



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SECD2613-03 SYSTEM ANALYSIS AND DESIGN

<CamEx System>

PROJECT PHASE 2

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1.0 Overview of The Project

We are proposing a suitable Campus Resource Management System, CamEx(Campus Expert) System that will enhance the resource management including the Facility Booking , Event, Student, Faculty and Staff management. By enhancing the system with modified functionalities the CamEx System will have an improved productivity and communication in between students, faculties and the staff.

2.0 Problem Statement

a) Time-consuming processing

The current manual processes for data management often lead to miscommunication, logistical challenges and delays in execution. This results in frustration among students, staff and faculty who rely on facilities for academic or extracurricular events.

b) Complex Interface

In the absence of a centralized database, data is dispersed among numerous forms, ledgers, and documents, making it challenging to find specific information fast. Other than that, distinct departments may record information using different formats and techniques, leading to confusion and inconsistencies. In order to comprehend and navigate the procedures, which can be challenging and lengthy, new users or those who are not familiar with the system must undergo extensive training.

c) Hard To Access

Usually, documents and records are frequently kept in designated areas, like filing cabinets or offices, making them inaccessible from a distance or during non-business hours. Depending on which staff members are available to handle the records, access to particular information may be restricted. If these people aren't available, it gets harder to find the information you need. The current manual nature of updates causes a lag in displaying the most recent data, which may result in scheduling conflicts or the use of out-of-date information. The efficient operation of

university operations is limited by these access problems, which lead to delays and inefficiencies.

d) Data security Concern

Paper documents and records can be lost, stolen, or harmed by natural disasters like fire or water. Moreover, in the absence of appropriate controls, private information may be readily accessed by unauthorized parties, potentially resulting in privacy violations. Reliable backup procedures are frequently absent from manual systems. It might not be able to retrieve the lost data in the event of a data loss incident. It also can be challenging to guarantee the accuracy and integrity of records when data is handwritten or manually entered because these methods are prone to errors.

3.0 Proposed Solution

The CamEx System is a new solution that we are trying to propose and introduce to universities which will help to solve the problems that are faced by system users. It is a system that provides universities to manage the important resources and data in organized, like facilities, events, students, faculties and staff by implementing automated systems for data management. This system will store all date, time and also venue for each activity that has been scheduled, so it definitely can overcome the time-consuming process of “old-school” data management system, and increase the productivity of the university department in organizing everything. Besides, this system also stores students’ profile in terms of studentID, enrolment, studentCourse, and so forth. For example, we only need to key in studentID to find a specific student’s profile. In addition, faculty members can access teaching schedules, submit grades, and communicate with students, this allows them to arrange the lessons without clashing with others and also enable students to achieve their grades for assignments and exams.

This system will provide universities to categorize and arrange all documents by uploading all the data through the system, which would be stored in a database. This helps to lower the reliance on high human resources which is necessary for the older system, especially in the

documentation part. By searching the term, we are able to find out the document within seconds and also for booking facility or venue for events, it does not need too many staff to ensure the department is working. Hence, this increases the efficiency of work. For instance, many of the staff have to take leave because of some issues and this situation will affect the productivity of the department on that day.

Previously, it was hard to make sure all records are correctly recorded and stored as it is highly reliant on human resources. However, with the new system, it can be overcome by replacing the original paperwork system which creates a lot of trouble with documenting, such as the handwriting of staff is very messy, causing the next person unable to recognize it. We manage to keep academic progress up-to-date correctly through the system in terms of booking and student records.

Moreover, the CamEx system is able to facilitate communication among stakeholders through email, messaging and notifications. Users will receive announcements, reminders, and alerts regarding upcoming events, bookings, and deadlines. With this, we can track the latest information and students would be able to manage their time wisely hence they can use their time to improve themselves either in academic or soft skills. The university staff also can access all the information immediately which makes their work easier. Thus, increasing the productivity of students and staff.

4.0 Information Gathering Process

4.1 Method Used

4.1.1 Questionnaires(*Interactive Method*)

Q1: You are a
60 responses

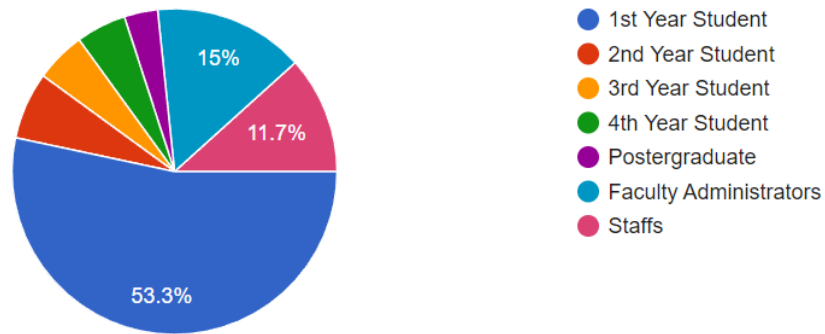


Diagram 1: User Demographics

As demonstrated in the first pie chart, the largest share of 60 respondents belongs to the category of first-year students who are 53.3% (32 respondents). A much smaller number of respondents belong to the category of the faculty administrators 15% (9 respondents), while 11.7%(7 respondents) were staff members.

Q2: How often do you use the current facility booking system in university?
60 responses

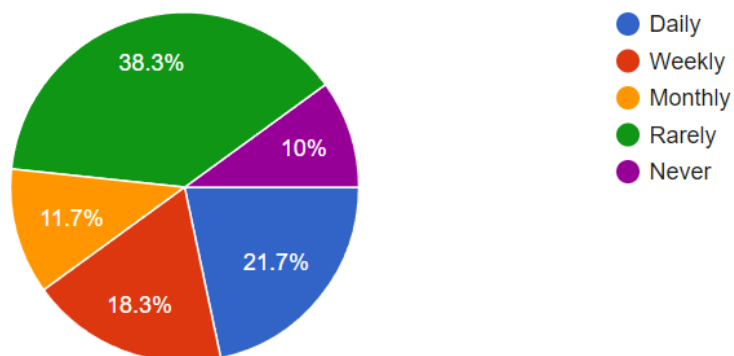


Diagram 2: Frequency of System Usage

As presented in the second pie chart, the most frequent users of the university's facility booking system use it weekly. This is 38.3% of all participants (23 respondents), which may be associated with the need to find or book facilities, though not every day. Additionally, 18.3%(11 respondents) of them rarely use the system, which also indicates the availability of opportunities to make the system more accessible.or user-friendly. Other portions include daily users 11.7% (7 respondents), monthly users 10% (6 respondents), and those who never use the system 21.7% (13 respondents).

