaining insight into users' perspectives, the project team identified key problems to be addressed in the proposed system. To collect empathy data, an online survey was conducted using Google Forms, as this method allows efficient data collection from a wider range of respondents within a limited time. The survey targeted campus users, including students, academic staff, non-academic staff, and visitors.

A total of **20 respondents** participated in the survey, with most indicating that they are frequently present on campus and spend a significant amount of time there. The

results showed that many respondents are *not fully aware of existing campus emergency procedures*, indicating a gap in safety awareness. In addition, several respondents reported *confusion or difficulty when reporting incidents*, highlighting the need for a simpler and faster reporting mechanism. Overall, the findings suggest a strong demand for a **user-friendly** and **efficient campus safety platform** to improve response time and enhance campus security.

2.2 Define Phase

The define phase focuses on clearly identifying the core problems faced by campus users in relation to safety and emergency management. Based on the findings from the empathy phase, it was identified that many campus users lack awareness of existing emergency procedures and experience confusion when attempting to report incidents. These issues may lead to delayed responses during emergency situations and increase potential safety risks.

Campus users, including students, staff, and visitors, require a centralized and user-friendly platform that provides clear emergency guidance and allows incidents to be reported quickly and efficiently. Therefore, the main problem identified is the absence of an accessible and effective digital system that supports timely emergency reporting and communication on campus.

2.3 Ideate Phase

The ideate phase focuses on generating solutions to address the safety and emergency issues identified earlier. Based on the defined user needs, brainstorming was conducted to propose features that improve emergency awareness, reporting, and response efficiency.

Key ideas included a centralized digital platform for emergency reporting, a one-touch emergency alert button for quick assistance, easily accessible emergency contact information, and clear step-by-step emergency guidelines. Additional ideas such as real-time notifications and location sharing were also considered to help responders act faster. These ideas were selected based on their relevance to user needs, ease of use, and suitability for campus environments, and were further developed in the prototype phase.

2.4 Prototype Phase

The prototype phase focuses on transforming the selected ideas into a tangible design to visualize the proposed solution. Based on the ideas generated during the ideate phase, a non-functional prototype was developed to demonstrate the system's interface design, key features, and user flow.

The non-functional prototype was designed to illustrate the system's interface layout, key features, and user navigation flow. The prototype includes a home screen, an emergency reporting and SOS feature, as well as emergency contact information and guidance pages. These interfaces were designed with simplicity and clarity to support quick user actions during emergency situations. **Selected prototype screens are presented in Appendix C (Appendix C.1–C.3).**

2.5 Testing Phase

During the testing phase, users reviewed the non-functional prototype interfaces to evaluate ease of navigation, clarity of information, and overall usability. The prototype screens used during testing are shown in **Appendix C, particularly Appendix C.2 and Appendix C.3.**The test phase aims to evaluate the usability and effectiveness of the proposed system by

gathering feedback on the prototype. Users were asked to review the non-functional prototype to assess the clarity of the interface, ease of navigation, and usefulness of the features.

Feedback from users was used to identify areas for improvement, such as simplifying navigation and improving feature clarity. The insights gained from this phase help refine the design to better meet user needs and enhance the overall effectiveness of the campus safety system.

3.0 Project Analysis & Team Collaboration

3.1 Detailed Problem Description

The primary challenge identified at UTM is the lack of a streamlined, digital communication channel for emergencies. While the university has existing safety protocols, our survey of 20 respondents revealed a critical "Awareness-Action Gap".

- **Communication Bottlenecks:** Currently, 40% of users rely on calling friends during an emergency rather than official security channels, which delays professional medical or security intervention.
- **Information Uncertainty:** 65% of campus users are only "somewhat" sure of who to contact, leading to hesitation during high-stress situations where every second counts.
- **Reporting Complexity:** Without a centralized system, reporting an incident requires knowing specific phone numbers or physically finding staff, which is inefficient for visitors or new students.

