THE DEVELOPMENT OF ADDING OF SUBJECT FOR IRREGULAR STUDENTS IN TECHNOLOGICAL UNIVERSITY OF THE PHILIPPINES – CAVITE CAMPUS USING DJANGO

A RESEARCH PROJECT

Presented to the Faculty of

Department of InformationTechnology

Technological University of the Philippines – Cavite Campus

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In Partial Fulfillment of the Requirements for the Degree

Bachelor of Engineering Technology

Major in Computer Engineering Technology

June 2022

Chapter 1

INTRODUCTION

Background of the Study

Students run across a variety of issues throughout their time at school. Throughout their academic years, these issues change. It may be as basic as forgetting to turn in the homework or arriving late to class. It may be as serious as failing the subject or worse, being dropped. According to *What Percentage of Students Change Majors?* (2022), At least 80% of college students change their major throughout their college education. Several of these problems occur, resulting in a student's having an irregular status in school. Irregular students are those who have enrolled in subjects that are different from regular students. Because of their status, they tend to have a different schedule compared to regular students. This could mean that they have to be aware of their time availability that should not overlap with their other schedule. The section is also one of the factors that must be considered because their course subject may possibly match the other section's course subject.

Enrollment and Registration System refers to the procedures and activities that drive efforts in admissions to the number, shape, and characteristics of a student population of the school. Well-designed, intensive, and comprehensive research is what the researcher aims to develop.

As the world changes, technology also does. Technological University of the Philippines (TUP) is upgrading the more advanced scheme of enrollment and registration

using a web based application, powered by AIMS and Pinnacle Technologies, Inc. for more than 2 years. Enrollment and Registration System (ERS) are one of the main factors that help the university to deliver good services to the applicants, students and faculties. This kind of technology has a good advantage for universities since it has the ability of making the work easier. Nowadays, especially in this time of pandemic, the transactions are being done through the use of web-based applications. Government, banks, institutions, and more are currently working and implementing the use of these web applications to reach more people with their service.

At the present, the Technological University of the Philippines -Cavite (TUPC) offers a convenient and efficient way of having transactions through the use of TUP ERS since it can be accessed anywhere and anytime as long as the user has a device with a browser. A better accommodation and ease when enrolling online are expected for the benefits of the students. But it is not only limited to students, also, for the department head and program-in-charge for this system. A lot of students rely on the benefits that the TUP ERS system can provide. Meanwhile, they have observed that the enrollment for irregular students is done manually every semester in view of the fact that the continuing development of the implementation process of the system is still occurring.

The faculty manage the adding of subjects for irregular students after they process the enrollment of the regular student. Irregular students must communicate with the program in charge of the transactions, one to three weeks in advance to decide on what subjects to enroll for the next semester. Students can sign in their student account in TUP Student Portal to encode the subjects to enroll. The program-in-charge is responsible for accommodating the students in regards to their enrollment. The TUPC faculty has also

experienced a hardship to the adding of subject procedures. The long line up of irregular students also affects the enrollment, the system can't gather their information and it is manually done by the person-in-charge, in result it takes a very considerable time. In addition, given the fact that the irregular students are those who have to enroll subjects that are different from regular classes, it is very complicated to make an organized schedule that would match the student's prescribed number of classes, subjects and units in that semester. Moreover, the cause of this problem is the shortage of class slots and cluttered schedule owing to the system, which has not yet been able to check the number of slots available.

Based on the interview conducted by the researchers with one of the professors handling the addition of subjects, students need to wait for the faculty adviser or program-in-charge to approve their enrollment. They have to wait for days or weeks for the approval process. Most of the students suggest that it will become easier and more convenient if they have the role interface that has a built-in scheduler function, with notification and communication to the program-in-charge. The faculty also suggests that it will be a good idea to make an appointment via built-in messages on the system, communication between students and faculty is essential. Faculty can inform the students anytime for their online or face-to-face appointment and the schedule is included.

The solution which researchers are proposing is to create and develop an independent web-based application for adding subjects. This is to provide a faster and convenient way of enrollment and requesting adding of subjects for irregular students and faculty inside the university. In terms of slots availability, a well-designed dashboard provides the most important metrics. A dashboard that presents the available slots and

number of students who are in queue in their interface, as they can immediately see the detailed information upon request in one quick glance. In addition, the registrar can import the csv file from the ers to our system for scheduling that will also be viewed by other user roles. The features will be gathered and able to manage on the accounts of department head, program-in-charge, students and registrar.

Objectives of the Study

The general objectives of the study is to develop a web-based system for the TUPC Adding of Subjects that will be used by the students, program-in-charge, department head and registrar in the Technological University of the Philippines - Cavite that will ensure the organized line up of requesting for adding of subjects with queuing of students upon the slots availability and easy process of plotting of schedule for their classes.

Specifically, the study aims to:

1. Design and develop a web appointment and transaction system that supports different types of web browser and screen size for compatibility.
2. Use a google login render button, which automatically configures the user details to fill out on the login form.

3. Give the following UserType to create accounts with corresponding condition, authorization to certain web pages, and be authenticated to access particular modules:

    a. Superadmin has the capacity to create accounts for Department Heads, change UserTypes for error handling, reset passwords, delete an account and see all datas in the system's database. A Department Head account can only be created under the following conditions:

        i. Only one (1) account can be created per department.

        ii. A Department should have students and programs to handle to be able to qualify for account creation.

    The Superadmin account can also create an account for the TUP Registrar for them to import or export schedules and subjects that they are offering for this semester.

    b. Department Heads accounts, currently consisting of Engineering, Industrial Technology and Industrial Education, have the power to create one (1) Program-in-Charge accounts for every program or course, or modify and delete it. The said UserType can also access the following features:

        i. Department Head user interface

        ii. Editing of slots available per course section of the department that they are handling .

        iii. Processing of subject requests passed by the Program-in-charge from the student's request.

c. Program-in-charge accounts are able to access the Program-in-charge user interface with their information that consists of the following process:
    i. Accepting of request from students' module
    ii. Processing of student's request with requirements such as proof of grades and curriculum from TUP ERS, Student's profile, and subject's details they wanted to add or take for the current semester.
    iii. Adding of comments (not compulsory and can be null) for every subject that the student has requested.
    iv. Viewing of requests history in Student Records.
d. Student account is able to access the student user interface with their information consists of the following process:
    i. Able to view slots available per class and schedule.
    ii. Upload grades from ERS as the proof. Fill out the form includes subject to add, schedule (start-time and end-time), course and section.
e. Registrar account is able to access the registrar user interface consists of the following process:
    i. Viewing of requests history in Student Records.
    ii. Importing a csv file contains the schedule in the database system.
    iii. Importing a csv file contains the offer subjects in the database system.

4. To test the functionality, accuracy, reliability and timeliness of the prototype;

5. To evaluate in terms of Aesthetics, Workability and Compatibility of the prototype.

Scope and Limitations of the Study

The study involves the development of Web-Based Adding of Subjects for Technological University of the Philippines - Cavite campus. Since it is for the TUPC, this study will be conducted at the stated university where respondents are irregular students and other personnels. The study starts in the second semester of the academic year 2021-2022 and is expected to be done in the first semester of the next academic year.

This study was made for the school especially for the irregular students, person-in-charge, departmead head, and registrar in order to improve the existing adding of subjects in Technological University of the Philippines - Cavite. This will further help and reach the irregular students in regards with their adding of subjects. This development will help them to organize their works and do it as easily as it can for different user types.

This study does not include other branches of Technological university of the Philippines. Results are based on what the researchers got from the irregular students and faculties of the TUP Cavite and the web application is designed only for adding subjects of the enrollment system. If the project succeeds, the web-based application may be used by the other branches of Technological University of the Philippines for them to have a more efficient and convenient way of processing.

Significance of the Study

The development of adding a subject web-based system in TUP-Cavite is made to provide an organized and time-efficient process of enlisting subjects and schedules of irregular students.

This also aims to help the faculty, department head, and registrar in tracking the subjects taken by the student for them to know the available subjects to offer. Also, this will help them in providing the class schedules.

Lastly, this study will benefit researchers and students who will be using the same paradigm in the future.

Chapter 2

CONCEPTUAL FRAMEWORK

This chapter shows the related literature and studies, conceptual model of the study, and operational definition of terms. Included in the related literature and studies are the fundamental articles, research and reports credited to reliable sources that help build the foundation of this thesis to make it more trustworthy and reliable. While the conceptual model of the study will present how the researchers conceptualize the details of our project, this contains the input, process and output to make it comprehensible.

Review of Related Literature

Online Transaction

Online transactions are business transactions that are carried out electronically over a computer network. Online transaction processing (OLTP) refers to information systems that facilitate and manage transaction-oriented applications, typically for data entry and retrieval transaction processing. Online transaction processing is database software designed to support transaction-related applications on the Internet. OLTP database systems are commonly used for order entry, financial transactions, customer relationship management and retail sales via the Internet.

Online School Enrollment

Online School Enrollment is any technique designed to collect information on students before they have enrolled in a facility or school. Online Enrollment provided convenience and efficiency to the enrollees. They expect the convenience and ease of

submitting information online, but online enrollment systems offer benefits to more than just enrollees. These systems also assist administrators and students.

Enrollment and Registration System

Registration is the methodical process of reserving seats in specific classes for qualified students. It is accomplished by following the steps announced by the student's home school prior to the registration period for each semester. Enrollment is the completion of the registration process and confers full student rights and privileges. Enrollment is accomplished through the payment(link is external) or other satisfaction of tuition and fees(link is external), as well as the fulfillment of other University obligations.

