UTM
UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING
UTM Johor Bahru

SECJ 2203: Software Engineering

Semester 01, 2024/2025

PROJECT PROPOSAL

MyGreen UTM

Redesign

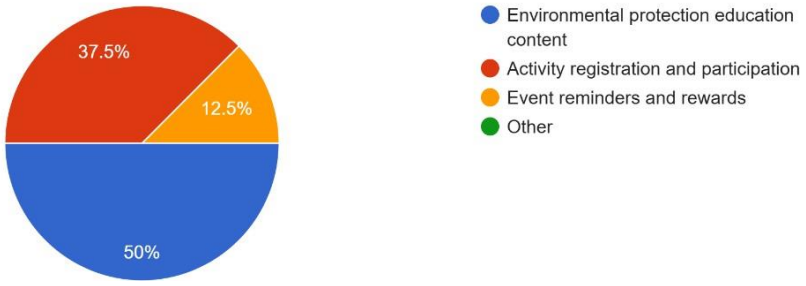
Team Name: NULL

Team Members:

1. Liu Ruoyang Team Leader
2. Zhao Wei
3. Liu Wanpeng
4. Bu Guoshun

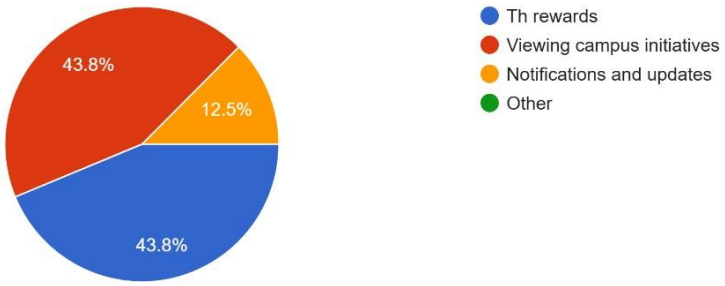
What features would you like to see added to your MYGreen UTM system?

（16 条回复）



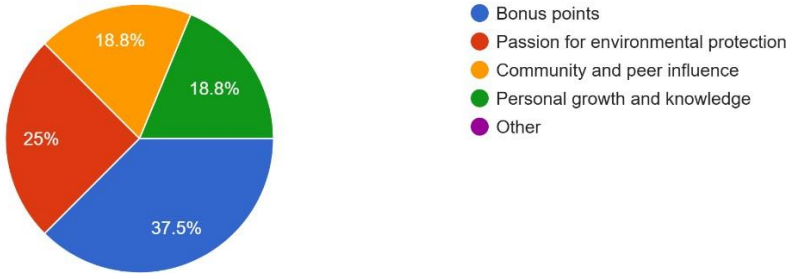
In the MYGreen UTM application, which feature do you find most helpful?

（16 条回复）



What motivates you most to participate in the activities listed on the app?

