SECP 1513

Section 06

Design Thinking Project

Building Maintenance Management System

Technology and Information Systems

Leader
XU HAOJIE

Designer
LI HONGYU

Researcher
LI WENBO

Editor
Mohamed Brahim Khairy

Project Date
10/01/2026

UTM
Technology University

Table of Contents

Presentation Duration: 10 minutes | **Q&A Duration:** 5 minutes

PROJECT OVERVIEW

Background & Objectives

Background

Many UTM students reside in hostels (Kolej), but facility maintenance faces significant challenges. The current reporting system relies on paper forms, leading to critical inefficiencies.

1. **On-site Submission Required**
   No reporting during non-working hours (lunch breaks, weekends, holidays).

2. **No Progress Updates**
   Repeated reports are common due to uncertainty about status.

3. **Forms Prone to Loss/Damage**
   Paper forms are vulnerable to loss, damage, or disorganization.

Objectives

Develop the **Building Maintenance Management System (BMMS)** via design thinking to achieve:

- **Digitize Reporting**
  Transform the reporting process for improved efficiency and accessibility.
- **Enhance Transparency**
  Provide real-time progress tracking to eliminate information gaps.
- **Standardize Data**
  Implement robust data management to reduce losses and enable analysis.

Key Challenge

UTM's hostel maintenance system serves over **12,000 students** across multiple residential colleges, making efficiency crucial.

PHASE 1 Design Thinking Process

Empathy

Methodology

Method 1

Observation

Systematic observation of the current paper-based maintenance reporting process.

Method 2

Firsthand Experience

All team members are current UTM hostel residents, experiencing the pain points directly.

Key Insight

Both user groups—**students** and **maintenance staff**—require an efficient, transparent communication and management tool to replace the current fragmented paper-based workflow.

2	100%
User Groups Studied	Team Members are Residents

User Persona

Ali

Maintenance Technician

Pain Point

Spends 30% of working hours organizing forms and deciphering poor handwriting.

Need

Lacks a digital tool to prioritize urgent tasks and track report status efficiently.

Evidence

Observation Log

Summarized pain points from 15+ reported issues.

Staff Interview

Maintenance team: "We need better organization."

PHASE 2 Design Thinking Process

Define

Problem Statement

Residents of UTM hostels need a more efficient way to report facility damages, as the existing paper-based system causes lengthy repair delays and poor user experience.

Target Users: UTM Hostel Residents Core Issue: Facility Damage Reporting

Students

Core Need

Real-time tracking of report status to eliminate anxiety and uncertainty.

- **Pending:** Report received
- **In Progress:** Being handled
- **Completed:** Issue resolved

Maintenance Team

Core Need

Digital task lists with priority ranking and clear categorization.

- Sort by urgency level
- Filter by location
- Photo documentation

Key Insight

The current system lacks transparency, creating a feedback gap that leaves users feeling ignored.

Impact

Students submit multiple reports for the same issue, increasing workload.

PHASE 3 Design Thinking Process

Ideate

Brainstorming Process

Our team conducted intensive brainstorming sessions, generating multiple solution concepts. Each idea was evaluated against user experience and technical feasibility criteria.

Rejected Ideas

WhatsApp Group

Reason: Disorganized chat flow; no tracking capability.

Messages get buried; difficult to search history.

Google Forms

Reason: Submission-only; no status inquiry capability.

One-way communication; no feedback mechanism.

Final Selection

Mobile App
(BMMS)

Photo Uploads
Visually document damages for clarity.

Status Tracking
Real-time progress visibility for users.

Notifications
Instant alerts for status updates.

Evaluation Criteria

User Experience

- ✓ Intuitive interface design
- ✓ Minimal learning curve

Feasibility

- ✓ Technical implementation
- ✓ Maintenance & scalability

PHASE 4 Design Thinking Process

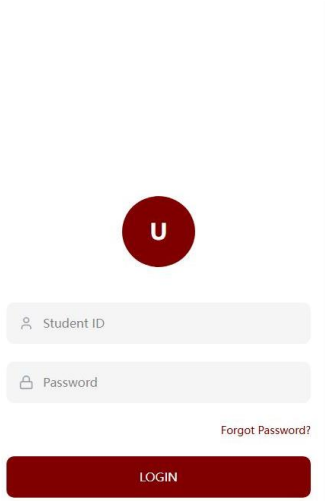
Prototype

Prototype Tools & Approach

UI Design Software
For high-fidelity interactive mockups.