Class Schedule System

Abdullah (2019) addressed the design and implementation of a class scheduling system, class scheduling system is software that improves these processes by providing a database for storing records and information. Whether there are any changes, the end-user can add, edit, delete, save, and update records or information. It can generate reports such as a class schedule, a class list, an instructor list, a hall list, a department list, and a school year with multiple semesters. Class Schedule System is a class management system for a university that handles which courses are being studied in which semester, manages user profiles, and grants users the authority to retrieve and export course details. It is a better solution with many flexible and convenient features that allow teachers and administrators to maximize efficiency while minimizing time waste.

Database

Database is an organized collection of data that has been organized to allow for easy access, management, and updating. Data records or files containing information, such as sales transactions, customer data, financials, and product information, are often stored in computer databases. It is used to store, manage, and access all types of information. They gather data about people, places, and objects. This data is collected in one location so it can be viewed and evaluated. Databases are collections of data that are arranged. There are many types of databases. It may be classified according to content type: bibliographic, full text, numeric and images. In computing, databases are often classified based on the organizational approach they use. One of the main organizational databases is Relational where MySQL belongs.

MySQL

According to Moore (2018), MySQL is an Oracle-backed open source relational database management system (RDBMS) based on Structured Query Language (SQL). MySQL runs on virtually all platforms, including Linux, UNIX and Windows. Although it can be used in a wide range of applications, MySQL is most often associated with web applications and online publishing. It is also the common and widely-used database and some benefits of MySQL include it is open-source and compatible, fast and reliable, its availability, scalability and security. Typically, MySQL could be considered a good option for smaller businesses or organizations that don’t have a large or sophisticated data team.

This is because of its low costs and simple setup process, as well as the widespread support of a huge community.

Figure 1. MySQL
(Source:https://www.unixmen.com/wp-content/uploads/2015/03/mysql.jpg)

Web-based Application Software

Web application, also called as web-based application, is a computer program that uses a web browser to perform a particular function. It is accessed over a network connection using HTTP, rather than existing within a device's memory. Web-based applications often run inside a web browser. Unlike software applications, you don't need to install it on the hard drive, so it doesn't cause space limitations. It also requires less support and maintenance from the business and lower technical requirements from the user's computer. All users can access the same version so it eliminates any compatibility issues and it can also access anywhere with a web browser.

HTML

HTML (HyperText Markup Language) as shown in Figure 2 is the most basic building block of the Web. It defines the meaning and structure of web content. It allows web users to create and structure sections, paragraphs, and links using elements, tags, and attributes. However, it's worth noting that HTML is not

considered a programming language as it can’t create dynamic functionality (Astari).

Figure 2. HTML
(Source:https://www.nicepng.com/png/detail/352-3529769_html5-course-training-content-details-logo-html-5.png)

CSS

Cascading style sheets as shown in Figure # are used to format the layout of Web pages. They can be used to define text styles, table sizes, and other aspects of Web pages that previously could only be defined in a page's HTML. It is a simple design language intended to simplify the process of making web pages presentable. Some advantages of using CSS are it saves time, page loads faster, easy maintenance, superior styles in HTML, multiple devices compatibility and it is a global web standard.

Figure 3. HTML
(Source:https://www.nicepng.com/png/detail/352-3529769_html5-course-training-content-details-logo-html-5.png)

JavaScript

JavaScript as shown in Figure 4 is a programming language used primarily by Web browsers to create a dynamic and interactive experience for the user. Most of the functions and applications that make the Internet indispensable to modern life are coded in some form of JavaScript. Without JavaScript, most interactive computer and mobile device features, such as media or games, wouldn't function properly. As projects become more reliant on JavaScript, employers increasingly seek candidates with strong skills in this technical area (Griffiths, 2021).

Figure 4. JavaScript
(Source:http://windotnet.com/why-javascript-is-programming-language-of-future/)

Web Framework

Web applications have evolved at such a rapid pace that their usability and interactivity now rival that of native applications. The technology and expertise required to create tailored solutions at this level of proficiency are demanding. Fortunately, there are tools that help with web application development, one of which is a web app framework.

Web application frameworks or web frameworks are defined by GeeksforGeeks as a software framework that is designed to support the development of web applications including web services, web resources, and web APIs. In layman's terms, web frameworks are pieces of software that allow you to create and run web applications. As a result, you don't have to code on your own and look for potential errors and miscalculations.

Web frameworks were introduced in the early days of web app development as a way to eliminate hand-coding of applications where only the developer of a specific app could change it. That was a long time ago; now we have web-specific languages, and the problem of changing the structure of an app has been solved by the arrival of a general performance. Now, depending on your task, you can select a single web framework that meets all of your requirements or combine multiple frameworks.

Django

Django shown in Figure 5 is a Python-based Web framework. A Web framework is a piece of software that facilitates the creation of dynamic Web sites, applications, and services. It provides a set of tools and functionalities that solve many common problems associated with Web development, such as security features, database access, sessions, template processing, URL routing, internationalization, localization, and much more.

Using a Web framework, such as Django, allows us to create secure and reliable Web applications quickly and in a standardized manner, eliminating the need to reinvent the wheel.

For starters, it's a Python Web framework, which means you can use a variety of open source libraries. Over 116K packages are available in the Python Package Index repository (as per 6 of Sep. 2017). If you need to solve a specific problem, chances are someone else has already done so.

Django is one of the most popular Python-based Web frameworks. It is unquestionably the most comprehensive, with features such as a standalone Web server for development and testing, caching, middleware system, ORM, template engine, form processing, and integration with Python's unit testing tools available right out of the box.

Django also includes a battery, as well as built-in applications such as an authentication system, an administrative interface with automatically generated pages for CRUD operations, syndication feed generation (RSS/Atom), and sitemaps. Django even includes a Geographic Information System (GIS) framework.

Django prioritizes security and assists developers in avoiding many common security vulnerabilities such as SQL injection, cross-site scripting, cross-site request forgery, and click fraud. Its user authentication system allows for the secure management of user accounts and passwords.

Django development is supported by the Django Software Foundation, which is sponsored by companies such as JetBrains and Instagram. Django has also been around for a long time. It has been actively developed for over 12 years and has proven to be a mature, reliable, and secure Web framework.

It's useful to know who else is using Django so users know what users can do with it. Instagram, Disqus, Mozilla, Bitbucket, Last.fm, and National Geographic are among the most popular Django-powered websites. Django's ability to quickly and flexibly scale to meet the heaviest traffic demands is used by some of the world's busiest sites. Django has been used by businesses, organizations, and governments to build everything from content management systems to social networks to scientific computing platforms.

Figure 5. Django
(Source:https://static.djangoproject.com/img/logos/django-logo-negative.png)

Bootstrap

According to Spurluck (2013) , Bootstrap, as shown in Figure 1 below, is an open source frontend development framework for the creation of websites and webapps from two employees of Twitter named Mark Otto and Jacob Thorton. It is formerly known as Twitter Blueprint and sometimes labeled as Twitter bootstrap.

This framework is created to facilitate the development of responsive, mobile-first sites and apps. Responsive design allows a web page or app to know the user’'s screen size and orientation and automatically adapt the display accordingly. Also, the mobile-first approach considers the smartphone and tablets as primary tools.

Moreover, Bootstrap is available as source code or precompiled. It includes user interface components, layouts, and JS tools together with the framework for implementation.

Figure 6. Bootstrap
(Source:https://logovectorseek.com/bootstrap-logo-vector-svg/)

Programming Language

In the art of computer programming, programming languages are the medium of expression. (Mitchel, 2003). It is a set of instructions, commands, and other syntax used to create a software program. High-level languages are languages that programmers use

to write code that can then be converted into a “low-level language” that is recognized by the computer hardware. As shown in Figure 2 below, there are twenty one most popular programming languages in the world including Python, CSS, and HTML (Shannon, 2021).

Figure 7. Most Popular Programming Languages
(Source:https://gowithcode.com/wp-content/uploads/2021/04/top-programming-languages.jpg/)

Python Language

As shown in Figure 3, Python, it is a high-level programming language. It was created in 1989 by the father of Python named Guido Van Rossum, while he was working at the National Research Institute in the Netherlands. It is one of the most popular programming languages. Python has the functional programming features of C, object oriented features of C++, modular programming of Modula-3, scripting language of Perl and many more (Sharma, Kumar, & Pathak, 2022). Python is simple and easy to learn syntax that emphasizes readability and therefore reduces the cost of program maintenance. It also supports modules and packages, which encourages program modularity and code reuse. Luckily, it can

be freely distributed since the interpreter and standard library are available in source without any payment for all major platforms.

Figure 8. Python
(Source:https://logos-world.net/python-logo/)

Review of Related Studies

The following are the related studies that support the project researchers to conceptualize the design of this development.

Mobile Web-based Student System

In the study conducted by Cantos et al., (2015, 361-362), in order to enlist the course if a student is irregular student, the system should check first the following: *Pre-requisite or co-requisite check*: if the course has any pre-requisite and co-requisite from the curriculum; and whether the student passed the requisite. If the student doesn't, he/she will not be able to take such courses; *Course is not offered anymore check*: whether the course is still open. If not, the student will not be able to add such courses;

and *Credit course check*: if the course that will be taken is credited or not. Also, they have mentioned that the students can manage their own enlistment in which the students will be able to see the available subjects that are aligned from their course. Lastly, the student can also send their request to the registrar for approval if they will be allowed to add or drop a subject.