Q3: How would you rate the current event management system?

60 responses

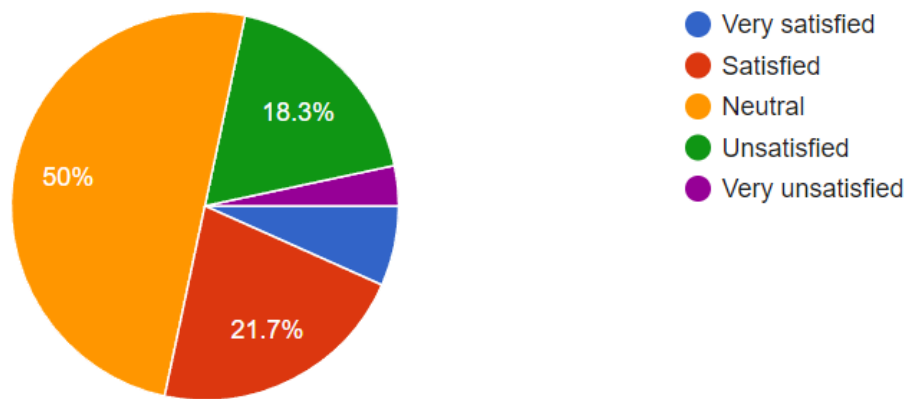


Diagram 3: User Satisfaction

The third pie chart above shows user rating on the current event management system. Here, half of the respondents, 50% (30 respondents) are neutral, showing slight satisfaction. 21.7% (13 respondents), other users are satisfied while 18.3% (11 respondents)are unsatisfied and 3.3% (2 respondents) are very displeased with the system. This means that there is need for improved services on the system.

Q4: What are the main challenges you face with the existing campus resource management system?

60 responses

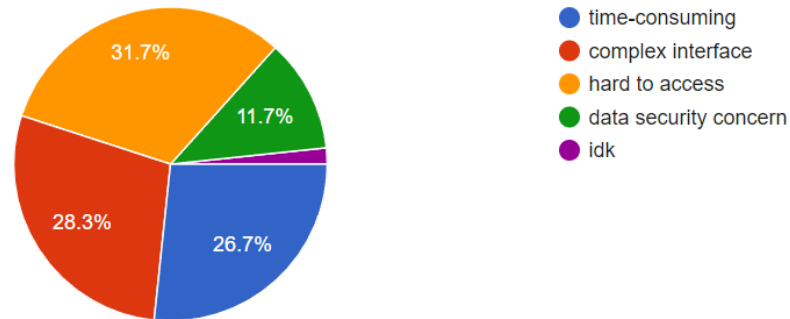


Diagram 4: System Challenges

The fourth pie chart above displays rating on how the current campus resource management system meets the user's needs. In the chart, the highest concern is the complex interface at 28.3% (17 respondents) followed by time consumption at 26.7% (16 respondents). These challenges have an effect on productivity, as they are likely to make the users confused and frustrated.

Q5: How often do you encounter errors in the current system?

60 responses

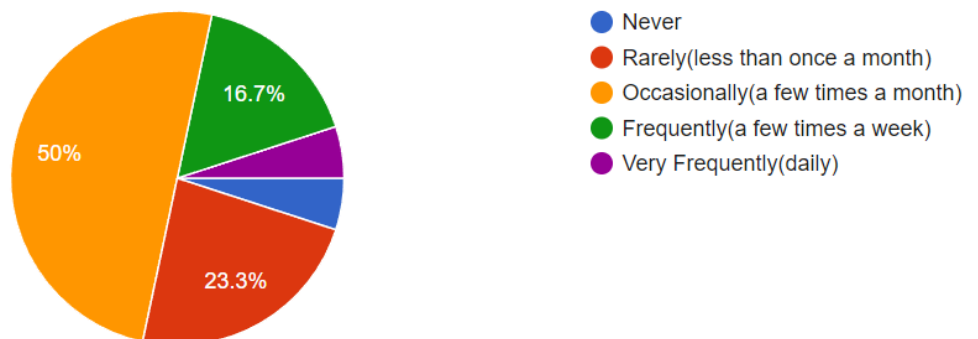


Diagram 5 :Error frequency.

The fifth pie chart shows the error frequency in the current system. Half of the respondents at 30 people in percentage, 50% say that they encounter errors occasionally, meaning a few times a month.

Only two-thirds, 23.3%, have rarely encountered errors. An additional 16.7% encounters frequent errors. However, 5% (3 respondents) and another 5% (e respondents) each very frequently encounters and never encounters. This shows that the system has a problem since more than half of the members have errors at least occasionally.

Q6: What features would you like to see in our proposed CamEx System?

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60 responses

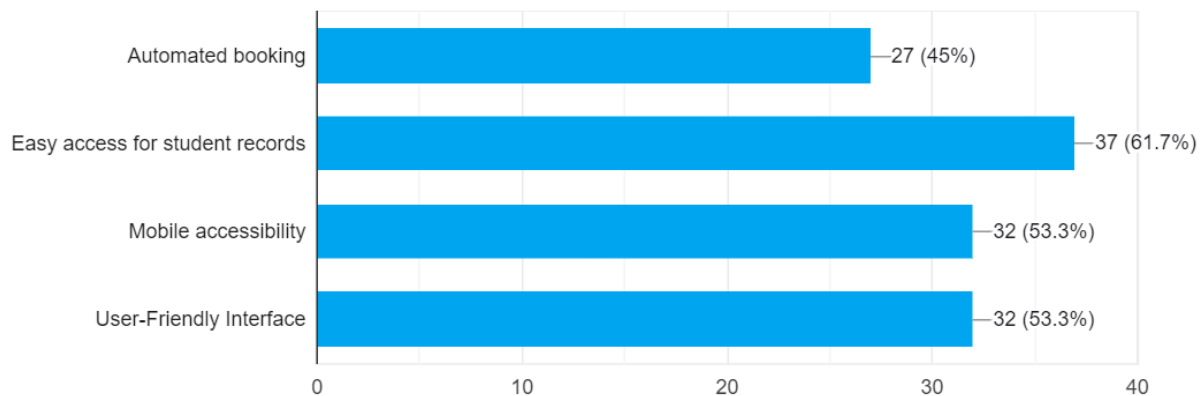


Diagram 6: Desired features for CamEx.