3.2 Proposed solution & Impact on Campus

Our solution, the **UTM Digital Campus Security and Emergency Safety Response System**, is a non-functional, interface-only computerized system designed for the "Future Digital Campus". It focuses on three core pillars:

- **The One-Tap SOS System:** Addressing the 95% of users who requested a panic button, this feature allows for immediate distress signaling without navigating complex menus.
- **Centralized Resource Hub:** The system integrates emergency guidelines and direct contact modules, transforming a fragmented process into a user-friendly platform.
- **Impact on Hospitality & Well-being:** By providing real-time alerts and clear guidance, the system reduces student anxiety regarding campus safety, particularly at night or in remote faculty areas, thereby improving the overall campus environment.

The proposed solution was visualized through a prototype interface that demonstrates how users can quickly access emergency reporting features, contacts, and guidance. **Examples of these interface designs can be referred to in Appendix C (Figures C.1–C.5).**

3.3 Teamwork and Progress Log

Our team used a collaborative design-thinking methodology to ensure every phase was grounded in user empathy and evidence. Evidence of teamwork and role fulfillment is provided in **Appendix D.2**

3.4 Assessment Points

To maintain quality and alignment with the project goals, assessment occurred at two critical junctures:

1. **Phase Transition Assessment:** At the end of the Ideate phase, the team evaluated whether the proposed features directly solved the "confusion" and "slow response" issues identified in the Empathy phase.
2. **Final Project Demonstration:** The proposed solution was visualized through a prototype interface that demonstrates how users can quickly access emergency reporting features, contacts, and guidance. **Examples of these interface designs can be referred to in Appendix C (Figures C.1–C.5).**

4.0 Individual Reflections

4.1 Individual Reflection: Azaam

a) I aspire to be a computing professional who designs and analyzes systems that solve real-world problems, focusing on safety, security, and efficient information systems, using technology to improve decision-making and assist users in critical situations.

b) The design thinking project taught me to analyze user problems before proposing solutions. Working on the campus security system showed how technology can reduce confusion, speed responses, and support users in high-stress situations, aligning with my goal to create impactful systems.

c) To advance in the industry, I aim to strengthen skills in system analysis, problem identification, and requirements gathering, while studying security systems, emergency response technologies, and real-world case studies.

4.2 Individual Reflection: Hazilen Fiona Francis

a) I aim to be a Cybersecurity Analyst, protecting digital infrastructure and sensitive data, creating secure environments that safeguard users from physical and digital threats.

b) This project showed that security involves both technology and user experience, teaching me to design protocols that are robust yet user-friendly.

c)I plan to earn cybersecurity certifications, integrate user-focused design into security frameworks, and sharpen analytical skills through real-world incident response studies.

4.3 Individual Reflection: Wan Nur Anis Dayana Binti Norfadiz

a) My dream is to become a Cybersecurity Forensic Expert. I want to use the knowledge I gain to help others through the legal system.

b) This project taught me to understand problems deeply and empathize with users to provide the most effective solutions.

c) I plan to pursue a cybersecurity forensics certificate and join CTFs and hackathons to gain knowledge and connect with like-minded peers.

4.4 Individual Reflection: Nishat Tabassum

a) I aim to be a skilled computing and security professional, creating reliable, user-friendly digital systems that enhance safety and support users in high-stress situations.

b) This project showed that effective security systems rely on both technology and user behavior. Working on the UTM Campus Safety System highlighted empathy, clear communication, and simple interfaces, reinforcing the need for user-centered, practical designs.

c) I plan to enhance skills in system documentation, requirements analysis, and UX design, strengthen my cybersecurity and incident response knowledge through projects and competitions, and improve time management and teamwork for effective collaboration.