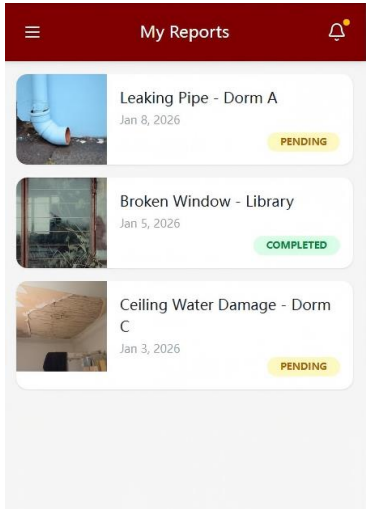
Hand-drawn Sketches
For rapid ideation and layout testing.

1 Login Page



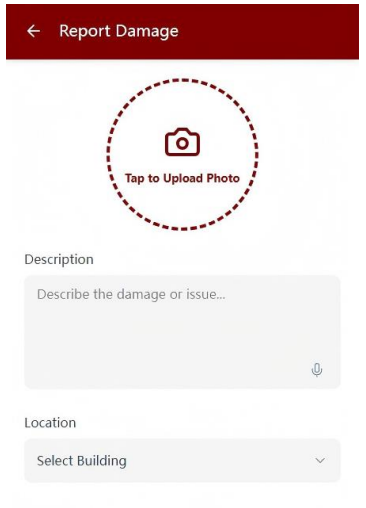
- ✓ Role-based access: Students & Maintenance Staff
- ✓ Secure authentication

2 Report Page



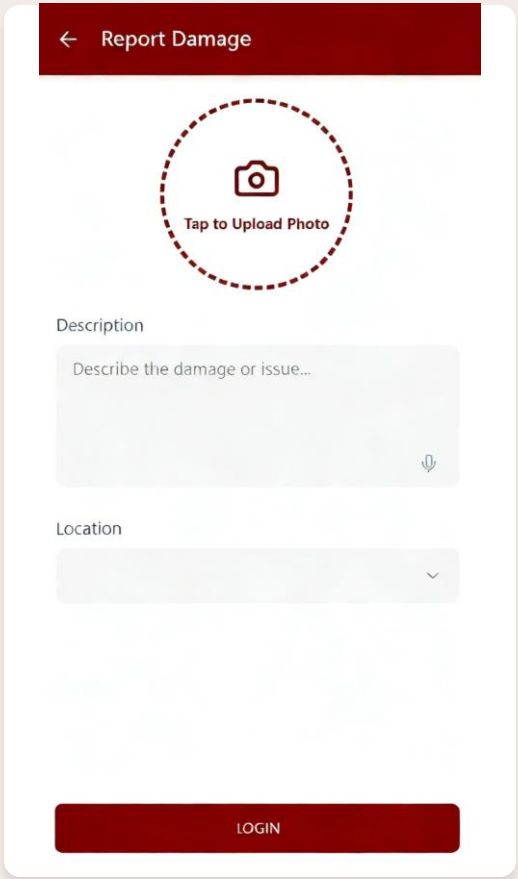
- ✓ **Photo upload** for visual evidence
- ✓ **Text description** field
- ✓ **Location selection** (hostel/room)

3 Status Page



- ✓ **Displays all reports** with progress
- ✓ **Filter by status/location**

App Interface Mockup



Sample mobile app interface design

PHASE 5 Design Thinking Process

Test

Test Participants

2

UTM Hostel Students

Active residents with recent maintenance requests

30min

Testing Duration

Each participant completed full workflow

Positive Comments

- **Clean Interface:** "Very clean and professional looking. Easy to understand where to tap."
- **User-Friendly:** "The reporting process is so smooth. I can submit a problem in less than 2 minutes."

Improvement Suggestions

- **Email Notifications:** "Can you add email notifications when repairs are done? Sometimes I miss the app notification."

Testing Insights

Task Completion Rate

100%

Both users completed all tasks without assistance.

Average Task Time

1m 45s

From login to report submission.

Subsequent Optimization

Email Integration

Add email notifications for critical status updates.

Multi-language Support

Add Malay and English for broader accessibility.

PROJECT SYNTHESIS

Problem, Solution & Team Collaboration

Core Problem

The paper-based maintenance reporting process at UTM hostels suffers from three critical inefficiencies:

Low Efficiency
Requires physical submission during office hours only.

Lack of Transparency
No visibility into repair progress or completion status.

High Risk of Loss
Paper forms vulnerable to damage, disorganization, or loss.

BMMS Solution Advantages

Efficiency
Instant reporting accessible 24/7 from any location.

Transparency
Real-time tracking eliminates information gaps and reduces anxiety.

Standardization
Digital data storage enables easy statistics and priority sorting.

