UTM UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING
UTM Johor Bahru

Project : Phase 2

SECD2613 - SYSTEM ANALYSIS AND DESIGN

Lecturer: Dr. Rozilawati
Section: 03

Group Name: **The Elite Four**

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1.0 Project Overview

This project should develop a campus resource management system that would greatly enhance the current resource management process. Using the current process, managing these resources often leads to scheduling conflicts, underutilized facilities, and poor or slow communication. The inefficiencies and associated problems with the current system in use shall be rectified by providing efficient scheduling, usage, and better communication regarding campus resources such as classrooms, laboratories, conference rooms, and recreational facilities. The CRMS will centralize the resource management by providing a unified platform, integrating modern technologies. This project will automate and optimize the utilization of campus resources, ensuring real-time information access and improved coordination.

To ensure we meet the needs of all users, we will gather detailed requirements through surveys with students, by giving out google form questionnaires. Doing this will ensure that we obtain various views capturing the right information about people, goals, data, and procedures. Using this information, we will create Data Flow Diagrams (DFDs) and Entity Relationship Diagrams (ERDs) to map out the current system and design the new one. This is going to help us understand the flow of the process and find areas that can be improved.

By the end of this project, we aim to have a fully functioning CRMS that resolves the issues of the current resource management system and enhances management at UTM. The new system will provide a better user experience, improve efficiency, and make it easier for everyone to access and use campus resources.

2.0 Problem Statement

2.1 Manual Inefficiency in Resource Management

Managing campus resources at UTM currently relies on semi manual processes and separate systems. This approach often leads to conflicting schedule, underused resources, and poor communication. In order to book a room or equipment will require multiple emails, visits to the administration office and/or phone calls, which is going to take quite some time, prone to errors, and would cause frustration for students, faculty, and staff.

2.2 Lack of a Centralized Platform

Without a centralized platform, information about resource availability and scheduling is scattered between various systems and formats. This decentralization causes confusion, poor utilization of resources, and makes it difficult to coordinate resource management effectively.

2.3 Poor Communication and Real-Time Information

The lack of real-time information on the current system adds to the inefficiencies. The availability of rooms, equipment, or facilities cannot be determined quickly by users because there's no centralized platform to see which are available. This lack of centralized platform makes the overall experience of finding and booking available spaces, rooms, equipment, or facilities inefficient and time consuming, caused by delays and miscommunication.

2.4 Overloading of Facilities and Resources

Without an efficient system to manage and balance the use of resources, some facilities may become overbooked while others remain underutilized. Overloading is caused by poorly coordinated and no centralized format. This overloading leads to reduced effectiveness, quality and causing wear and tear both. This overloading means that some users may have to wait longer to access the resources they need.

2.5 Security and Data Management Issues

The current systems used for managing resources at UTM pose major security and data management risks. Since each department or faculty keep a record of their own, sensitive information about bookings and usage is stored across various formats and locations. making the system vulnerable to data breaches and unauthorized access.

2.6 Need for an Integrated Solution

Taken together, these issues highlight the need for an integrated solution to improve the efficiency, transparency, and security of campus resource management at UTM. A Campus Resource Management System (CRMS) can centralize all aspects of resource management, it brings together all data into one place so it can be managed more effectively and accessed easily and securely. CRMS will provide a streamline scheduling, real-time updates, and ensure optimal use of campus resources, other than that this system will lead to a better overall experience for students, staff and lecturer.

3.0 Proposed Solutions

3.1 Implementation of a Campus Resource Management System (CRMS)

Introduce a CRMS specifically tailored to postgraduate supervision. This system will automate the scheduling of supervision sessions and allow both students and supervisors to input their availability, preferences and constraints. The CRMS will then generate optimized schedules, reducing the need for manual coordination and minimizing scheduling conflicts. It will also centralize communication between students and supervisors and provide a platform for transparent communication, schedule management and feedback mechanisms.

3.2 Integration of Automated Appointment Scheduling Software:

Create appointment scheduling software that is connected to the university's system. This program lets students schedule meetings with their mentors using current availability, removing the need for constant communication. Additionally, it has the capability to send automated reminders to both individuals, which helps decrease the number of missed appointments and enhance time management.