5.0 Task Allocation

No.	Team Member	Task Assigned
1	**Azaam Ahmed Digale**	Problem analysis, define phase, prototype design
2	**Hazilen Fiona Francis**	Empathy survey, ideation, and report writing
3	**Wan Nur Anis Dayana**	Data collection, testing phase, documentation

4	Nishaat	Progress log, formatting, references, appendices

6.0 Reference

1. Delnevo, G., Ghini, V., Fiumana, E., & Mirri, S. (2024). *A support tool for emergency management in smart campuses.*
   Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC11435935/
2. Salazar Cazco, S. A., Dávila Fuentes, C. A., Padilla Padilla, N. M., Ramos Jiménez, R. B., & Del Pozo Naranjo, J. G. (2025). *Optimization of emergency notification processes in university campuses through a mobile app. Computers*, 14(11), 453.
   DOI: https://doi.org/10.3390/computers14110453
3. Hu, R., et al. (2023). *Research on evaluation of university emergency management ability (BP neural network model). International Journal of Environmental Research and Public Health*, 20(5), 3970.
   Link: https://www.mdpi.com/1660-4601/20/5/3970
4. Skurka, C., et al. (2018). *An evaluation of a college campus emergency planning video. Journal of School Safety*.
   Summary: https://www.sciencedirect.com/science/article/abs/pii/S0022437517305571
5. Lachlan, K. A., et al. (2016). *The effect of alert sources on learning, message speed, and perceptions of campus safety. Journal of Security Education*
   Link (abstract page): https://journals.sagepub.com/doi/abs/10.1177/028072701603400105
6. Li, L. (2025). *Research on the construction strategies and optimization paths of campus security management systems. Frontiers in Economics and Management*, 6(4).
   PDF (open access): https://bcpublication.org/index.php/FEM/article/download/8427/8364/10837
7. *SHIELD: Social sensing and help in emergency using mobile devices* (2010). *arXiv preprint*.
   Link: https://arxiv.org/abs/1004.4356
8. Diaz Intal, G. L., et al. (2020). *User experience design for disaster management mobile apps. ACM Conference Proceedings*.
   Link: https://dl.acm.org/doi/10.1145/3446569.3446587
9. Jaenichen, K. K. (2021). *Design for emergency management.* In *Design for Emergency Management* (pp. 140–162).
   PDF (open access):
   https://library.oapen.org/bitstream/id/4b2ba817-5146-4778-83a2-39148083b80a/9781003306771_10.4324_9781003306771-10.pdf
10. Ingram, C., Langhans, T., & Perrotta, C. (2022). *Teaching design thinking as a tool to address complex challenges. BMC Medical Education*.
    DOI: https://doi.org/10.1186/s12909-022-03334-6

7.0 Appendices

Appendix A: Google Forms Survey Questions

Figure A.1

Figure A.2

Figure A.3

Figure A.4

Section C : Emergency System Needs

How important is having a digital emergency system for campus safety?

	1	2	3	4	5	
Not important	○	○	○	○	○	Very Important

Which features would you find useful in a campus emergency system?

- ☐ One-tap SOS / Panic button
- ☐ Real-time location sharing
- ☐ Emergency alerts & notifications
- ☐ Campus safety map
- ☐ Direct contact with campus security
- ☐ Medical emergency assistance

How likely are you to use a campus emergency safety app?

	1	2	3	4	5	
Very unlikely	○	○	○	○	○	Very likely

What device would you most likely use for emergency reporting?

- ○ Mobile phone
- ○ Tablet
- ○ Laptop

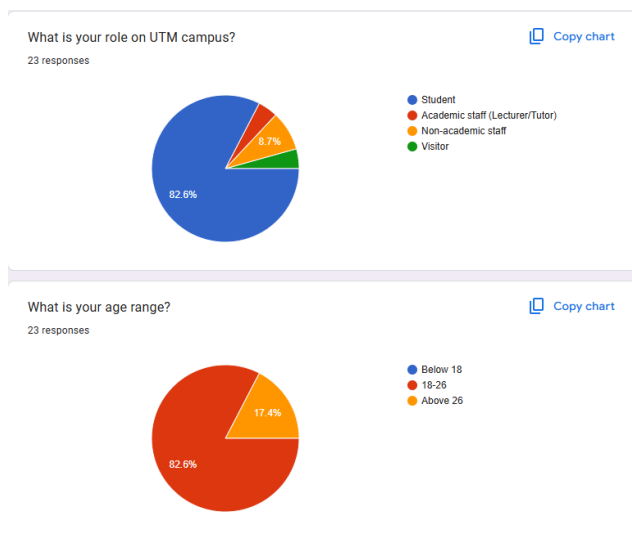Would a one-tap SOS button make you feel safer on campus?