（16 条回复）



1. Introduction

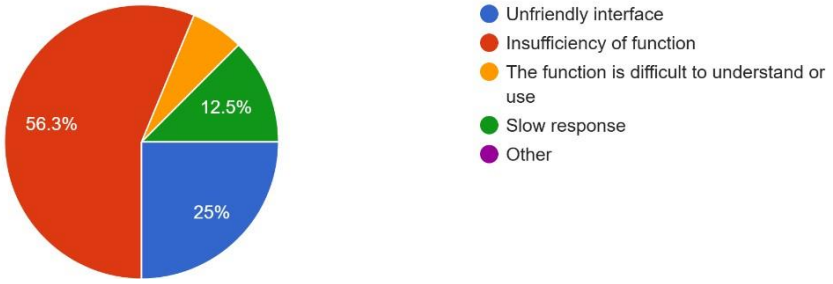
Need (N)	MYGreen UTM aims to fill this gap, drive the campus community to become more actively involved in environmental activities, and increase students' green awareness and campus sustainability.
Approach (A)	The MYGreen UTM system was redesigned to adopt the form of a **mobile application** as the core platform. The mobile application can provide users with more convenient access and increase environmental awareness and participation in the campus community by integrating multiple functions. 1. **Environmental activities and points function** **Function description:** Users can earn points by participating in campus environmental protection activities. 2. **Qr code scanning function** **Function Description:** This module allows users to quickly scan the QR code when participating in activities and viewing resource monitoring data. 3. **Environmental education and information functions (**New Feature**)** **Function Description:** This module provides users with the latest environmental information, green living tips and the introduction of campus sustainability projects.
Benefit (B)	**Increase environmental awareness:** Through educational modules and activities, help users understand the importance of green living. **Enhance community participation:** Encourage users to actively participate in campus environmental protection activities and create a green campus culture.
Competitor (C)	**status quo：** There are a variety of systems and applications dedicated to environmental management and sustainability on campuses and similar environments. **Differentiation and Advantages:** By showing significant advantages in functional design, user experience, technology integration and educational communication, MYGreen UTM not only effectively fills in the shortcomings of EcoCampus, but also provides a more attractive and efficient solution. Compared with EcoCampus, which focuses on institutional management, ignores personal experience, and has relatively limited user interaction and education functions, MYGreen UTM has more comprehensive functions that not only meet the resource management needs of institutions, but also provide personalized recommendations, interactive learning

	modules, and in-depth community functions. Integration considers the participation experience of individual users, further enhances the practicality and attractiveness of the system, provides more comprehensive services to higher education institutions and their teacher and student users, and demonstrates outstanding market competitiveness. **The link for EcoCampus:** https://www.ecocampus.co.uk/

2. Existing Systemss

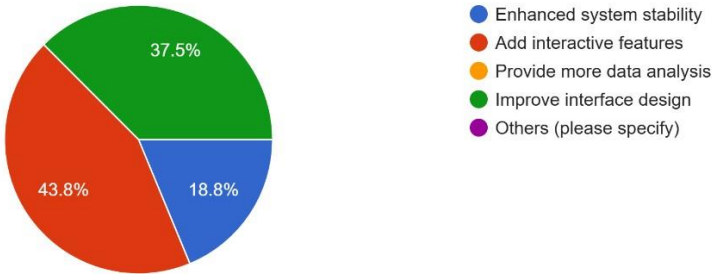
When you use the MYGreen UTM system, what features do you find inconvenient or unsatisfactory?

（16 条回复）



Do you have any specific suggestions for improving the look and feel of the MYGreen UTM system?

（16 条回复）



According to the survey report, we found several problems with the current system

Problem 1: Lack of real-time data tracking and analysis

Existing environmental applications and manual systems are generally unable to monitor campus resource use and waste management in real time. This leads to waste of resources and inefficient management。

Problem 2: Low user engagement and lack of personalized experience

The interface and function of the system are not attractive, which fails to effectively stimulate the user's interest in participation.

Lack of personalization to recommend relevant activities or educational content based on user preferences and historical behavior.

Problem 3: Lack of clear guidelines on scanning QR codes

In the existing MYGreen UTM system, users often need to scan QR codes when using various functions, such as participating in environmental activities, signing in, and obtaining points. However, user feedback pointed out that the system lacked clear guidelines for the operation of scanning QR codes in each functional module, which could lead to confusion and inconvenience for users during use.

3. Proposed System

The **MYGreen UTM** system is designed to address the identified gaps and overcome challenges in current environmental management applications. By integrating modern technology, MYGreen UTM will actively promote sustainability practices within the campus while improving user engagement and efficiency.

Features of the Proposed System

1. **Real-Time Data Tracking and Analysis**

   Smart Monitoring: Sensors integrated across the campus for real-time tracking of resource usage (e.g., energy, water) and waste generation.

   Data Visualization: A dashboard displaying real-time statistics and trends to enable informed decision-making.

   Predictive Analytics: Tools for analyzing data patterns to forecast resource demands and identify areas for improvement.

2. **User-Centric Design and Personalization**

   Engaging Interface: A visually appealing and interactive user interface

to maintain interest.