3.3 Development of a Centralized Communication Platform:

Develop a dedicated centralized communication platform designed for postgraduate supervision. This tool will allow students and supervisors to interact, exchange files, establish due dates, and get input in a single, centralized spot. By bringing together communication channels, the chances of valuable information getting spread out among various platforms are minimized.

3.4 Introduction of a Systematic Feedback Mechanism:

Introduce a structured feedback system for declined supervision requests. If a student's request for supervision is declined, the system will offer thorough explanation on why it was rejected, enabling students to identify ways to enhance their application. This level of openness enables students to improve their profiles and communicate with other supervisors more effectively, leading to decreased frustration and uncertainty.

3.5 Limiting Supervisory Workload:

Set rules to restrict the amount of students a supervisor can handle at the same time. By establishing appropriate boundaries, it prevents supervisors from being overwhelmed, thereby upholding the supervision quality. Moreover, it supports fair allocation of supervisory responsibilities, decreasing discrepancies in academic support and enhancing the overall student journey.

3.6 Enhanced Security Measures:

Enhance security protocols to safeguard important academic information. This involves putting in place encryption protocols, access controls, and conducting routine security audits to protect against data breaches and unauthorized access. By focusing on data security, the system builds trust and confidentiality among students and supervisors, addressing privacy worries and upholding the integrity of academic records.

3.7 Implementation of Performance Monitoring Tools:

Implement performance monitoring tools to assess the quality of supervision given by each supervisor. These tools are able to monitor metrics like student satisfaction, meeting attendance, and timely delivery of feedback. Through the observation of supervisor performance, it pinpoints areas that need improvement and guarantees uniform quality in all supervisory interactions.

3.8. Scalable System Architecture:

It is crucial to have a Scalable System Architecture for the Campus Resource Management System (CRMS) to meet the changing requirements of the university community. Through the use of a modular design, the CRMS can be organized into separate components or modules, with each one handling particular tasks like scheduling, communication, feedback management, and data security. The modular parts can be effortlessly included, taken out, or altered without causing any disturbance to the whole system, enabling smooth incorporation of new features or updates.

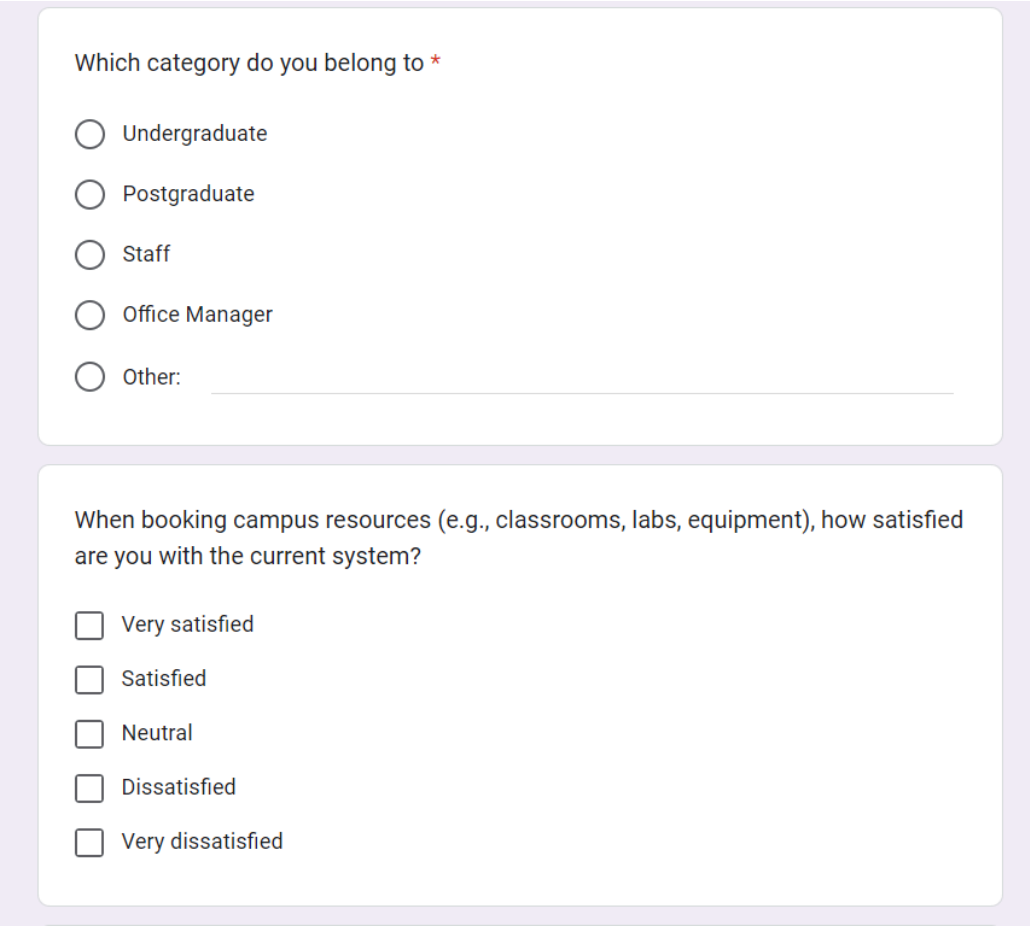
Moreover, using scalable databases that can manage growing amounts of data guarantees that the system stays fast and effective as both users and resources expand. Cloud-based infrastructure improves scalability by offering resources that can be adjusted based on demand, reducing costs and optimizing performance during peak usage periods. Basically, Scalable System Architecture establishes the base for a strong CRMS that can adjust and grow with the evolving needs of the university, guaranteeing sustainability and user contentment in the long run.