The bar chart shows the desire of what features should be in the CamEx system. As seen, a majority of the respondents, 61.7%, totaling 37 people say that they need easy access to student records. The second highest desired feature with 61.7% (37 respondents) is mobile access. Another 53.3% (32 respondents) want a user-friendly interface. Automated booking features were also requested by 45% (27 respondents). This clearly indicates that respondents struggle with accessing student records in the current system.

Q7: How important is mobile accessibility for using this system

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60 responses

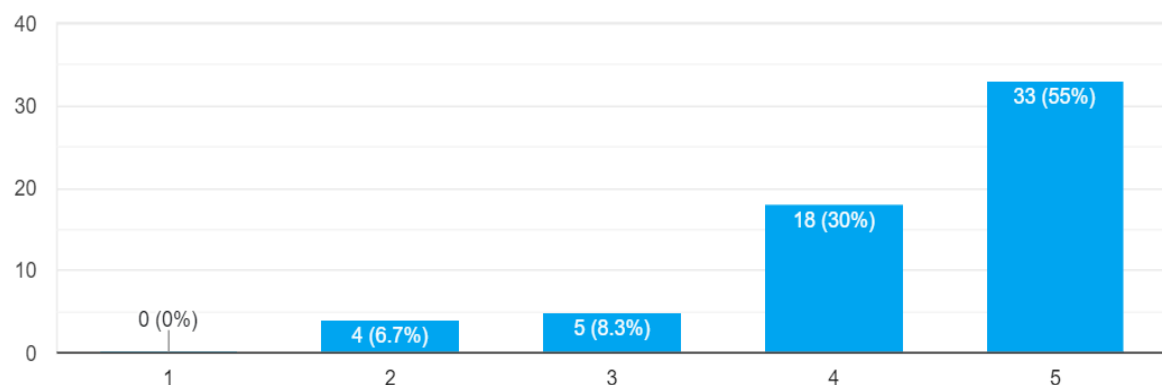


Diagram 7: The Importance of Mobile Accessibility

The seventh diagram below depicts the level of importance on mobile accessibility in the proposed system, CamEx. 55% (33 respondents) rated it as the most important since it is depicted as 5 in the 1-5 scaling. This was followed by 30% (18 respondents) rating 4, 8.3% (5 respondents) rating 3, and 6.7% (4 respondents) rating 2. From the information, it is evident that the respondents consider mobile accessibility as crucial in the new proposed system.

Q8: Do you think an integrated system like CamEx would improve your productivity?

60 responses

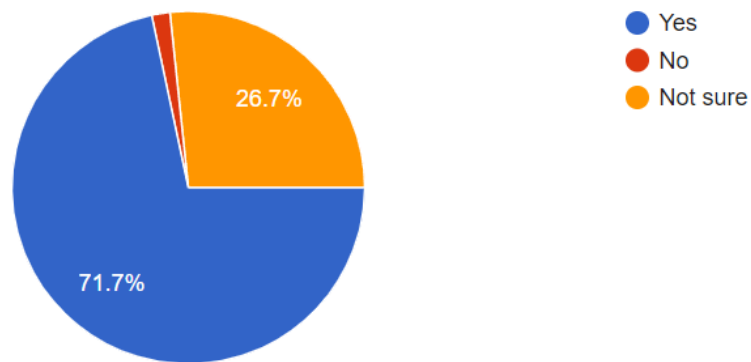


Diagram 8: Productivity Improvement With CamEx

The eight diagram is a pie chart showing if the respondents believe that an integrated system of CamEx could enhance their productivity. 71% (43 respondents) believed it would enhance their productivity with an additional 26.7% (16 respondents) said they were not sure.

Q9: What concerns do you have about transitioning to a new system?



60 responses

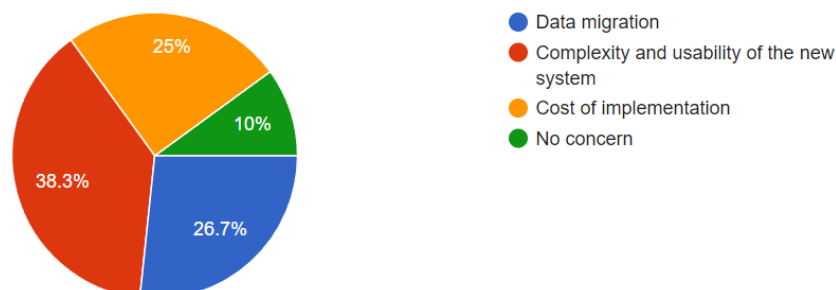


Diagram 9:Concerns about Transition to CamEx

The pie chart indicates users' concerns regarding the transition to a new system. The highest number of users 38.3%(23 respondents) have concerns regarding system complexity and usability. 26.7%(16 respondents) of users expressed concern about data migration, and 25% (15 respondents) are concerned about the implementation cost. The camEx system will only serve a limited number of 10% (6 respondents)of the total number of users without worry. The proposed CamEx system, therefore, should be less complex, user-friendly, and secure data and less costly.

4.1.2 Interviewing(*Interactive Method*)

We have conducted an interview session with each of our stakeholders from the administration, faculty, and students.

ADMINISTRATOR:

Q1: Could you explain how facilities are currently booked and events are managed? What functions properly and what doesn't?

Currently, you can reserve facilities by sending an email to the facilities management office or by completing a paper form. After that, these requests are manually recorded in a spreadsheet or physical logbook. Although updates are not reflected in real-time, this system is slow and prone to scheduling conflicts even though it does a good job of keeping records. Furthermore, it can take a while to locate approvals from several departments.

Q2: How do you currently manage student and faculty data? What are some of the common issues that you come across?