- ○ Yes
- ○ Maybe
- ○ No

Figure A.5　　　　　　　　　　　　　*Figure A.6*

Appendix B: Survey Results and Charts

What is your role on UTM campus?
23 responses
- Student 82.6%
- Academic staff (Lecturer/Tutor)
- Non-academic staff 8.7%
- Visitor

What is your age range?
23 responses
- Below 18
- 18-26 82.6%
- Above 26 17.4%

Section B : Campus Safety Experience

How safe do you generally feel on campus?
23 responses
- 1: 0 (0%)
- 2: 2 (8.7%)
- 3: 10 (43.5%)
- 4: 10 (43.5%)
- 5: 1 (4.3%)

Have you ever felt unsafe or worried about your safety on campus?
23 responses
- Yes 52.2%
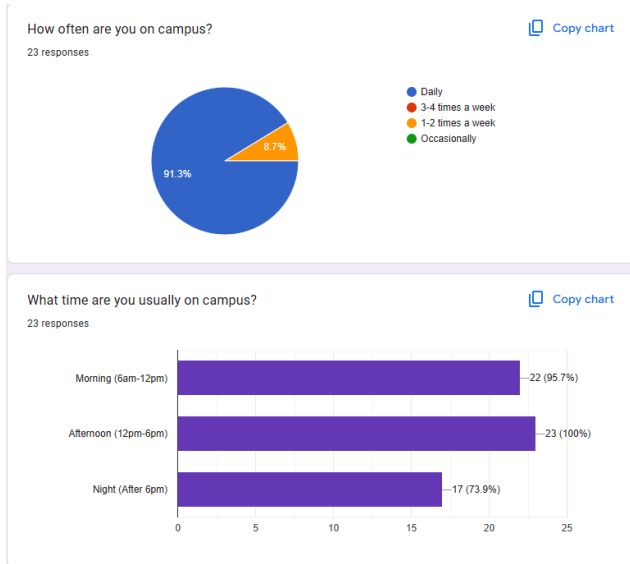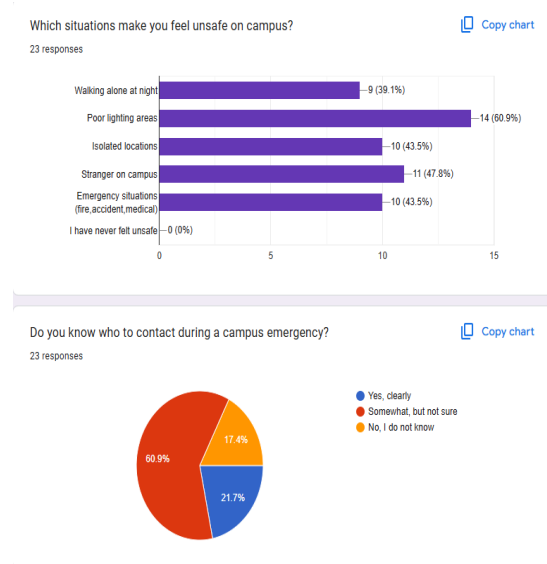- No 13%
- Not sure 34.8%

Figure B.1

Figure B.2

(Respondents' Awareness of Emergency Procedures)   (Difficulty in Reporting Campus Incidents)