College Enrollment Management System

Liao (2021) develops an invention related to the technical field of management systems and discloses a college enrollment management system that includes an undergraduate enrollment management subsystem, a graduate student enrollment management subsystem, and a system maintenance subsystem. Undergraduate enrollment management subsystems include an enrollment website module, an enrollment planning module, an admission module, a consultation module, and an enrollment module; graduate student enrollment management subsystems include an enrollment propaganda module, an enrollment plan distribution module, and an enrollment module; and system maintenance subsystems include a system account information maintenance module, a system data maintenance module, and an enrollment module. The system makes previously time-consuming and complex enrollment tasks faster and more efficient, achieves standardization, systematization, and automation of college enrollment, and improves the efficiency and quality of college enrollment work.

Computer-implemented System and Method for Providing Student Enrollment Alerts in an Online Learning Environment

Lippert and Agarwal (2018) addressed a computer-implemented system and method for providing student enrollment alerts in an online learning environment. For students enrolled in an online learning environment, an organization's subscription threshold is determined. The subscription threshold takes into account the number of subscriptions purchased by the organization. New enrollments for one or more of the organization's students are received. Each new enrollment generates a new enrollment alert, which is delivered to an administrator of the online learning environment. The total number of new enrollments for the organization is determined. The subscription threshold is calculated based on the number of new enrollments. When the number of new enrollments reaches the subscription threshold, a subscription alert is generated.

Registration System

According to Lopez (2005), a registration system helps and provides efficient and reliable services to the students, enrollment personnel and administration. This system improved the process of enrollment in terms of searching, retrieving and subject schedules.

Requirements Based Registration System

Watkins (2005) developed a requirements-based registration system for higher education that optimizes the registration process to reduce students' time-to-degree and credits-to-degree. Students are presented with their student profile and degree progression information after logging into the system. Once that information has been validated, the

system displays the students' remaining requirements to obtain their desired degree. After students specify the requirement(s) to be met, the system generates fulfillment options to ensure that each course chosen meets the specified requirement (s). When courses are submitted, the system verifies that the student is eligible to enroll in each course and also determines whether any course can be used to fulfill a more stringent requirement. Based on each student's individual profile, the system can prevent students from registering for non-degree (ND) courses or allow a limited number of ND courses (e.g., classification). Students must specify why they are taking ND courses. Special review flags are automatically set for first-time freshmen, new transfers, and students changing majors to ensure that due diligence efforts (e.g., transfer equivalency review) have been performed prior to registration.

Method and System for Strong, Convenient Authentication of a Web User

Schutzer (2001) addressed the method and system for strong, convenient authentication of a web user employs, for example, a computing device, such as a user's personal computer (PC), coupled over a network, such as the Internet, to one or more servers, such as an authenticating authority's host server, as well as one or more databases of the authenticating authority. The authentication process is divided into three phases: registration, enrollment, and transaction authentication, with each phase being less intrusive and less secure than the one before it. During the registration phase, an authenticating authority registers the user based on identification of the user using a strong authentication technique and provides the user with an authenticating token, which can be used to enroll one or more user devices for the user during the enrollment phase. The authenticating authority can then authenticate the user for a transaction during the

transaction authentication phase based on the user's presentation of a user password via the enrolled user device.

Modular Platform for Web Applications and Systems

Karlsen (2014) developed a method and system for delivering a web platform designed to aid in web application development. The method comprises creating a core layer of a web development software stack with first bundles organized into a first bundle group by an underlying web framework, creating a ket layer of the web development software stack with second bundles organized into the first bundle group by the underlying web framework, and creating an application layer of the web development software stack with third bundles organized into a second bundle group by the underlying web framework.

Class Schedule System

Abdullah (2019) addressed the design and implementation of a class schedule system, a class schedule system created as a web database application system using PHP and the MySQL database management system. Finally, it only takes a few minutes to develop a comprehensive high-quality solution for assigning a significant improvement over manual labor. The most effective point for this system is that it has flexibility and scalability, which is very important for future development. Future work and correlations are required for the Class Schedule System. The design and implementation of a smartphone application have been deferred until later. Users can use a smartphone

application to access the application at any time and from any location, even if they do not have access to desktop applications.

Systems and Methods for on-line scheduling of appointments and other resources

Coley, Nessland, Leonhardt, Barry, Wilson and Nettuno (2009) develop a computer-based system and computer-implemented methods for providing an automated computer network-based, or online, appointment scheduling service that allows registered customers to schedule appointments with a variety of businesses that are also registered with the online appointment scheduling service. The application describes an optimization algorithm for controlling the start times presented to a customer when selecting an appointment time that seeks to cluster the new appointment to existing appointments for the business in order to reduce time gaps during the day for the business/service provider that are insufficient in duration to schedule other appointments for the company's business other customers.

Conceptual Model of the Study

In this part of this study, the researchers come up with a conceptualized diagram to show the comprehensive details on how they will build the project starting from the input, going to the process, and finally, to the output of this research project.

Starting from the input; hardware, knowledge, and software requirements are needed to be discussed to properly set up the project as it serves as the foundation for the process not to collapse. As the Technological University of the Philippines Cavite campus is very technologically advanced and progressive, and that people are living in a generation where technology helped people throughout all the transactions that they are making everyday, the researchers decided that there will be an implementation of this web application to a mobile browser to reach more people conveniently. Also, in order for the process to take place and be fulfilled, knowledge requirements are needed just like comprehension with using programming to create features and functionalities, web designing, database management and web development. Software requirements are also important as it will help what specifically is needed to perform such a process.

This part of this project is the process, where all the designing, development and implementation will happen. In the Design, researchers need to put themselves in the shoes of a user of this application and ask themselves, what will make them use this web application, what color is pleasant to their eyes yet it will still represent its purpose and how can they make it easier for the beginner to use this app. After that, they will visualize the design and create a mockup using different platforms such as Figma to access the design and see what they can improve on it. If everything is going to their plans as a group of researchers, they then finalize it and start programming the design and implementing it to the web application, together with its functionalities and make it responsive to support different types of devices. The development of this web application will proceed in planning for the data on how, who, what and where to send, receive, update, delete or retrieve. After the planning, it is time to develop and test the results and

eliminate any redundant process and information for the program to run smoothly. Lastly, they will implement the project through web hosting. It might cost a little and it will depend on how big the files, how many processes and datas, data traffic and such things before purchasing a web hosting.

After all the processes happen, the outcome of this project will be the development of adding subjects for irregular students in Technological University of the Philippines Cavite Campus and below will be the conclusion of this part in a more visual way for further understanding.

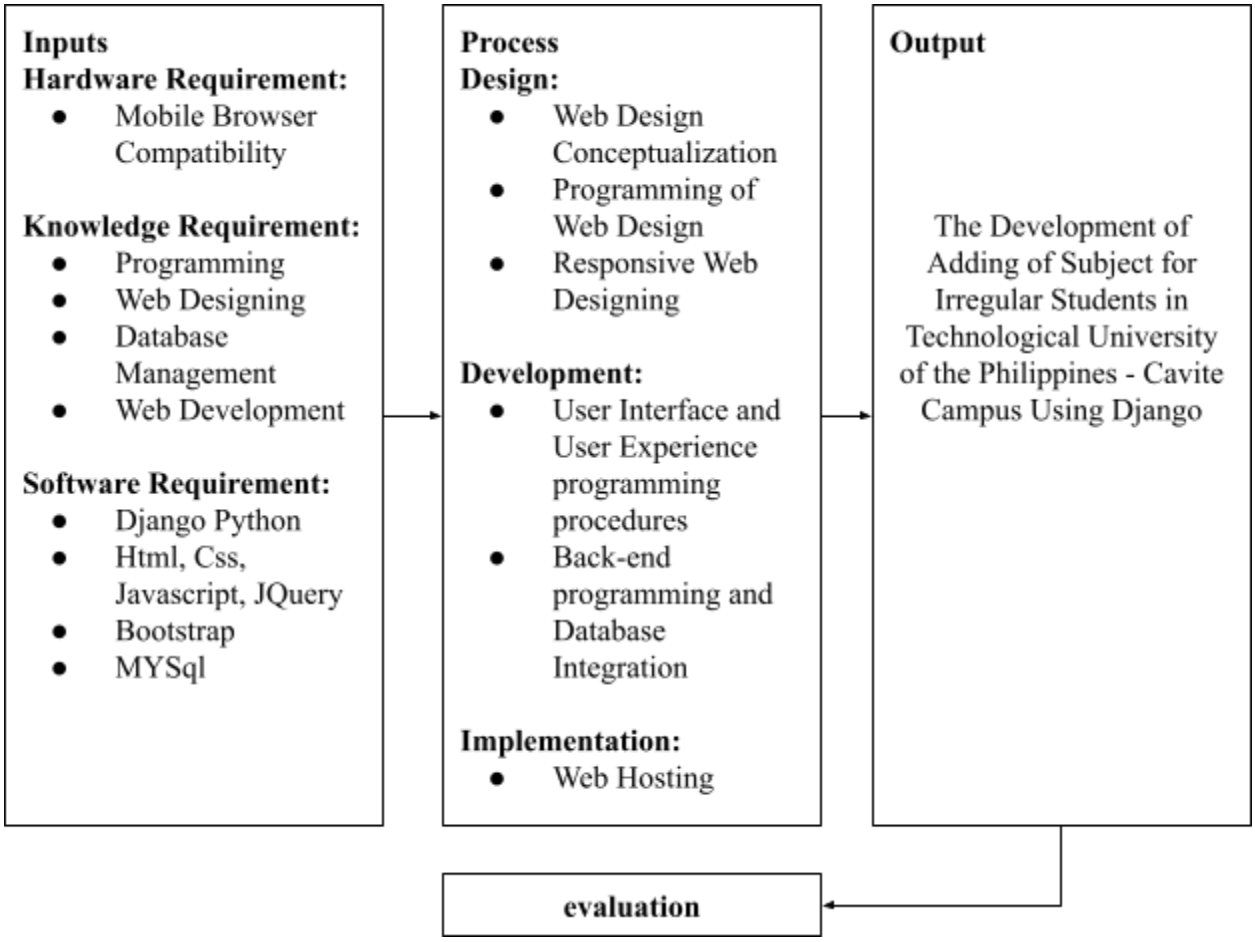

Figure 9. The Conceptual Model of the Study

Operational Definition of Terms

Web-based Application refers to application in a client-server setting that will be operated by the prototype.