Spreadsheets and hard copies are used in conjunction to manage faculty and student data. We use different, departmental databases which are not connected, which result in inconsistent data entry and redundant data entry. Frequently occurring problems include the inability to update records in a timely manner, a high probability of human error, and difficulties rapidly retrieving specific information.

Q3: In terms of administrative effectiveness, what do you anticipate from the CamEx system?

We anticipate that the CamEx system will reduce human error and manual entry by streamlining and automating the booking and data management procedures. It should facilitate the coordination of facilities and events by offering centralized access to information and real-time updates. It should also improve communication and cut down on time spent on administrative duties, which will raise productivity all around.

FACULTY MEMBER:

Q1: How are student communications and teaching schedules currently managed?

A combination of departmental and personal calendars, which are frequently distributed via email or printed timetables, are used to manage teaching schedules. Email is the main medium used for student communications, though departmental notice boards are occasionally used as well. There may occasionally be missed communications or scheduling conflicts due to the fragmentation of this system.

Q2: What challenges do you encounter when organizing activities and spaces for your extracurriculars or

classes?

Lack of real-time availability information and the manual booking process make it difficult to coordinate facilities and events. This may result in multiple reservations or last-minute alterations. Furthermore, obtaining departmental approvals can take time, and there isn't a centralized communication system to quickly notify students of updates or changes.

Q3:*Which CamEx system features do you believe would be most helpful to you?*

It would be very helpful to have an automated booking system with real-time availability. Many of our tasks would also be streamlined by having a single platform for scheduling classes, interacting with students, and planning events. It would also be beneficial to have features like user-friendly interface, simple access to student records, and automated reminders.

STUDENTS:

Q1:*How do you currently obtain data regarding reservations, events, and academic records?*

The usual networks to obtain information about events and reservations are bulletin boards, department emails, and personal referrals. Access to academic records is typically granted through a combination of individual requests and departmental offices. This procedure can be difficult and unpredictable, particularly if updates are not properly conveyed.

Q2:*What are the usability and accessibility issues you have with the current system?*

The information's fragmented structure, the absence of timely updates, and the difficulty of remote access are the primary challenges. Physical notices and in-person visits are key components of the current system, but they are not always possible. Furthermore, scheduling facilities or gaining access to academic records can be hindered by the manual processes' frequent delays and mistakes.

Q3:*In what ways can the CamEx system enhance your overall university experience?*

Our campus experience can be significantly improved by the CamEx system, which offers an integrated digital platform for all of our requirements. We'll be kept up to date on events and reservations with real-time notifications and updates. Time will be saved and frustration level will drop with the ease of access to academic records and online facility booking. All in all, it will greatly increase the efficiency and decrease the stress of managing our extracurricular and academic activities.

4.1.3 Observation(*Unobstructive Method*)

We have also conducted an observation on the existing resource management system in university.

Facility Booking Process

a)We observed the process of booking a facility, noted the time taken, steps involved, and any bottlenecks.

Users initiate the facility booking process by submitting an email request to the facilities management office or filling out a paper form. A staff member then manually enters this request into a spreadsheet or a physical logbook.

Time Required: Depending on staff availability and request complexity, the entire process may take a few hours to several days.

Steps Complicated:

The user makes a reservation request. After receiving the request, facilities management logs it. A manual availability check is performed. The appropriate departments are consulted for approvals. The user receives confirmation.

Restrictions:

- Manually recording and verifying availability takes a lot of time.
- Delays in obtaining several departments' approvals.
- Inconsistent record-keeping that results in mistakes or duplicate reservations.

b)We identified how users interact with the system and any common issues they face during the booking process.

The main ways that users communicate with the booking system are via email or paper forms. Typical problems consist of:

Request Tracking Is Hard: Frequently, users are unable to follow the progress of their booking requests.

Absence of Real-Time Updates: There could be duplicate bookings if availability information is not updated in real-time.

Delayed Responses: Due to manual processing, users experience delays in receiving confirmation or feedback on their requests.

Communication gaps: It's possible that users won't be informed promptly about the status of their requests, which could cause confusion and possibly conflict.

Event Management Workflow

a)We monitored the planning and execution of events, focusing on communication and coordination challenges.

The process of organizing an event entails several stages, such as scheduling, reserving a location, coordinating with various departments, and keeping in touch with guests.

Communication Challenges.

- Irregular means of communication (emails, bulletin boards, face-to-face meetings).
- Delays in notifying all parties who need to know.
- Inaccurate information or unclear details regarding the event.

Sync Problems.

- A challenge to coordinating the schedules of various parties.
- Conflicting reservations or last-minute alterations brought on by an uncentralized scheduling system.
- Difficulties getting the required resources and approvals in a timely manner.

b)We also assessed how staff and students receive and distribute information about events.

Event announcements are usually shared via email, physical bulletin boards, and word-of-mouth.

Issues with Delivery:

- Not all employees and students check emails or notice boards on a regular basis, which causes communications to be missed.
- It is challenging to make sure that everyone is informed when there isn't a single platform for event information.
- It can be challenging to properly notify every guest of last-minute alterations or updates.

Student, Staff, and Faculty Data Management:

a)We examined the current system's entry, updating, and retrieval of faculty and student data.monitored the planning and execution of events, focusing on communication and coordination challenges.

Data management for teachers and students entails manual entry into spreadsheets or hard copies. Staff members update as needed, frequently involving several steps and verifications.

Data entry: Employees manually enter information into spreadsheets from paper forms or emails.

Updating Records: Because manual data entry takes a long time, updates are frequently delayed.

Data retrieval: Employees have to go through hard copies of documents or spreadsheets, which can be laborious and error-prone.

b)We determined whether there are any repetitive tasks, mistakes, or hold-ups in handling academic records and correspondence.

Repeated Activities:

- Entering the same information more than once (in separate departmental records, for example).
- Manually verifying data, which results in effort duplication.

Typical Mistakes:

- Typos made when entering data by hand.
- Loss or incorrect filing of tangible documents.
- Inconsistent data because of a lack of synchronization between various records.

Delays:

- Amount of time needed to manually update and check records.
- Awaiting confirmation or approval from several departments.
- Response times are sluggish since they rely on manual procedures and paper documents.