Activity Recommendations: Personalized suggestions for green activities and events based on user preferences and history.

Gamification: Points and rewards system to encourage participation in green activities.

3. **Educational Modules**

   Interactive Learning: Modules on sustainability topics with engaging content (e.g., videos, quizzes).

   Certification: Users can earn certifications for completing modules, boosting their green credentials.

4. **Community Engagement**

   Event Coordination: Tools to organize and manage sustainability events.

   Social Sharing: Features to share green achievements and activities within the campus community.

   Feedback Mechanism: Easy channels for users to provide feedback on initiatives and system improvements.

5. **Resource Management**

   Waste Management System: A tracking system for waste segregation and disposal status.

   Energy Optimization Suggestions: Tips and guidelines to optimize energy use across the campus.

Advantages of the Proposed System

Efficiency: Automated real-time data tracking ensures timely and precise resource management.

Engagement: Interactive features foster greater participation and long-term involvement in sustainability.

Awareness: Educational content raises awareness of green practices and fosters a sustainable mindset among users.

Scalability: The system design allows for scalability to include additional features or integrate new technologies as needed.

Architectural Overview

The system will consist of:

Backend: Cloud-based data processing and storage for efficient management.

Frontend: A web and mobile application for easy access and interaction.

Integration: APIs for real-time communication with sensors and external systems.

4. Software Process Model

We chose **Waterfall Model** as the development model for MYGreen UTM system for the following reasons:

1. **Requirements are clear and stable:** they don't change much during development. The waterfall model is suitable for such projects with stable requirements.
2. **Strong structure and sequence:** there will be no major changes in the development process. The waterfall model is suitable for such projects with stable requirements.
3. **Detailed documentation support:** The Waterfall model focuses on documentation, which can improve transparency and communication efficiency, facilitate project management and post-maintenance.
4. **Low requirements change risk:** Due to strict project timelines, requirements change increase development risk. The waterfall model identifies requirements at an early stage, reducing the likelihood of requirements changes at later stages and keeping the project on schedule.

Waterfall model flow

1. **Planning**
   Prepare project proposal
2. **Requirement Analysis**
   Analysis the existing system
3. **System Design**
   Identify improvements needed in existing system
   System design
   GUI design
4. **Implementation**
   Finalize definition of data structures

Create database tables

Implement the program coding

5. **System Testing**

   Finalize project report

6. **Deployment & Maintenance**

   Release a trial version and collect feedback

5. Project Schedule

PROJECT PLAN				
TASK	PLAN START	PLAN DURATION	START	PERIOD(days)
PLANNING				
Prepare Project Proposal	1	5	7/11/2024	
Requirement : Gather Information				
Analysis the Existing System	6	5	12/11/2024	
Analysis & Design				
Identify Improvements needed in existing system	11	7	17/11/2024	
System Design	18	7	24/11/2024	
GUI Design	25	7	1/12/2024	
Implementation(System Prototype)				
Finalize definition of data structures	34	3	8/12/2024	
Create database tables	37	5	11/11/2024	
Implement the program coding	42	5	16/12/2024	
System Testing				
Finalise project report	49	5	23/12/2024	
Maintenance				
Release a trial version and collect feedback	56	5	30/12/2024	

Planning Phase

This phase involves the preparation of a project proposal to outline the objectives, scope, and deliverables of the upgrade project. The deliverable is a comprehensive project proposal that sets the foundation for the subsequent phases.

Requirement Gathering Phase

During this phase, the existing system will be analyzed to identify strengths, weaknesses, and areas for improvement. The outcome will be a list of system requirements necessary for the upgrade.

Analysis & Design Phase

This phase is divided into three key tasks:

- Identifying improvements in the existing system.
- Designing the system architecture to support new functionalities.
- Designing the graphical user interface (GUI).

  The deliverables include the architectural design document and the GUI prototypes.

Implementation Phase (System Prototype)

In this phase, the technical components of the system are developed, including defining data structures, creating database tables, and implementing program coding. The deliverable is a functional system prototype.