4.0 Information Gathering Process

A comprehensive information gathering process was carried out to address the challenges caused by the lack of a Campus Resource Management System (CRMS) and create effective solutions. The method consisted of obtaining perspectives from multiple individuals involved in the educational institution such as students, faculty, staff, and other pertinent groups. The main goals of the information gathering process were to grasp the current issues and weaknesses in resource management, pinpoint the exact needs and demands of users, and collect input on possible features and functions of a CRMS.

4.1 Method used

In order to effectively gather the information necessary to address the challenges caused by the lack of a Campus Resource Management System (CRMS) and develop appropriate solutions, we utilized a comprehensive questionnaire-based approach. This method involved the distribution of detailed questionnaires to a diverse group of stakeholders within the educational institution, including students, faculty, staff and other relevant parties. The main objectives of this approach were to understand the current problems and deficiencies in resource management, to identify the specific needs and requirements of users and to gather suggestions for possible features and functions of a CRMS. The questionnaires were designed to elicit detailed and honest responses that allowed us to capture a wide range of perspectives and insights. This information was critical to gaining a comprehensive understanding of existing issues and developing a CRMS that would effectively meet identified needs and improve resource management across campus



What challenges have you faced when trying to book campus resources?

- ◯ Scheduling conflicts
- ◯ Lack of availability
- ◯ Difficulty communicating with administration
- ◯ All of the above
- ◯ None of the above

How often do you encounter scheduling conflicts when booking campus resources?

- ◯ Frequently
- ◯ Occasionally
- ◯ Rarely
- ◯ Never

How do you typically communicate with the administration or relevant departments when requesting or booking campus resources?

- ◯ Email
- ◯ Phone
- ◯ In-person
- ◯ Online portal

On a scale of 1 to 10, how easy is it for you to find information about the availability of campus resources? (1 being very difficult and 10 being very easy)

1	2	3	4	5	6	7	8	9	10
◯	◯	◯	◯	◯	◯	◯	◯	◯	◯

Have you ever experienced difficulties accessing campus resources due to a lack of availability or visibility?

- ◯ Automated scheduling
- ◯ Real-time tracking
- ◯ Detailed reporting
- ◯ All of the above
- ◯ None of the above

How do you think a Campus Resource Management System (CRMS) could improve the efficiency of resource booking and utilization on campus?