4.2 Summary from Method Used (include example Interview/Questionnaire/Observation)

We have used two interactive methods which are a questionnaire and an Interview and one unobtrusive method which is observation to get the perspectives of our stakeholders (Administrators, Faculty Members, and Students) on the existing resource management system in our university. From all these methods we had an idea for our CamEx system on what to deliver for our clients. After receiving responses from all these information-gathering methods, we were able to decide which components of the current system we ought to prioritize.

5.0 Requirement Analysis (based on AS-IS analysis)

5.1 Current Business Process (scenarios, workflow)

Here are the scenarios and workflow of current system process for user:

1. Login to the system
2. Some options are displayed on the main menu
3. Option for facility booking
 - 3.1 Search and view on availability of campus facilities
 - 3.2 Display the booking options
 - 3.3 Allow users to search book for available campus facilities
4. Option for event registration
 - 4.1 Display the event that have scheduled
 - 4.2 Display options for event registration, promotion, attendee management, and feedback collection
 - 4.3 Create, schedule, and manage campus events, workshops, seminars, and extracurricular activities
5. Option for student profile
 - 5.1 Displays academic profiles, register for courses, view schedules, and track progress

Here are the scenarios and workflow of current system process for facility manager:

1. Login to the system
2. Some options are displayed on the main menu
3. Option for facility booking
 - 3.1 Define booking policies, manage reservations, and track resource utilization
4. Option for event registration

- 4.1 Manage event registration, promotion, attendance, and feedback collection
- 5. Option for student profile
 - 5.1 Manage student enrolment, course registration, academic records, and student activities
- 6. Option for faculty and staff management
 - 6.1 Manage faculty and staff information
 - 6.2 Manage recruitment, scheduling, performance evaluation, and leave management
 - 6.3 Access teaching schedules, submit grades, and communicate with students

5.2 Functional Requirement (Input, Process, and Output)

5.2.1 Context Diagram

PROCESS	INPUT	OUTPUT
CamEX System	Booking Information Event Registration Information Student ID Faculty and Staff Information	Booking Options Scheduled Events Student Profile Performance Evaluation

5.2.2 Level 0 Diagram

PROCESS	INPUT	OUTPUT
Booking Facility	Campus Facilities Information Booking Options Booking Policies	Availability of Campus Facilities Utilized Resources Facility booked Booking Details
Registering Events	Event Details	Attendance Feedback Scheduled Event Event Schedule
Managing Students	Student ID Course Registration	Academic Profiles and Records Schedules / Activities Current Progress
Managing Faculty and Staff	Staff ID Faculty Information Course Information	Recruitment Performance Teaching Schedules Grades Leave Management

5.2.3 Child Diagram

Process 1: Booking Facility

PROCESS	INPUT	OUTPUT
Search Facilities	Campus facilities information	Available of Campus Facilities Booking options
Update Data	Booking options Booking reason Resources information Booking policies	Utilized resources updated Updated policies Booking details
Confirm Booking	Booking details Confirmation of booking selected facilities	Facility booked

Process 2: Registering Events

PROCESS	INPUT	OUTPUT
Create and Manage Events	Events details	Updated event schedule Event registration number
Search Events	Event registration number	Scheduled event Attendance Feedback

Process 3: Managing Students

PROCESS	INPUT	OUTPUT
View Student Profile	Student ID	Student personal data Student enrolment Academic records
Update Student Information	Student personal data Student enrolment Course registration Academic records	Updated student profile
Track Student Progress	Student ID	Student schedules Current progress Student activities

Process 4: Managing Faculty and Staff

PROCESS	INPUT	OUTPUT
Update Staff Information	Staff ID	Performance Evaluation Staff recruitment Leave management
Update Faculty Information	Faculty information Course information	Teaching schedules Grades submission

5.3 Non-Functional Requirement

To ensure the CamEx system is efficient, secure, and accessible to a wide range of users, the following performance, security, and compatibility requirements should be met:

Performance

- **Performance Grade:** In order to achieve a performance grade of B (85) or more, CamEx should focus on improving the following categories:
- **Page Size:** The CamEx system should also not have a page size of more than 2. That's why each picture used by the website is 5MB to load faster.
- **Load Time:** This makes the CamEx system in a way have to be able to load within 3 seconds or less for users to not be able to tell the difference.