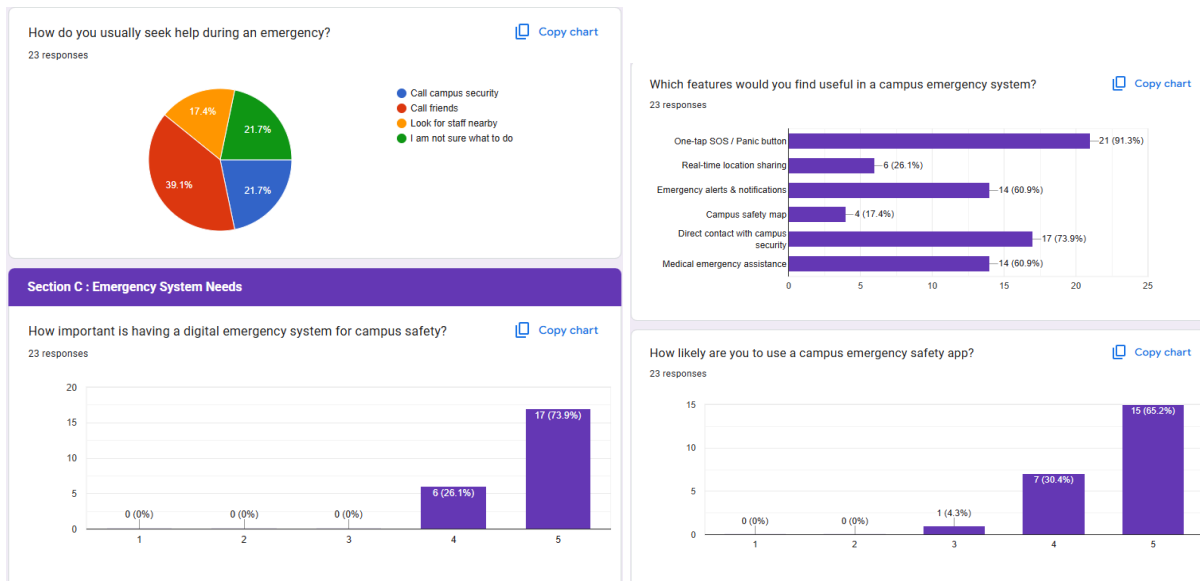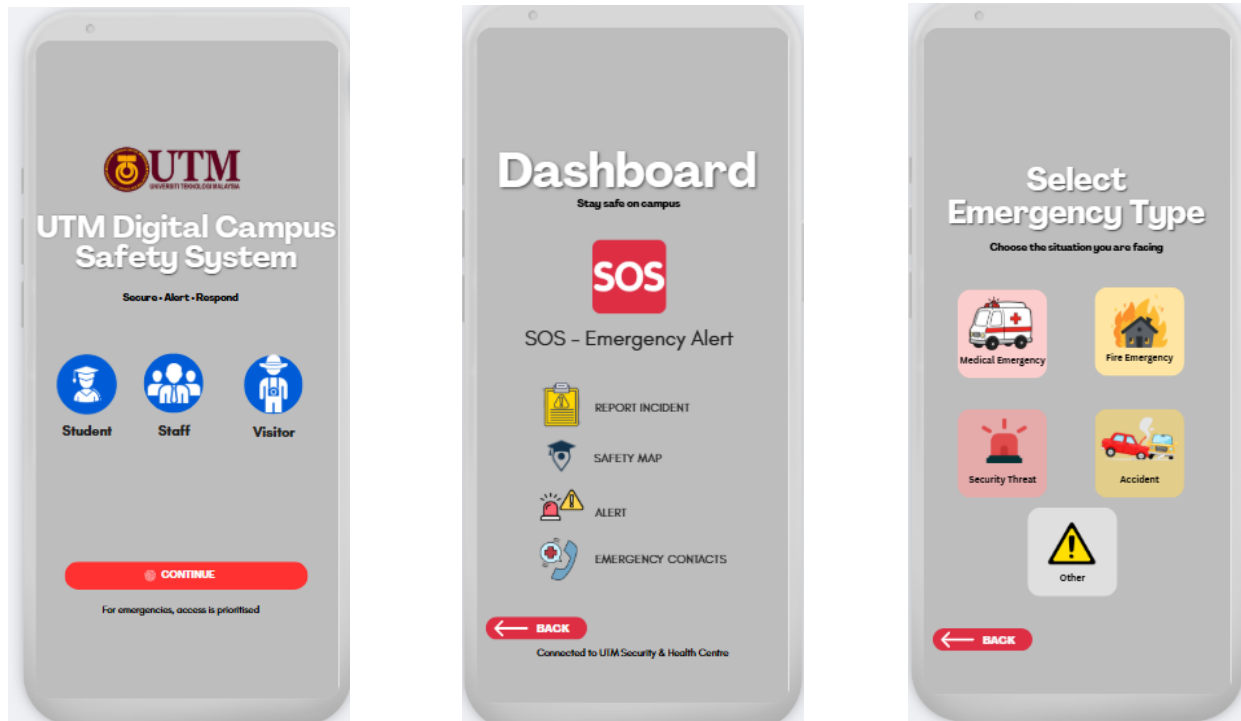*Figure B.3 Preferred Features in a Campus Safety System*