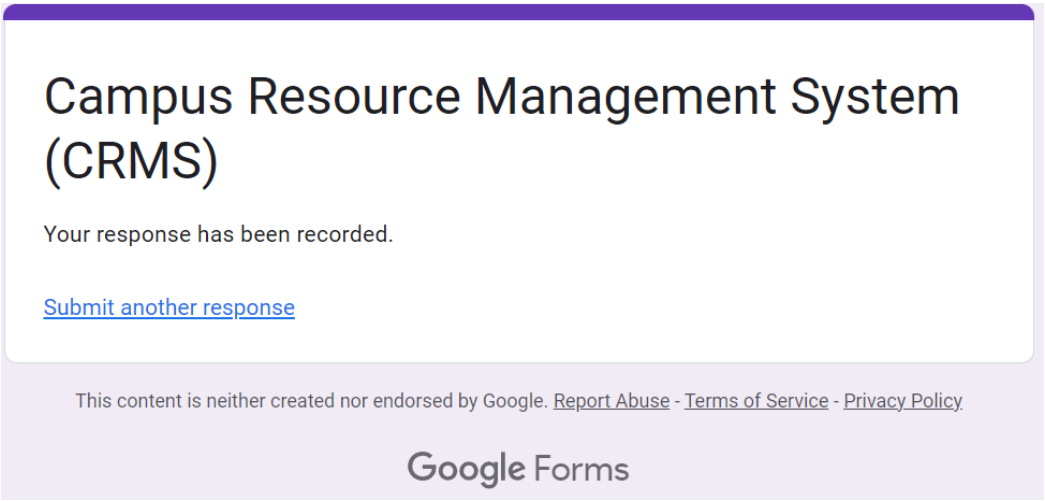
- ◯ Automated scheduling
- ◯ Real-time tracking
- ◯ Detailed reporting
- ◯ All of the above
- ◯ None of the above

How do you think a CRMS could contribute to a more positive campus experience for students, faculty, and staff?

- ◯ Streamlined processes
- ◯ Reduced scheduling conflicts
- ◯ Improved communication
- ◯ All of the above
- ◯ None of the above
- ◯ Other: _____

Submit

Clear form



4.2 Summary from method used

To address the difficulties caused by the lack of a Campus Resource Management System (CRMS), we employed a systematic strategy focused on surveys. The surveys were distributed to a wide range of people involved in the educational institution, such as students, teachers, staff, and other relevant groups. The aim of this approach was to gain a deep understanding of current resource management challenges, identify the unique requirements and preferences of users, and collect suggestions for possible CRMS features and functions. The information gathered from this procedure offered important knowledge that guided the creation of customized and impactful answer

4.2.1 sample of the questions

- Which category do you belong to
- When booking campus resources (e.g., classrooms, labs, equipment), how satisfied are you with the current system?
- What challenges have you faced when trying to book campus resources?
- How often do you encounter scheduling conflicts when booking campus resources?
- How do you typically communicate with the administration or relevant departments when requesting or booking campus resources?
- On a scale of 1 to 10, how easy is it for you to find information about the availability of campus resources? (1 being very difficult and 10 being very easy)
- Have you ever experienced difficulties accessing campus resources due to a lack of availability or visibility?
- How do you think a Campus Resource Management System (CRMS) could improve the efficiency of resource booking and utilization on campus?
- How do you think a CRMS could contribute to a more positive campus experience for students, faculty, and staff?

These were the questions used in our form in order to gather the information/data needed.

5.0 Requirement Analysis

5.1 Current business process

Project Initiation: The proposed Campus Resource Management System is initiated by establishing the project's scope and objectives, as well as forming project teams. This stage also includes the development of a project charter outlining important objectives and milestones.

Requirement Gathering: After project commencement, the next crucial phase is to gather requirements. This entails interviewing a variety of stakeholders, including students, professors, and administrative personnel, to better understand their needs and expectations from the system. The goal here is to document a complete list of functional criteria that the system must achieve. This step is critical for customizing the system to properly

meet unique campus resource management concerns.

Requirement Specification: Once the requirements are gathered, they are documented in a formal specifications document. This document serves as a blueprint for the development phase, ensuring all team members and stakeholders have a clear understanding of the system's capabilities and interfaces. It includes detailed descriptions of the user-friendly interface for booking resources, the integration capabilities with existing IT infrastructure, and the security measures that will protect user data and ensure privacy.

Review and Finalization: The final step in the requirement analysis process is the review and finalization of the functional specifications. This involves revisiting the initial requirements in light of any new information or changes in project scope that may have emerged during the gathering and specification phases. Adjustments are made to ensure the system's design comprehensively covers all identified needs. This stage culminates with the approval of the functional specifications, which confirms that the proposed system is ready to move into the design and development phases.