Security

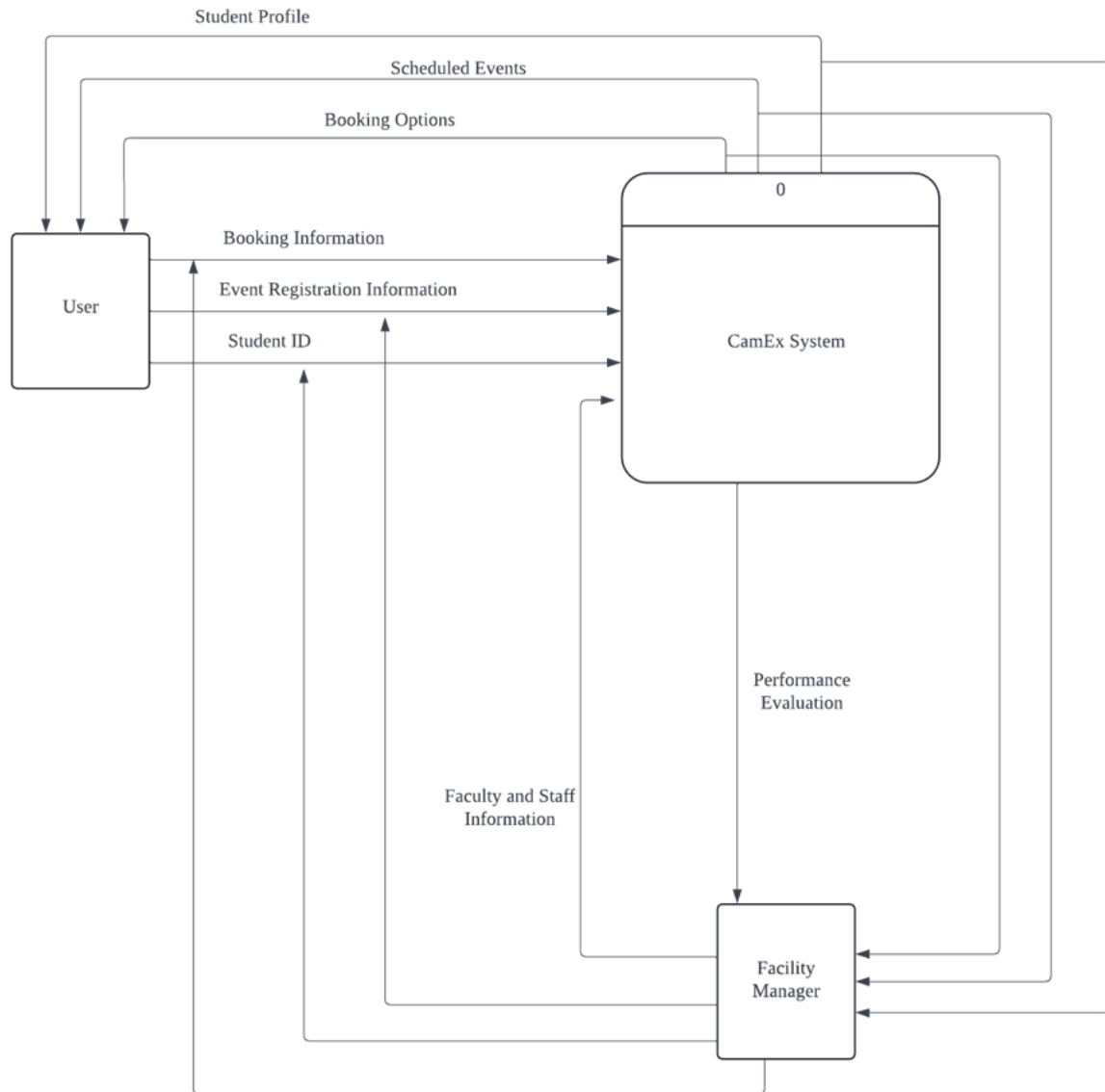
- **Secure Online Payments:** The CamEx system must ensure that the payment transaction takes place on the internet using the SSL/TLS security and other protocols.
- **Access Control:** The CamEx system should contain role-based access controls mechanism such as only allows the users access resources and features that are pertinent to their assigned role.

Compatibility

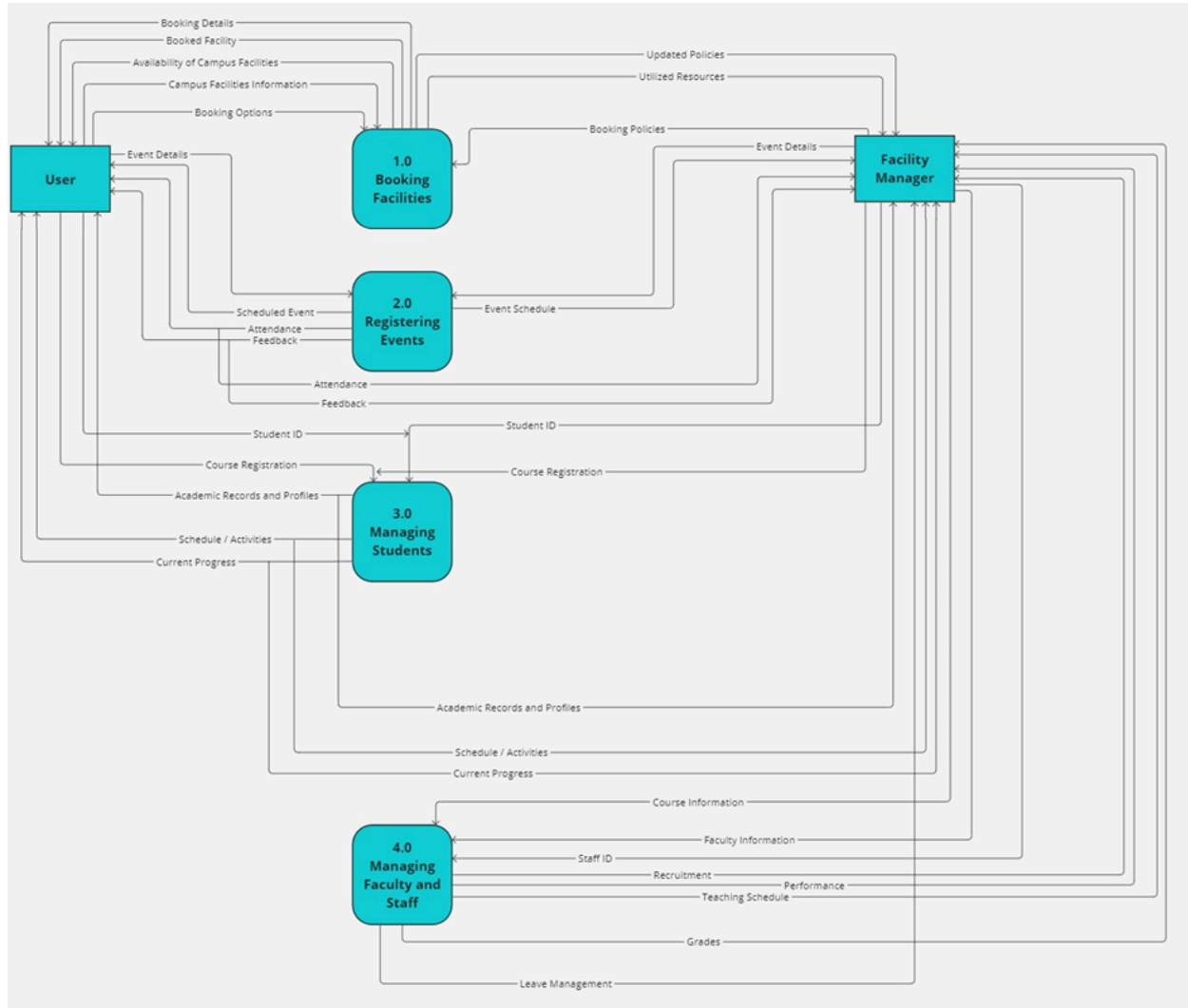
- **Supported Operating Systems:** The operating system should be Windows 10 or later and should have the macOS Big Sur 11 installed. 0 or later.
- **Minimum Processor Requirements:** This includes the Intel Core i3 or newer processors for the CamEx system.
- **Memory Requirements:** The CamEx system should be configured to have at least four gigabytes of RAM for smoother operation.
- **Internet Connection:** CamEx system should be equipped such that it is working on a stable internet connection.