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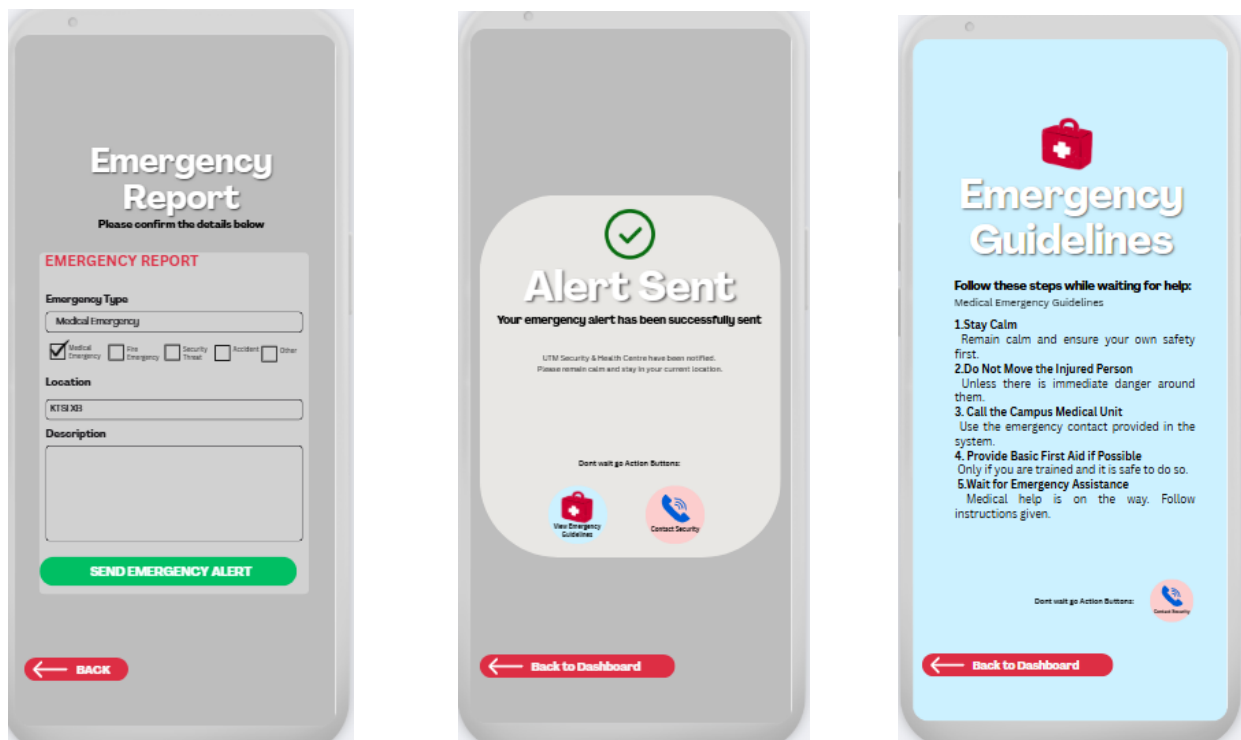*Figure C.1: Main Home Screen of the UTM Digital Campus Security System*