5.2 Functional Requirement for the Campus Resource Management System

Input: The Campus Resource Management System starts by gathering extensive information from users, such as their department affiliation, role as staff members, students, and particular demands with relation to campus resources. In order to ensure effective resource allocation and personalize the user experience, this data collecting is essential. Through an easy-to-use interface, users may also enter their preferred times and resources, which the system logs and processes.

Method:Process:

- **User Management and Registration:** In order to register users and oversee their accounts, the system processes the data that is fed in. This entails confirming login information and allocating suitable access levels according to user roles.
- **Resource Matching and Scheduling:** The system matches user requests with available resources by applying sophisticated algorithms. It takes into account a number of variables, including user priority, resource availability, and efficient resource usage. When there are conflicts or modifications, the system automatically modifies the schedules**.**
- **Security and Compliance:** To safeguard private user data, all procedures follow stringent data security guidelines. To guarantee adherence to data protection regulations, the system encrypts transaction logs and personal information.
- **Notification and Communication:** As soon as a request is processed, the system notifies users in real time about their reservations, any modifications, or any necessary action. This ensures continuous communication between the system and the users.

Output:

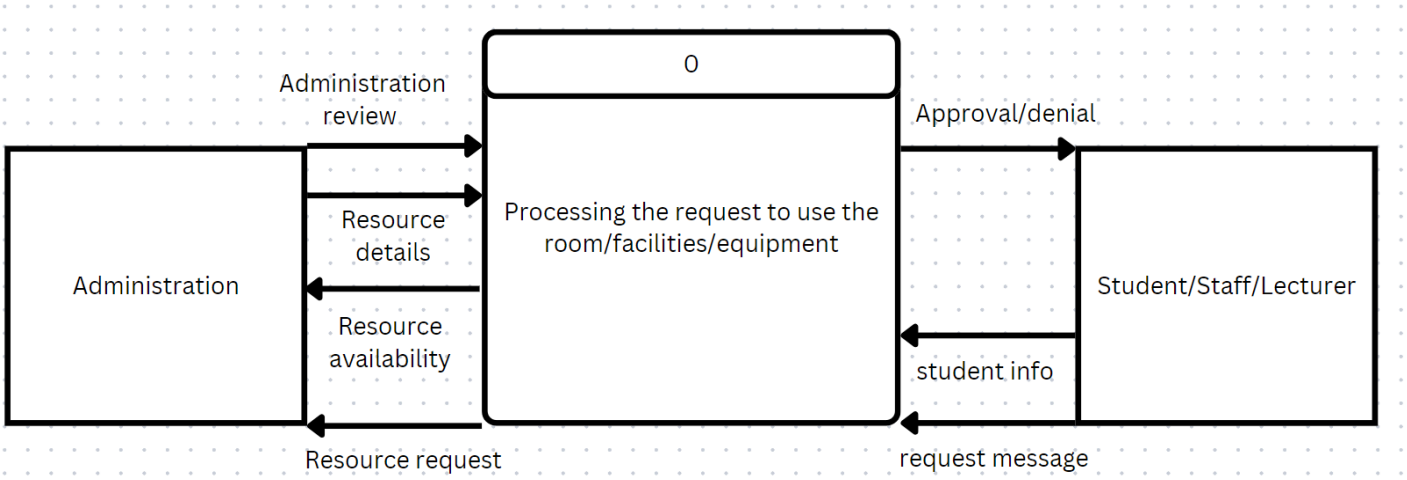
- **Reservation Confirmations:** Users receive confirmation of their reservations with details such as the time, location, and any necessary instructions or restrictions related to the resource use.
- **Reports and Analytics:** The system generates detailed reports on resource usage, user activity, and system performance. These reports help administrators in strategic decision-making and resource management.
- **System Alerts:** In case of issues, system conflicts, or updates, the system generates alerts for both