Web framework is a collection of resources and tools designed to help software developers create and manage web applications, web services, and websites.

Django is an advanced Web framework written in Python that makes use of the model view controller (MVC) architectural pattern. Django was created in a fast-moving newsroom environment, and its key objective is to ease the development of complicated, database-driven websites.

MySQL is an open-source relational database management system. Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language..

Python is a high-level, interpreted, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation. Python can be used on a server to create web applications.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter contains the discussion of the project including project design, project development, operation, and testing and evaluation procedure.

Project Design

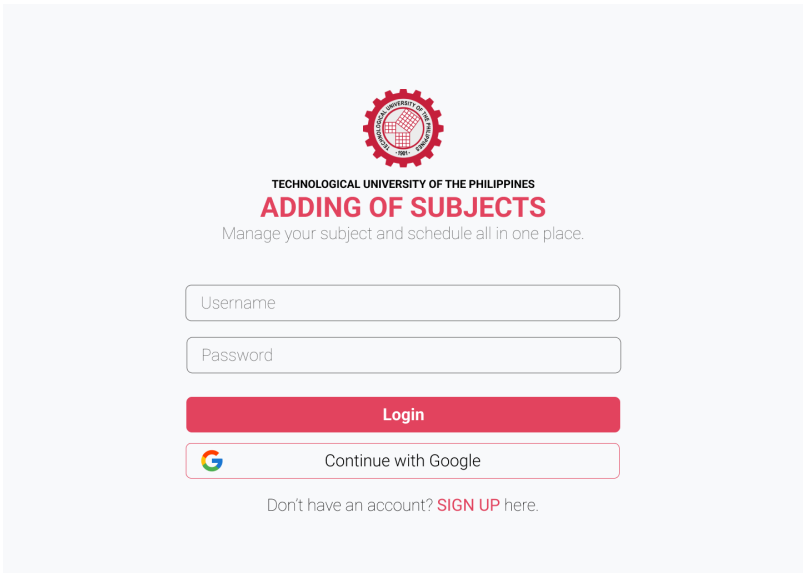

Figure 10. Login Page (Web App)

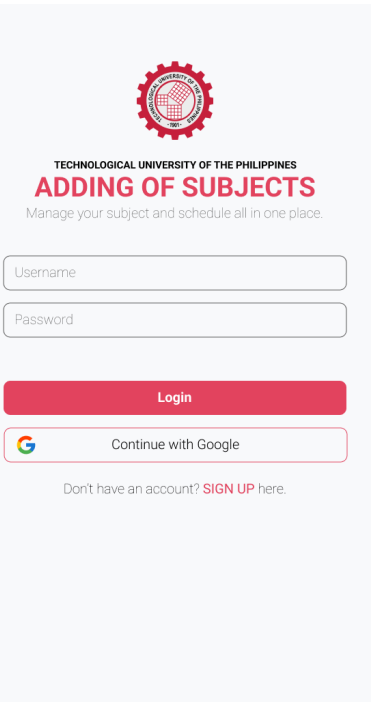

Figure 11. Login Page (Mobile View)

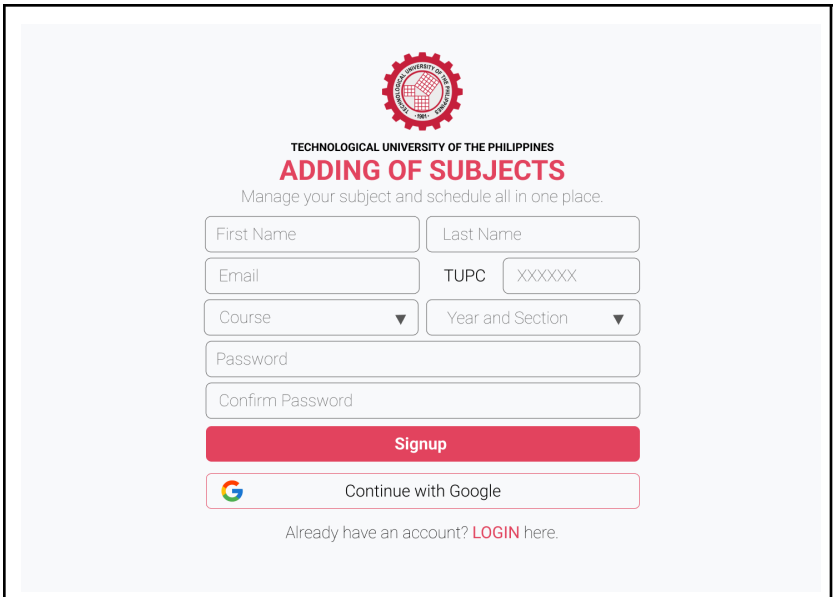

Figure 12. Account Registration (Web App)

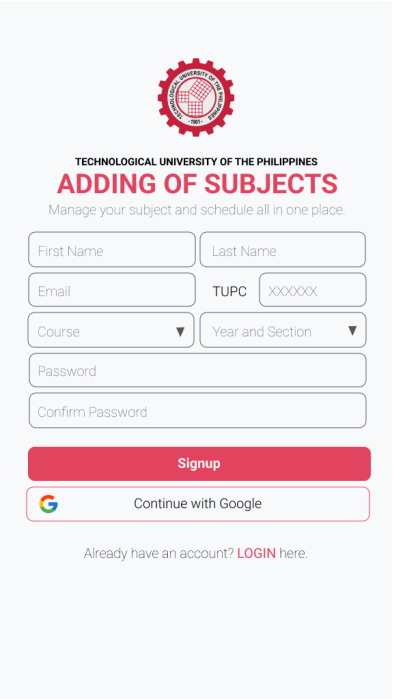

Figure 13. Account Registration (Mobile View)

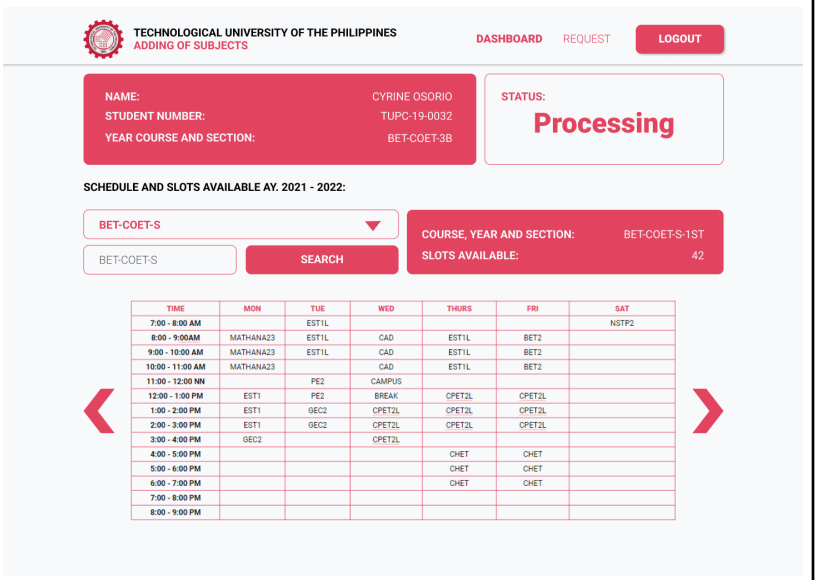

Figure 14. Student - Dashboard (Web App)

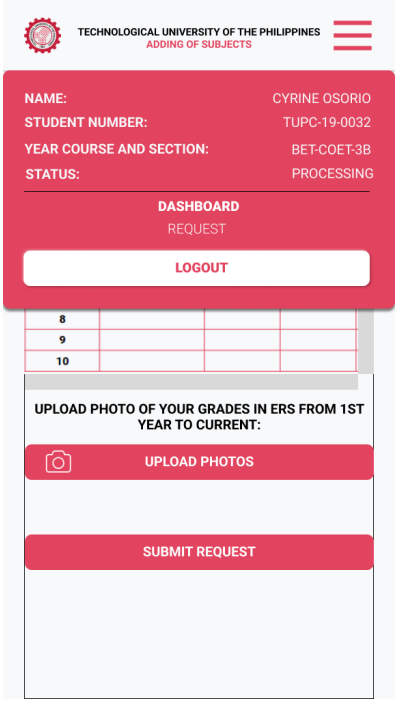

Figure 15. Student - Dashboard (Mobile View)