5.4 Logical DFD AS-IS System

5.4.1 Context Diagram

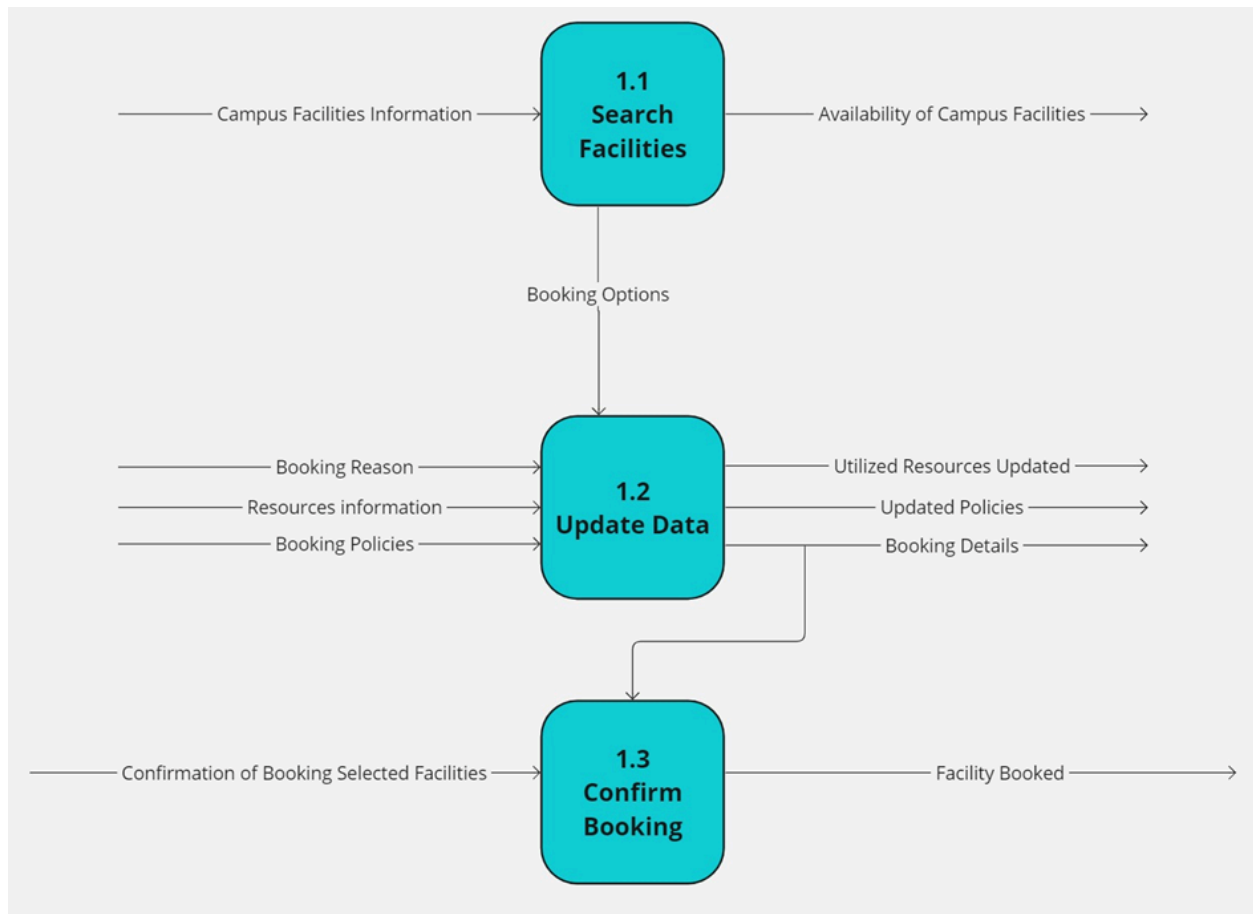


5.4.2 Level 0 Diagram

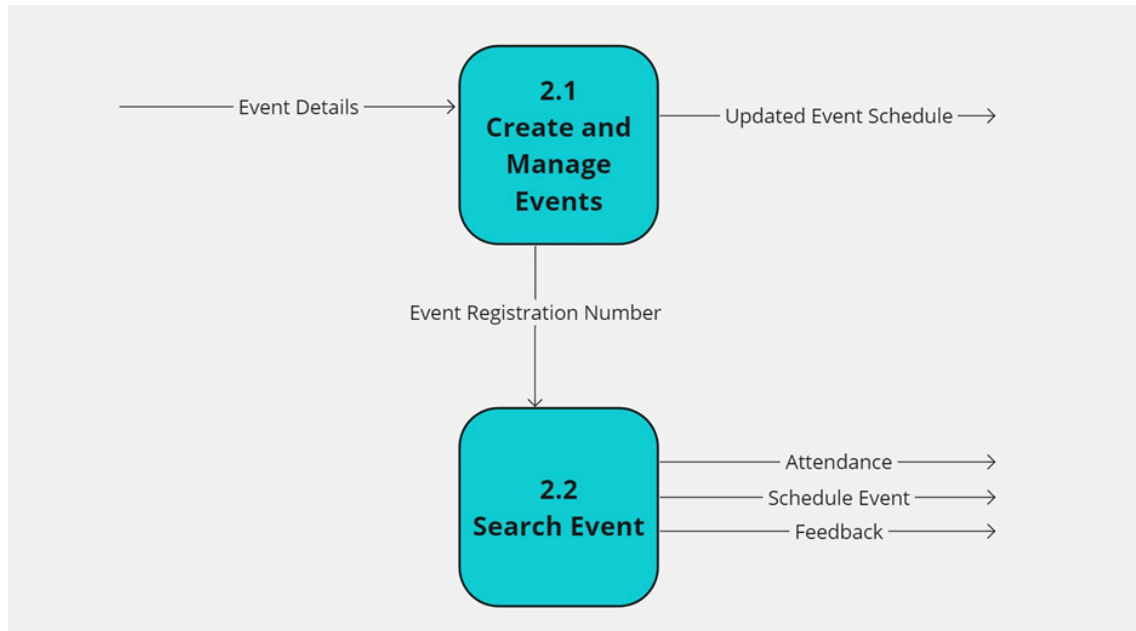


5.4.3 Child Diagram

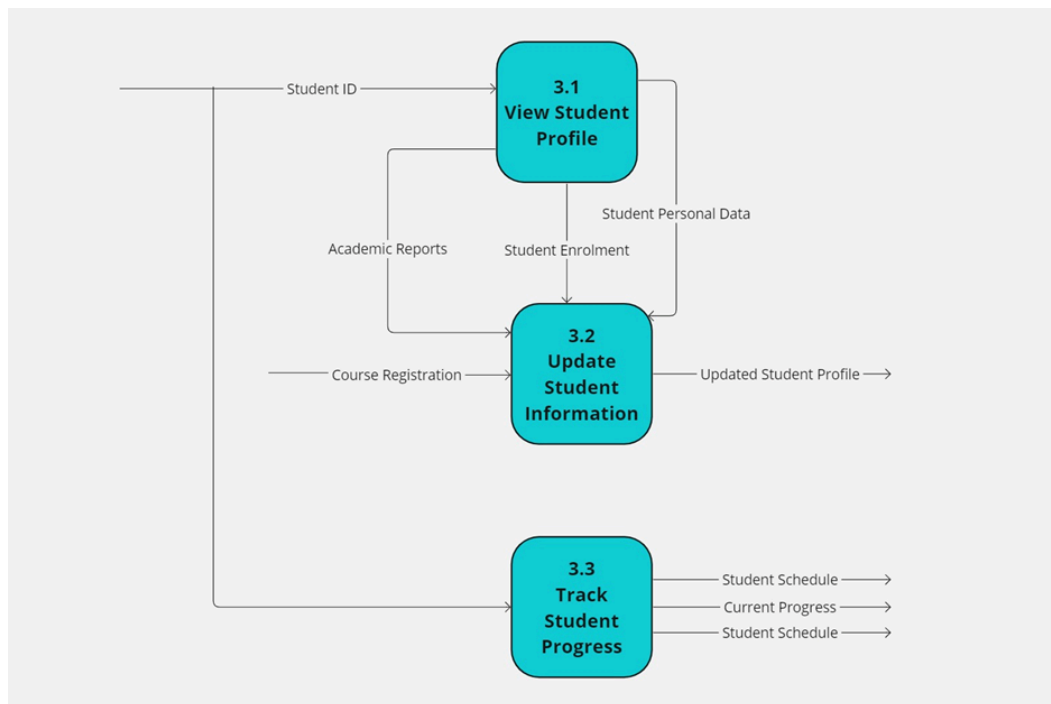
Process 1: Booking Facilities



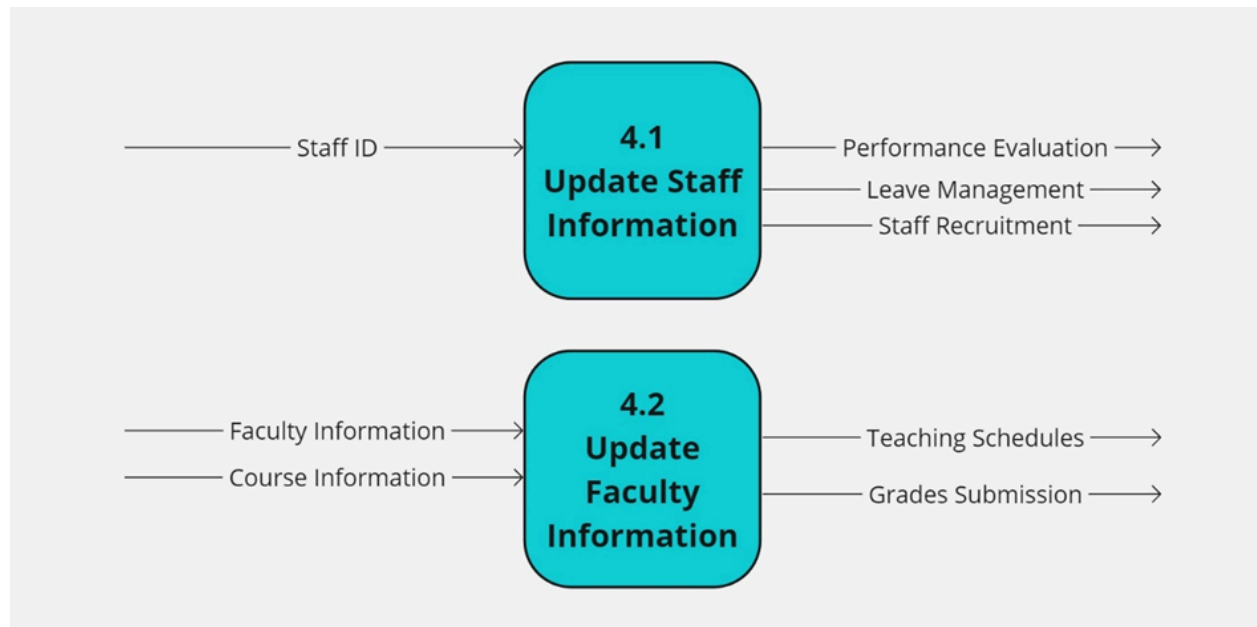
Process 2: Registering Events



Process 3: Managing Students



Process 4: Managing Faculty and Staff



6.0 Summary of Requirement Analysis Process

Numerous features that could improve the effectiveness and user experience of the current system are absent. By adding new features that improve accessibility and streamline operations, the proposed CamEx System seeks to close these gaps. The following features will be present in the TO-BE system:

Automated booking: To save time and lower the possibility of human error, automate the booking process.

Easy access for student records: To increase administrative effectiveness, a system that makes it simple and quick to obtain student records should be put in place.

Mobile accessibility: Making sure the system is reachable from mobile devices so that users can engage with it while they're on the go is known as mobile accessibility.

User-Friendly Interface: Creating an interface that is simple to use and intuitive to navigate will improve user experience and shorten the learning curve for new users.

These improvements are meant to decrease manual labor, increase overall system functionality, and give users effective and practical tools for task management.