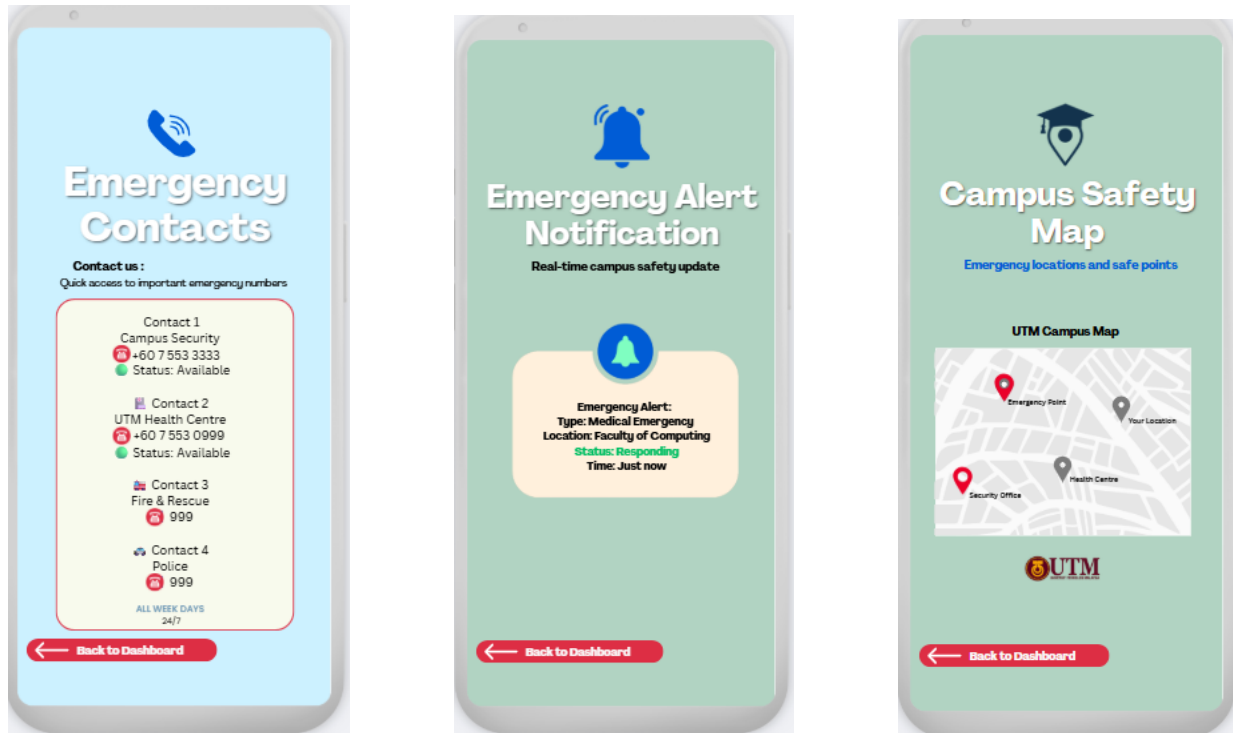*Figure C.2 : Emergency Reporting and SOS Feature*