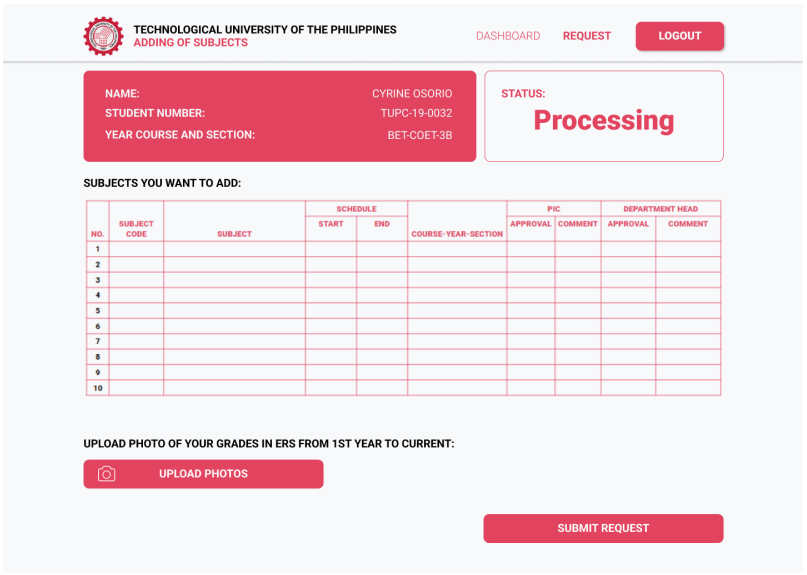

Figure 16. Student - Request (Web App)

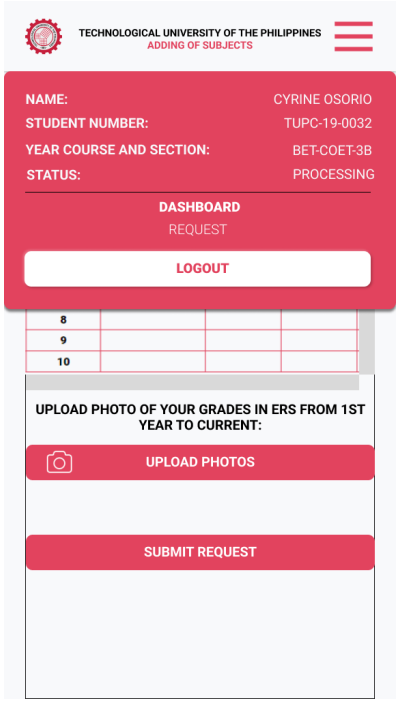

Figure 17. Student - Request (Mobile View)

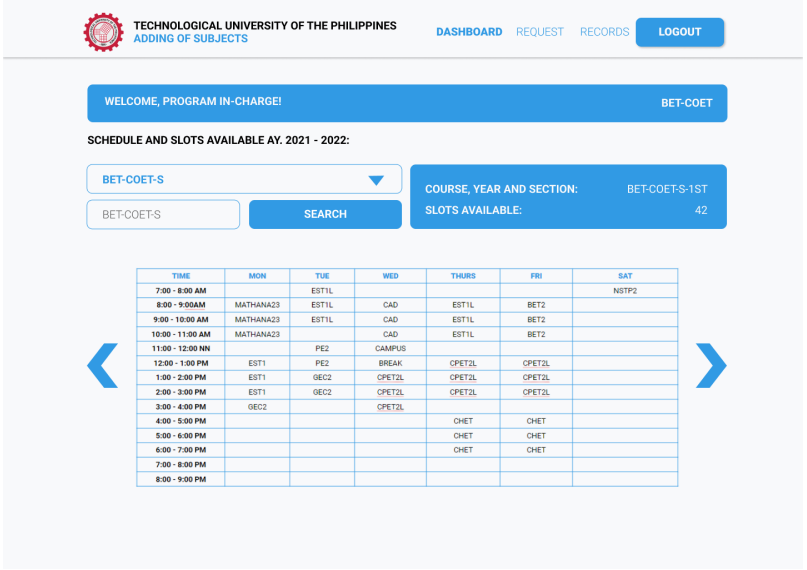

Figure 18. Program-in-charge - Dashboard (Web App)

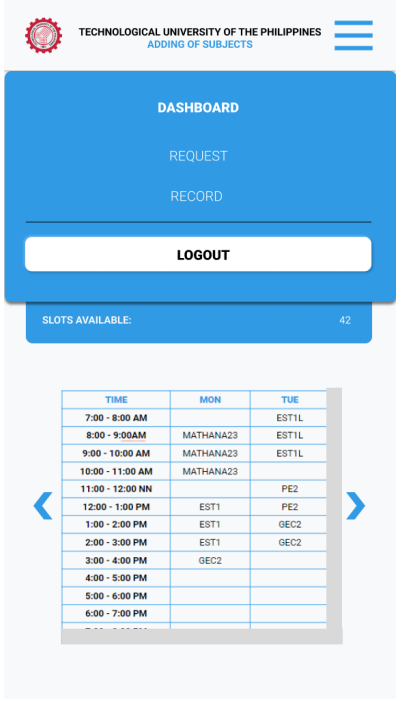

Figure 19. Program-in-charge - Dashboard (Mobile View)

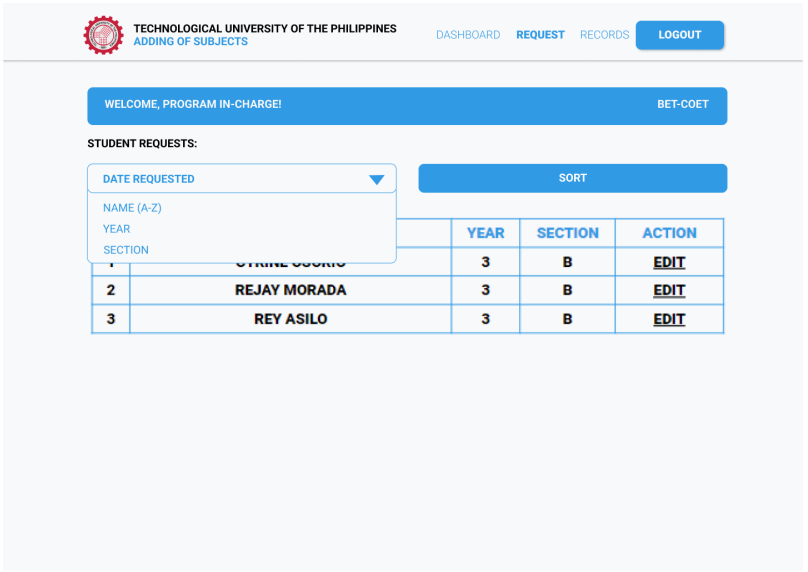

Figure 20. Program-in-charge - Request (Web App)

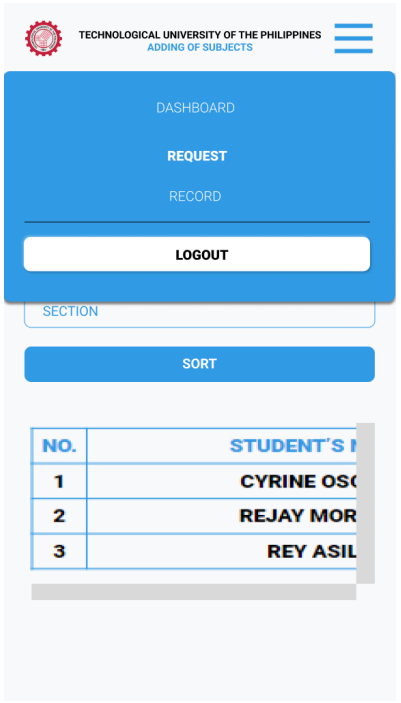

Figure 21. Program-in-charge - Request (Mobile View)

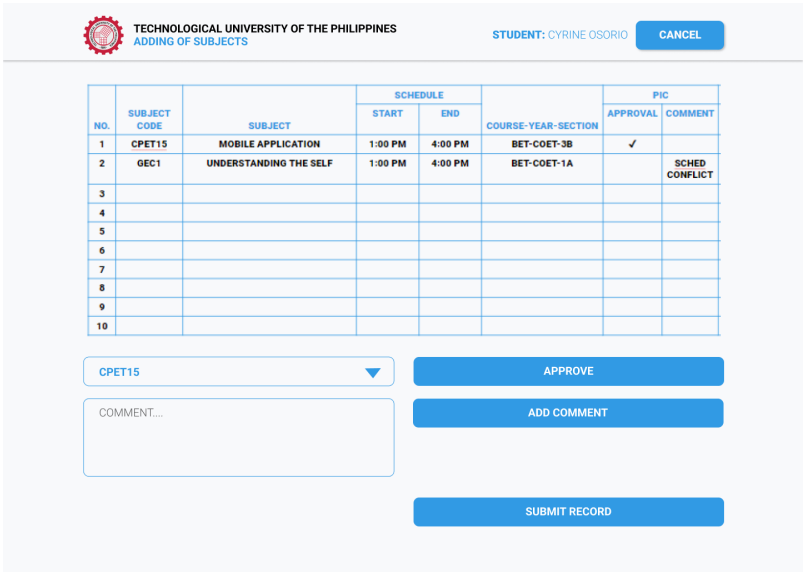

Figure 22. Program-in-charge - Checking of Request (Web App)

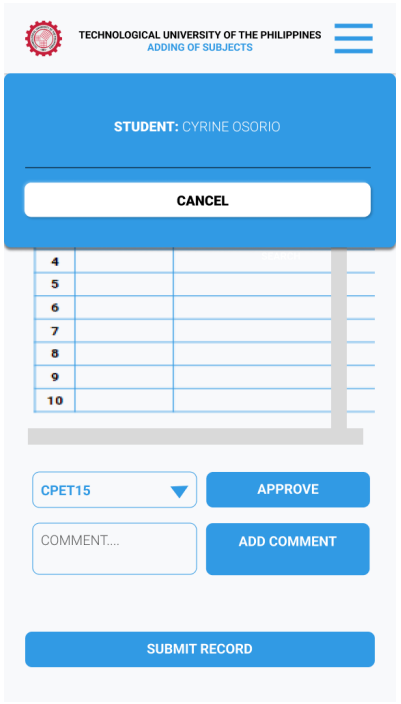

Figure 23. Program-in-charge - Checking of Request (Mobile View)