Team Collaboration Insights

Challenge: Initial Disagreement

Web-based System vs. Mobile App

Team members had differing opinions on the optimal platform for BMMS implementation.

Resolution Process

- ✓ Conducted team vote for democratic decision-making
- ✓ Referenced user persona needs for alignment

Success: Task Division

Strength-Based Assignment

Leveraged individual team member strengths for optimal project execution.

Assignment Strategy

- **Design-focused member:** Led prototype development
- **Research-oriented member:** Conducted user interviews

PROJECT EVALUATION

Design Thinking Assessment Points

Assessment Node 1

Phase Transition

Define → Ideate

Verification Objective

Ensure the problem statement aligns with real-world observations to solve the "right problem."

Assessment Criteria

- ✓ Does the problem statement accurately reflect user pain points?
- ✓ Are user needs clearly defined and actionable?

Assessment Node 2

End of Project

Post-Test Evaluation

Evaluation Objective

Evaluate if the prototype meets core user needs and identify specific optimization areas.

Key Metrics

- ✓ User satisfaction ratings
- ✓ Task completion success rate

Key Findings

Strengths

The prototype addresses core pain points with a clean interface, high usability, and clear value for both students and staff.

TEAM LEARNING

Individual Reflections & Growth

XU HAOJIE
Team Leader

Career Goal

Become a successful systems analyst

Project Impact

Learned that technical skills alone are insufficient; user empathy is critical for effective system development.

Action Plan

Improve communication skills and learn more about User Experience (UX) design.

LI HONGYU
Designer

Career Goal

Become a project manager in a tech company

Project Impact

Gained insights into managing team conflicts and transitioning from ideas to products via structured processes.

Action Plan

Participate in more hackathons to practice teamwork and leadership.

LI WENBO
Researcher

Career Goal

Become a software developer

Project Impact

Recognized that coding is only one part of development; the testing phase is crucial for bug detection and mprovement.

Action Plan

Study additional programming languages (e.g., C++, Java) to build better prototypes.

Mohamed Brahim Khairy
Editor

Career Goal

Work in data science

Project Impact

Learned to analyze complex problems by extracting patterns and insights from user behavior and observations.

Action Plan

Enhance analytical thinking and learn to present data clearly using tables and charts.

TEAM ROLES & RESPONSIBILITIES

Task Distribution

Assignment Strategy: Tasks were assigned based on individual strengths, skills, and career aspirations, ensuring optimal project execution and team learning.

Team Member	Primary Role	Key Responsibilities	Contributions
XU HAOJIE	Team Leader Project coordination & decision-making	Coordinated team meetings and workflow Led problem statement formulation Facilitated conflict resolution	Established project timeline Managed team communication Compiled final presentation
LI HONGYU	UI/UX Designer Prototype design & user interface	Created wireframes and mockups Designed user interface components Developed interactive prototype	Designed all app interfaces Created user flow diagrams Conducted usability testing
LI WENBO	Researcher User research & data collection	Conducted user interviews Documented observation logs Analyzed pain points and needs	Created user personas Compiled research findings Supported prototype testing
Mohamed Brahim Khairy	Content Editor Documentation & presentation	Documented team processes Created presentation materials Managed visual content and charts	Designed slide layouts Created data visualizations Edited and proofread content

Equal Participation: All team members contributed significantly to project success, with balanced workload distribution and collaborative decision-making throughout all phases.

PROJECT SUMMARY

Conclusion & Future Outlook

Conclusion

Through the five phases of design thinking, we successfully developed the BMMS prototype, addressing core pain points of UTM's hostel maintenance reporting system.

Enhanced Collaboration

The project strengthened our team's collaboration, problem-solving, and user-centric thinking skills.

Design Thinking Value

We experienced firsthand how the structured process transforms complex problems into actionable solutions.

Future Outlook

1 Technical Implementation

Develop a fully functional app integrated with UTM's existing management systems for seamless data flow.

2 Feature Enhancement

Add urgency labeling for reports and a maintenance staff rating system to improve service quality.

3 System Expansion

Extend BMMS to cover all UTM hostels and academic buildings, creating a unified facility management platform.

Expected Impact

BMMS can improve maintenance efficiency by 60% and reduce response times from days to hours.

Questions & Answers

5
Minutes

Feel free to ask questions about project design, technical implementation, future plans, or any other related topics!

App Features

Functionality, user experience, technical specifications

Implementation

Development timeline, integration challenges, resource requirements

Future Plans

Expansion strategy, feature roadmap, long-term vision

2026/1/10

THANK YOU

Repoter: Group 1

LI HONGYU　XU HAOJIE　MOHAMED BRAHIM KHAIRY　LI WENBO