System Testing Phase

System testing will ensure that the implemented features function correctly and align with the specified requirements. A final project report will summarize the results of the testing phase.

Maintenance Phase

This phase involves releasing a trial version of the upgraded system and collecting user feedback to address any remaining issues. The deliverable is the feedback report, which informs any final adjustments before full deployment.

6. Work Breakdown Structure

Work Breakdown Structure		
Task ID	Task	Assigned To
1	Planning Phase	Everyone
1.1	Drafting	Liu Ruoyang
1.2	Content Gathering	Zhao Wei
1.3	Formatting	Bu Guoshun
1.4	Review	Liu Wanpeng
2	Requirement Gathering Phase	Everyone
2.1	Analysis	Zhao Wei
2.2	Stakeholder Feedback	Bu Guoshun
2.3	Documenting	Liu Wanpeng
2.4	Requirement Summary	Liu Ruoyang
3	Analysis & Design Phase	Everyone
3.1	System Issues	Bu Guoshun
3.2	Feedback Validation	Zhao Wei
3.3	Improvement Proposals	Liu Ruoyang
3.4	System Design	Everyone
3.4.1	Architecture	Liu Wanpeng
3.4.2	Module Planning	Zhao Wei
3.5	GUI Design	Everyone
3.5.1	Prototyping	Zhao Wei
3.5.2	Finalizing	Liu Wanpeng
4	Implementation Phase (System Prototype)	Everyone
4.1	Definition	Liu Ruoyang
4.2	Validation	Bu Guoshun
4.3	Database Implementation	Everyone
4.3.1	Schema Design	Liu Wanpeng
4.3.2	Execution	Liu Ruoyang
4.4	Coding	Everyone
4.4.1	Backend	Bu Guoshun
4.4.2	Frontend	Zhao Wei
5	System Testing Phase	Everyone
5.1	Testing	Zhao Wei
5.2	Reporting	Liu Wanpeng
6	Maintenance Phase	Everyone
6.1	Release	Bu Guoshun
6.2	Adjustments	Liu Ruoyang
6.3	Feedback Summary	Zhao Wei

The WBS outlines the project in six main phases: *Planning, Requirement Gathering, Analysis & Design, Implementation, System Testing, and Maintenance*. Each phase is further broken down into specific tasks, with responsibilities clearly assigned to team members. This ensures clear task ownership and smooth execution of the project.

Team Roles and Responsibilities

Liu Ruoyang (Programmer)
Responsible for core technical tasks, including requirement summarization, data structure definition, database execution, backend development, and system adjustments. Focused on coding and technical implementation.

Zhao Wei (System Analyst & Designer)
Responsible for system requirement analysis, module planning, frontend development, and GUI prototyping. Also oversees system testing and feedback summarization, focusing on system functionality and user experience.

Liu Wanpeng (Project Manager)
Responsible for overall project architecture design, documentation, final review of module planning, and project report preparation. Focused on team coordination and documentation management.

Bu Guoshun (Stakeholder Liaison & Validator)
Responsible for collecting stakeholder feedback, formatting proposals, validating data structures, and handling version releases. Focused on communication, quality validation, and release processes.

7. References

[1] Sommerville, I. (2016). "*Software Engineering*", 10th Edition, US: Pearson.

[2] Royce, W. W. (1970). *Managing the development of large software systems*. Proceedings of IEEE WESCON, 1-9.

[3] Chen, T., & Li, S. (2020). *Real-time resource monitoring and visualization using IoT technologies in smart campuses*. IEEE Internet of Things Journal, 7(3), 1-10.

[4] Hassenzahl, M. (2010). *Experience Design: Technology for All the Right Reasons*. Morgan & Claypool Publishers.

Appendices

Google Survey Links:

https://forms.gle/BrWFmW2GZKyZ1nFp9

AI assist link:

https://chatgpt.com/share/673ac71f-2d98-8005-935d-722ed46b5791