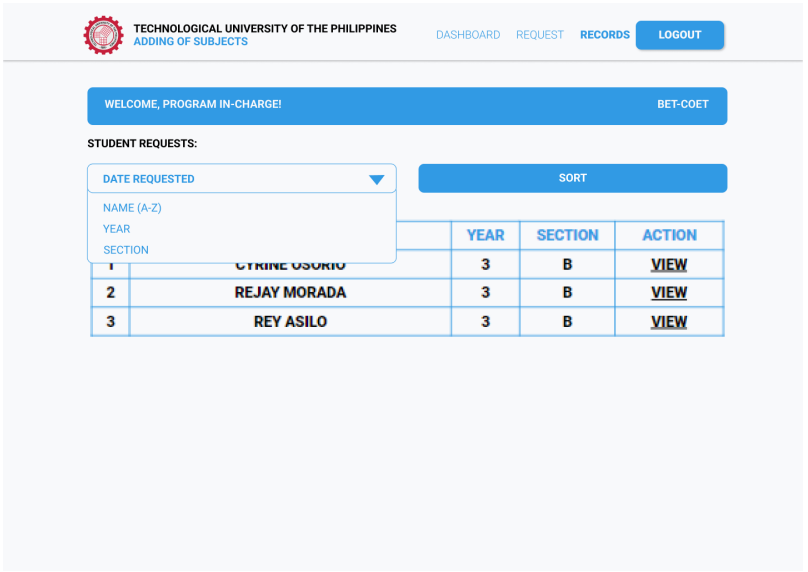

Figure 24. Program-in-charge - Student Records (Web App)

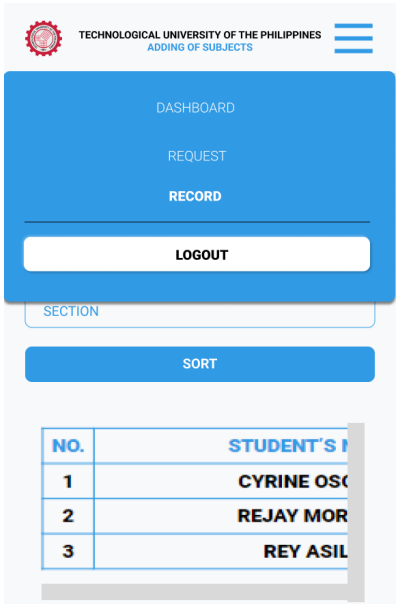

Figure 25. Program-in-charge - Student Records (Mobile View)

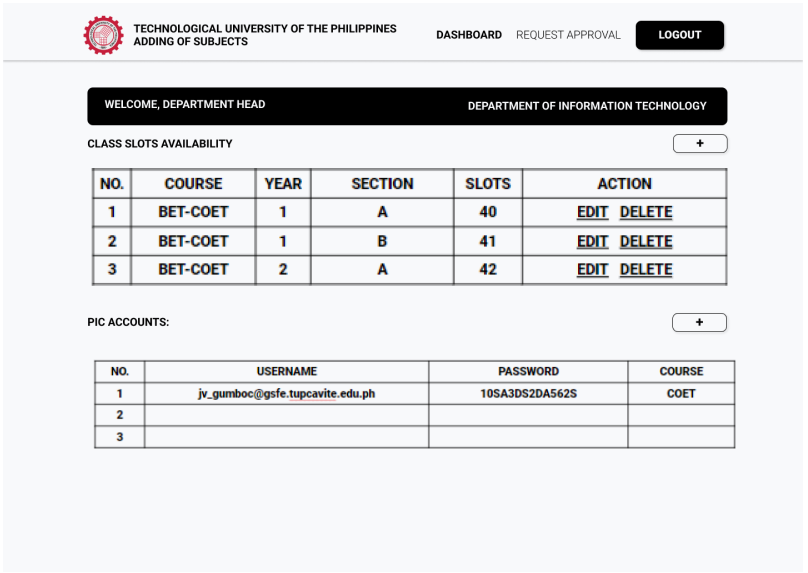

Figure 26. Department Head - Dashboard (Web App)

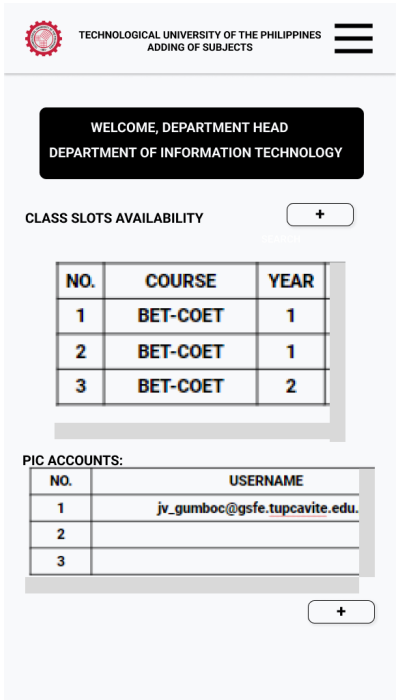

Figure 27. Department Head - Dashboard (Mobile View)

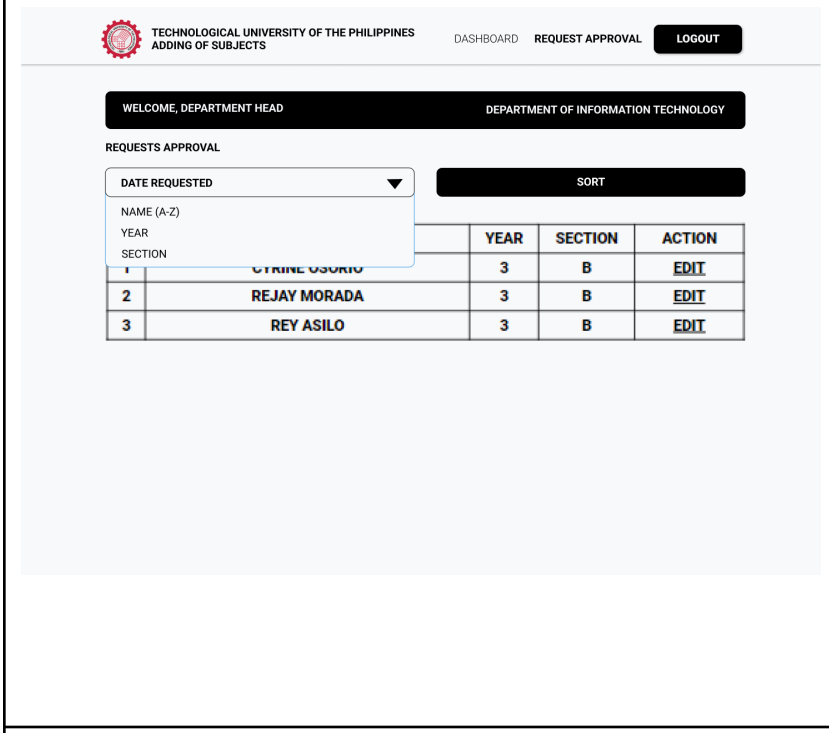

Figure 28. Department Head - Request Approval (Web App)

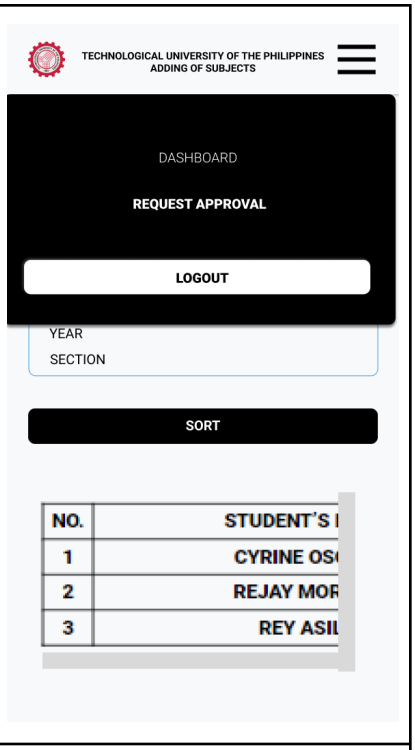

Figure 29. Department Head - Request Approval (Mobile View)

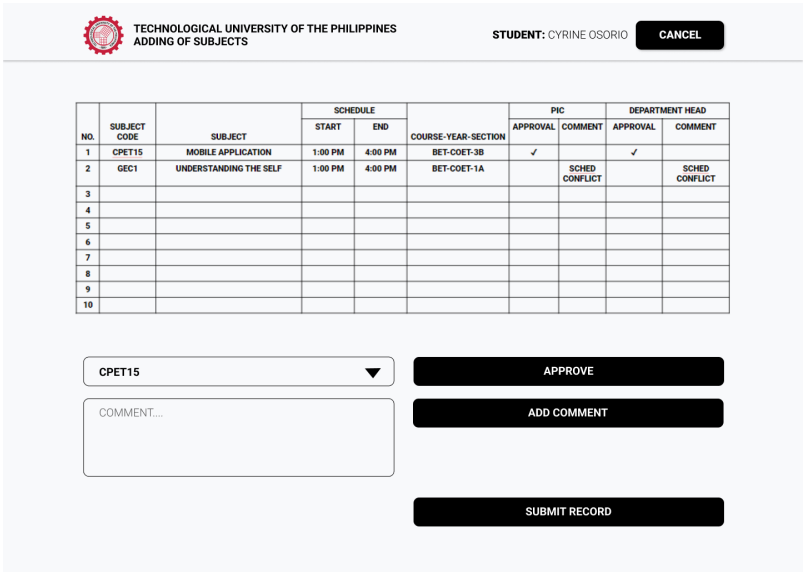

Figure 30. Department Head - Checking of Request (Web App)