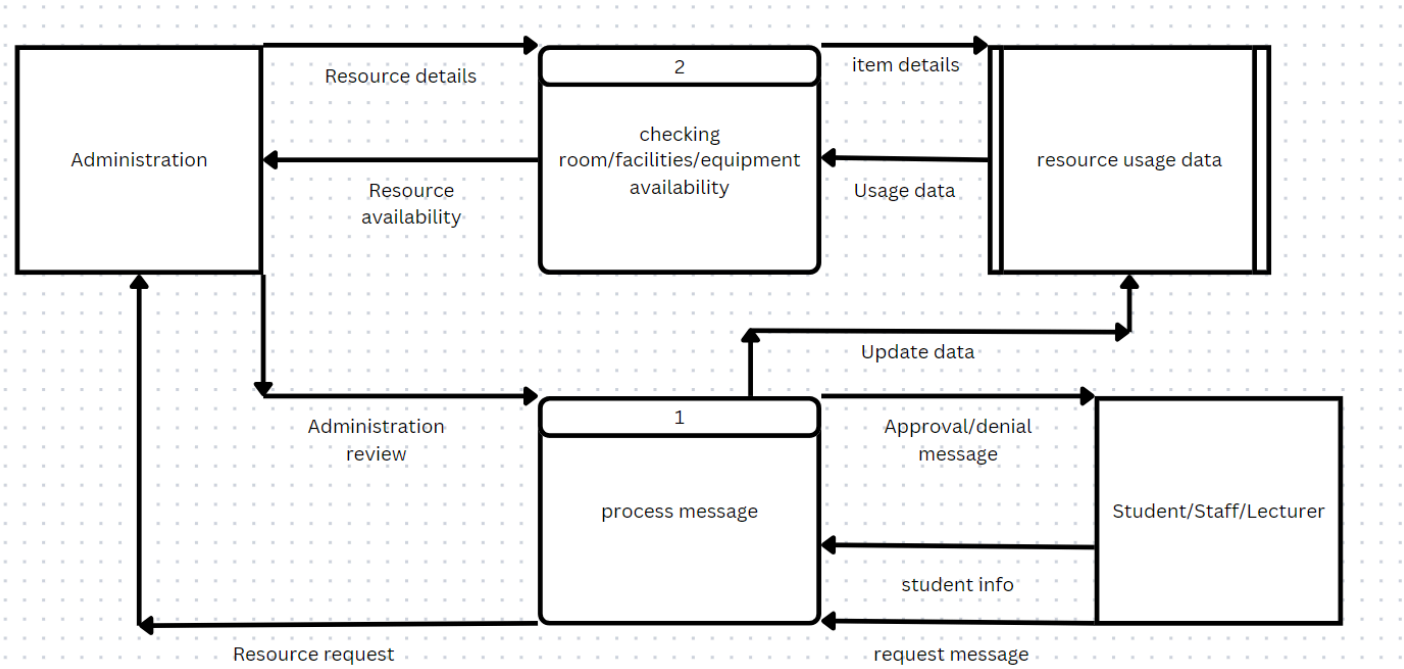
users and administrators, facilitating swift resolution of any potential problems.