Figure C.3: Emergency Information and Guidance

Appendix D: Team Progress Log

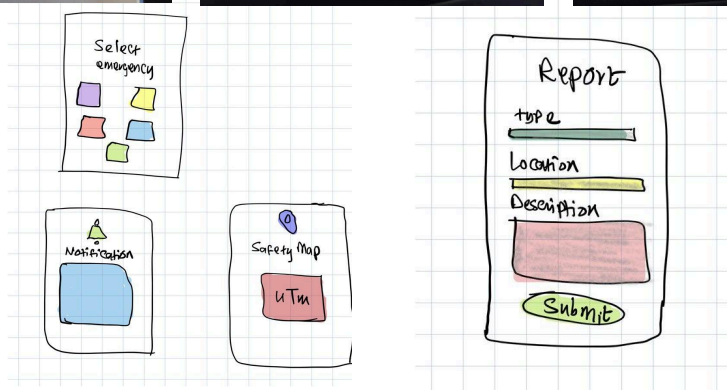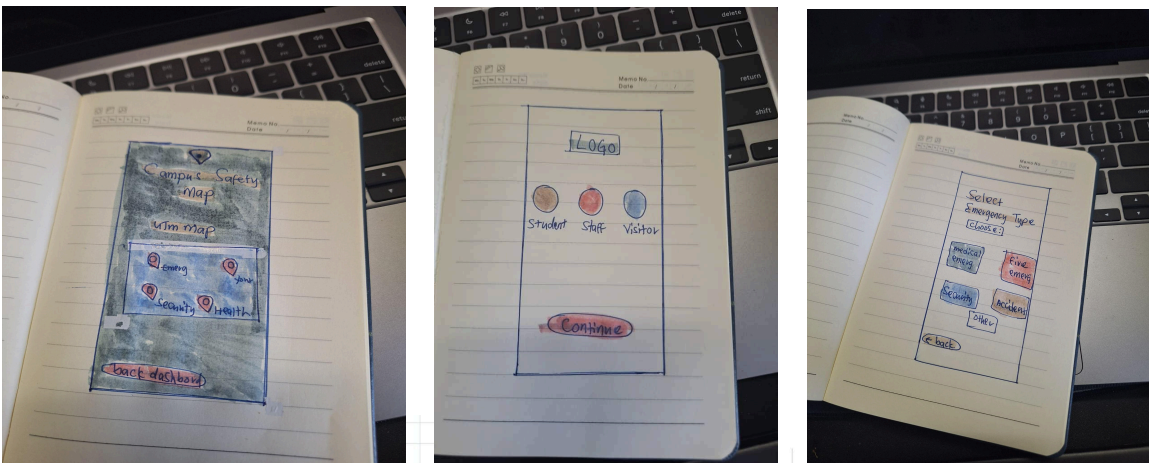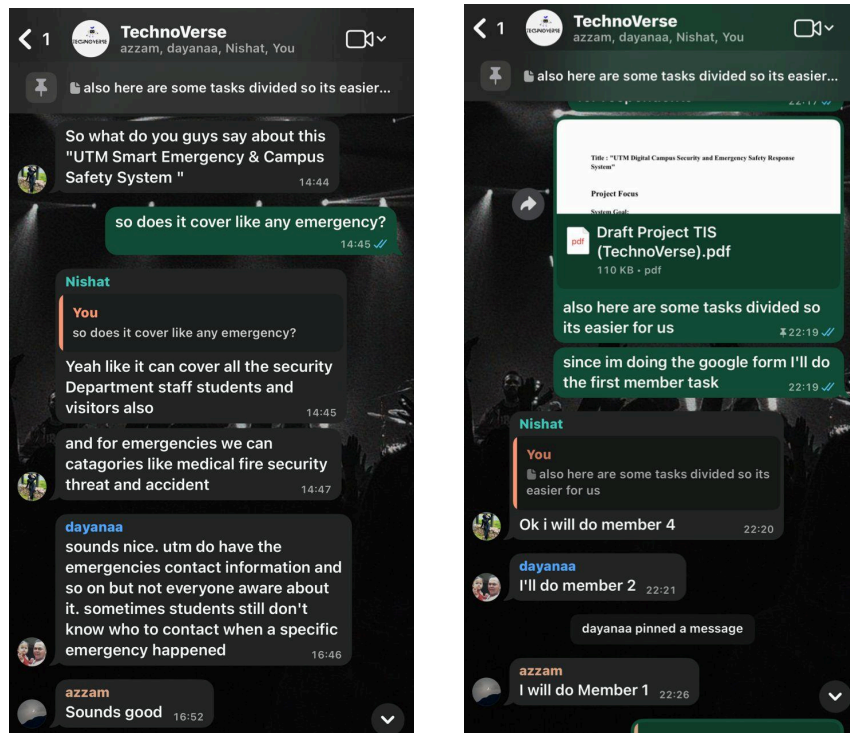*Figure D.1: Define and Ideate Phase*

Figure D.2: Evidence of Group Coordination and Decision Making