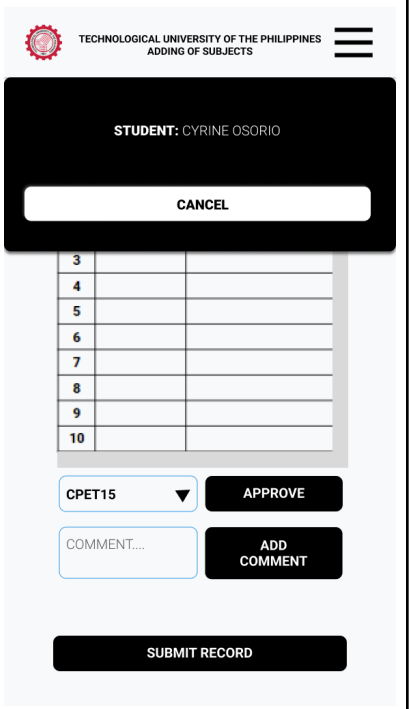

Figure 31. Department Head - Checking of Request (Mobile View)

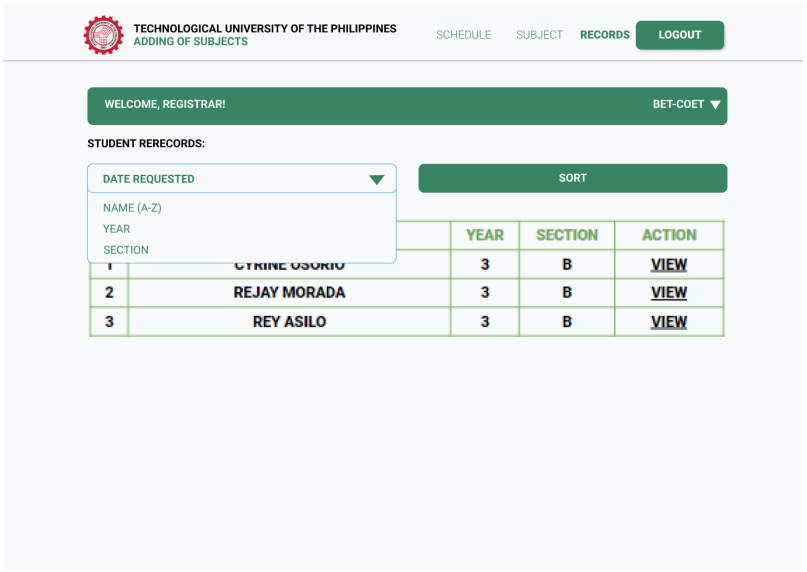

Figure 32. Registrar - Records (Web App)

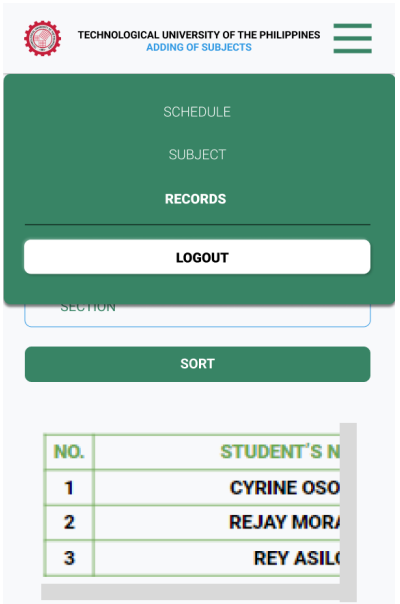

Figure 33. Registrar - Records (Mobile View)

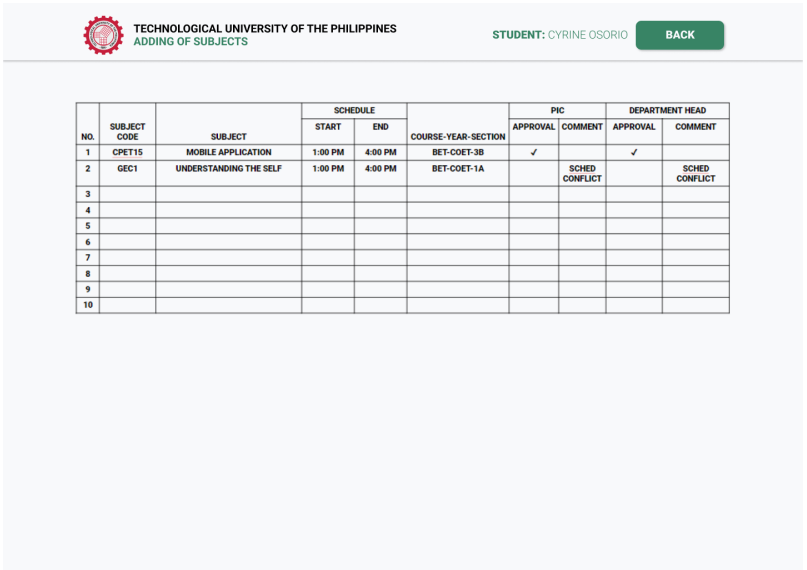

Figure 34. Registrar - Checking of Request (Web App)

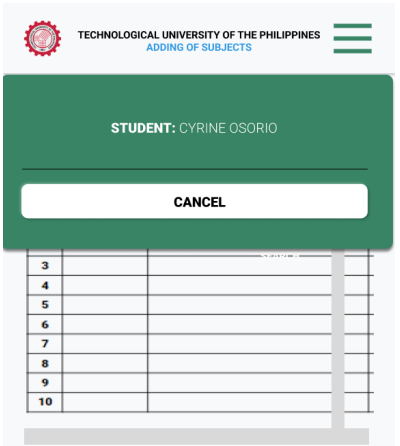

Figure 35. Registrar - Checking of Request (Mobile View)

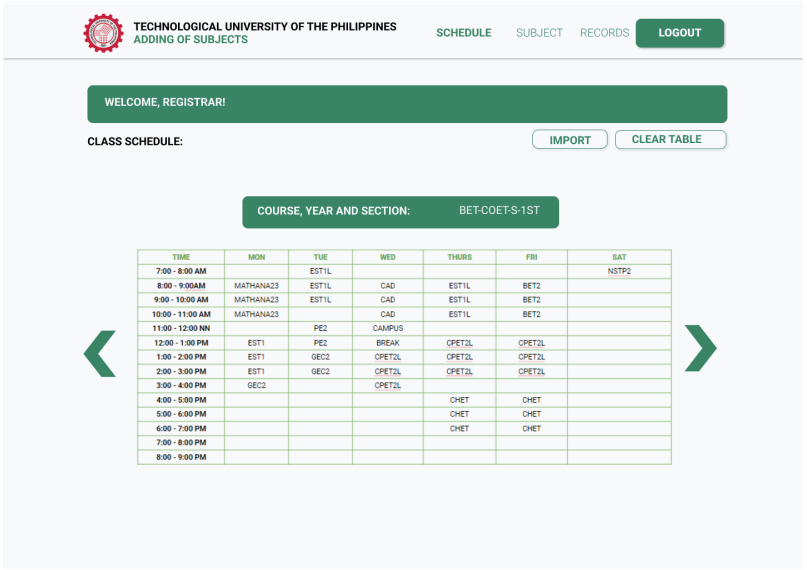

Figure 36. Registrar - Schedule (Web App)

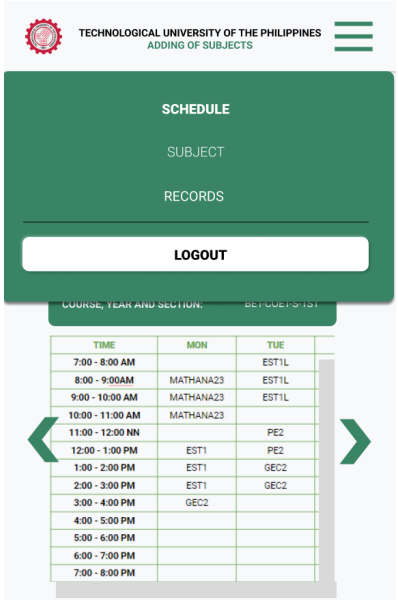

Figure 37. Registrar - Schedule (Mobile View)