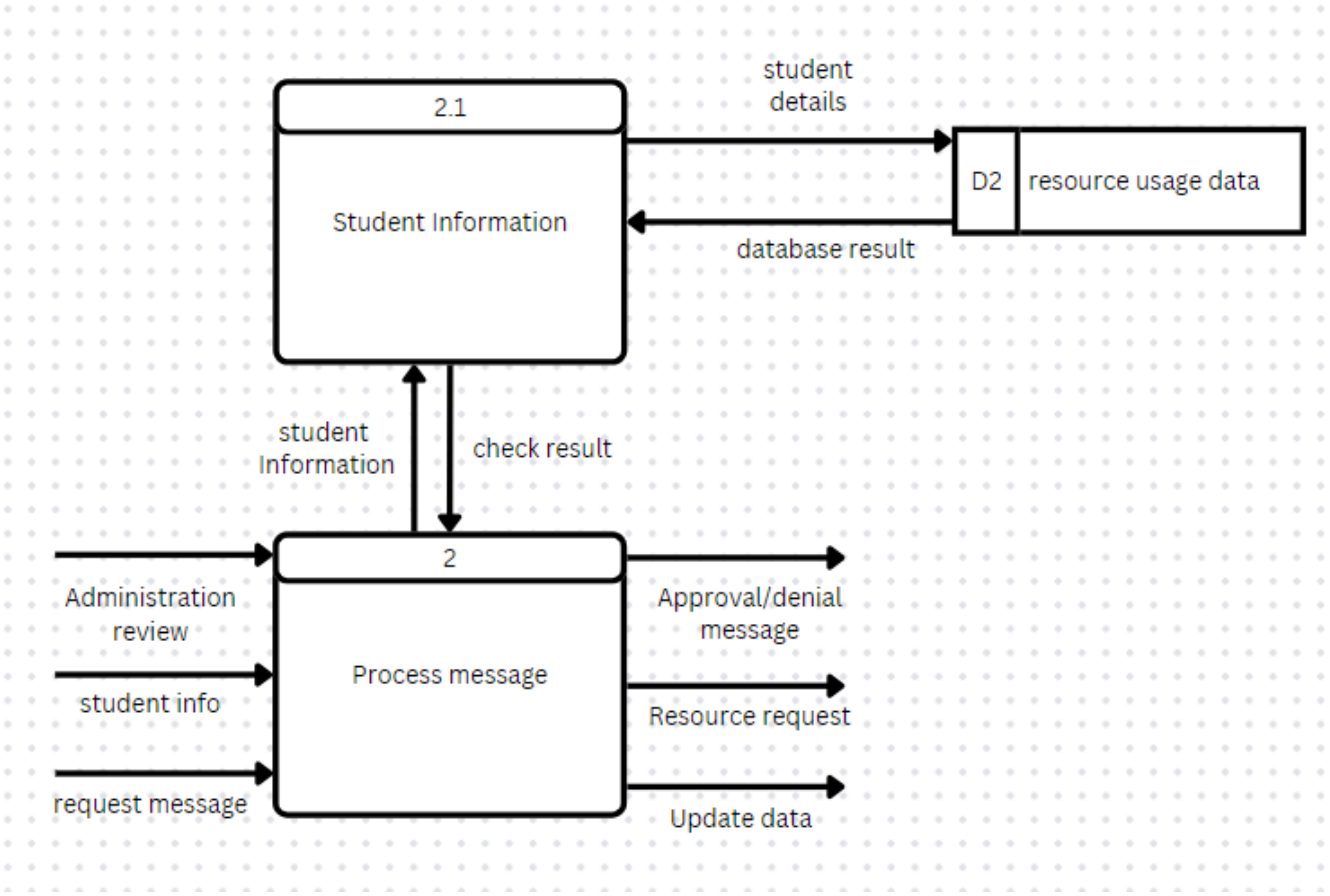
Additional Functionalities:

- **Interactive Dashboard:** Administrators access a comprehensive dashboard that provides an overview of all system activities, user interactions, and resource status, enabling effective management and quick adjustments.
- **Maintenance and Support:** The system includes a maintenance module that conducts regular checks and updates to ensure smooth operation. Technical support is available to assist users with any system-related inquiries or issues.

5.3 Logical DFD AS-IS system (Context Diagram, Diagram 0, Child)




Administration
Resource details
Resource availability
2
checking room/facilities/equipment availability
item details
Usage data
resource usage data
Update data
Administration review
1
process message
Approval/denial message
student info
Student/Staff/Lecturer
Resource request
request message



6.0 Summary of Requirement Analysis process:

The requirement analysis for the Campus Resource Management System methodically explains the necessary processes to guarantee the system meets the unique demands of students, professors, and staff. This systematic approach involves setting project objectives, gathering feedback, creating precise requirements, and validating those specifications with stakeholders.

The analysis begins with a clear description of the project's objectives, scope, and team responsibilities, as well as the production of a project charter to guide subsequent operations.Then this critical phase data collection involves collecting detailed information from various users and stakeholders to understand their needs and expectations. Methods include questionnaires, surveys, and review of existing documentation. The goal is to capture a comprehensive set of requirements that reflect the actual needs for resource management on campus**.** data collection including questionnaires, and document reviews to acquire specific user requirements that appropriately reflect the different demands of campus resource management.These requirements are then fully written, outlining both what the system should accomplish functional requirements and how it should behave non-functional needs like security and performance.

The Campus Resource Management System's functional requirements are made to guarantee effective resource management on campus, improve user experience by streamlining procedures, and maintain strict security and compliance guidelines. The system's ability to manage intricate scheduling, facilitate real-time

communication, and produce thorough reporting is essential for the efficient management of university resources.