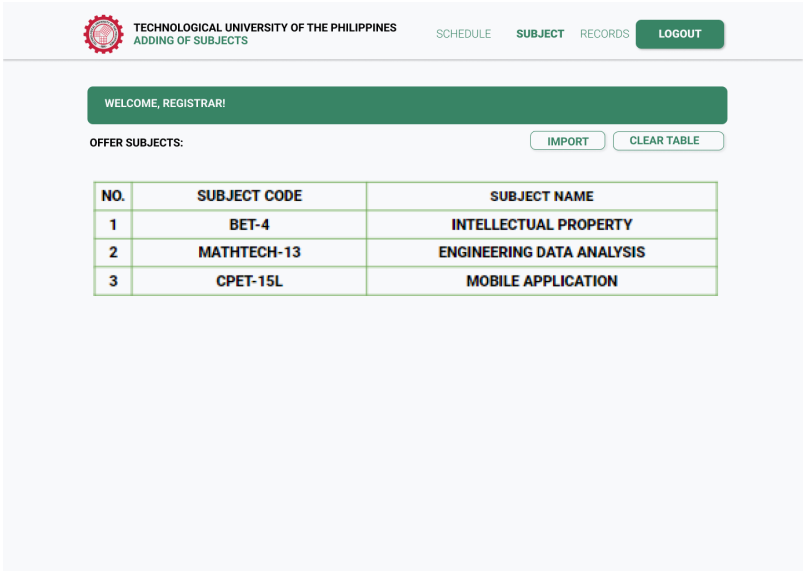

Figure 38. Registrar - Subject (Web App)

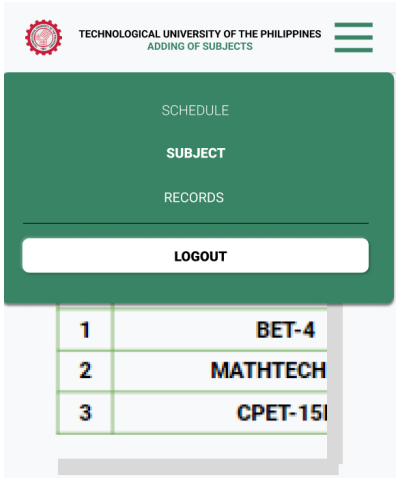

Figure 39. Registrar - Subject (Mobile View)

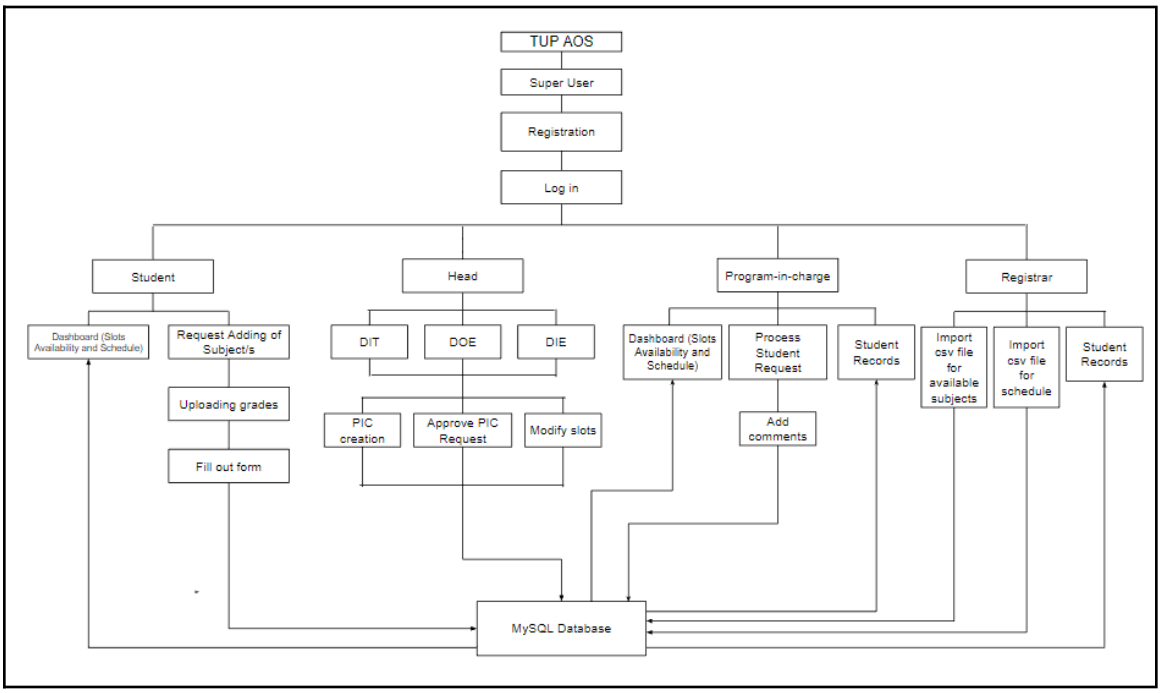

Figure 40. Block diagram of the TUPC Adding of Subjects

Login and Sign up

Figure 41 shows how to login in the system. First, the user must input the localhost address or link, after the page loads, it will direct to the Login page. The user will input the username and password and must click the “Login” button so the system can verify if the user is valid or invalid to access the database. If the username and password is invalid, it will display a message prompting either username or password, neither username nor password is valid. Only the user with valid username and password will be redirected to a new page where their user type or role will display on their

dashboard window. Second, if the user doesn't have yet an account, the user may used google account to sign up and also the user may proceed to sign up page and the user will input his credentials then if the user click the sign up button and if all of its inputs meet the requirements then it will proceed to saved account or the user are successfully create an account then it will saved to the database while if the credentials of user are not meet the requirements it will go back to the input credentials

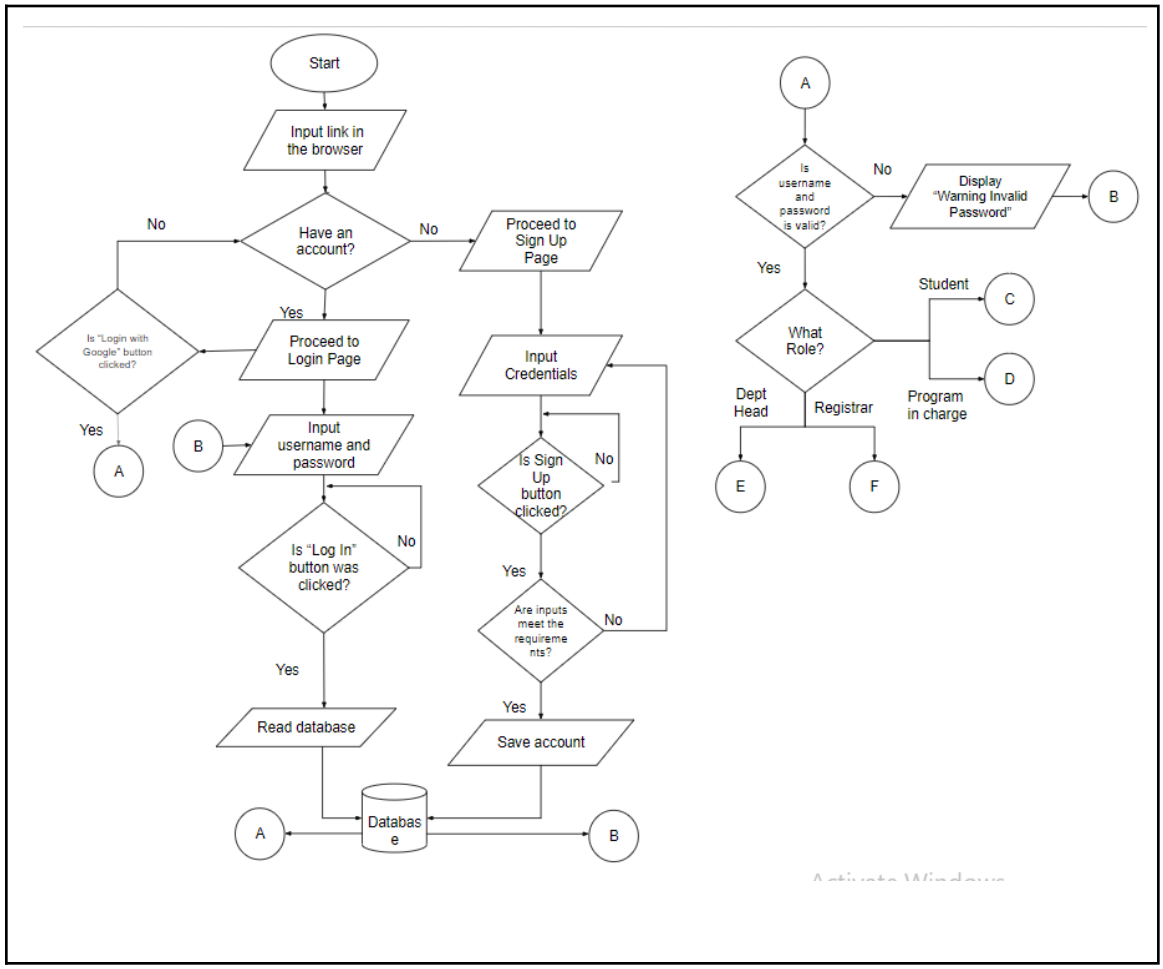

Figure 41. Flowchart for Sign up and Login.

Students

Figure 42 shows how the Student page looks and operates. First the student main window where his/her details and scheduling can be seen. If there are no slots, it will just go back to the main page and if there are slots available the student can “request new” to start the transaction. If not, it will keep on asking if the button was clicked and if yes, it will go to a page where the student can upload a file containing his/her grades from ERS. Then if the submit button is clicked it will record the added file that contains a subject that a student wants to add, course and schedule (start-time - end-time), save it to the database and display the current status which is to be processed by PIC. If not, it will go back to the page of the uploading file. Then if the request wasn't already processed by the PIC, the student will wait for PICs to process his request and if it was already processed by the PIC, the student will be notified of the status “Wait for Department Head’s Approval”. Then if the request wasn’t already processed by the Department Head the student will wait for Department Heads to process his request and if the request was already processed by Department head’s, the student will be notified that his request status is “Department Head processed your request” then it will automatically generate a PDF.

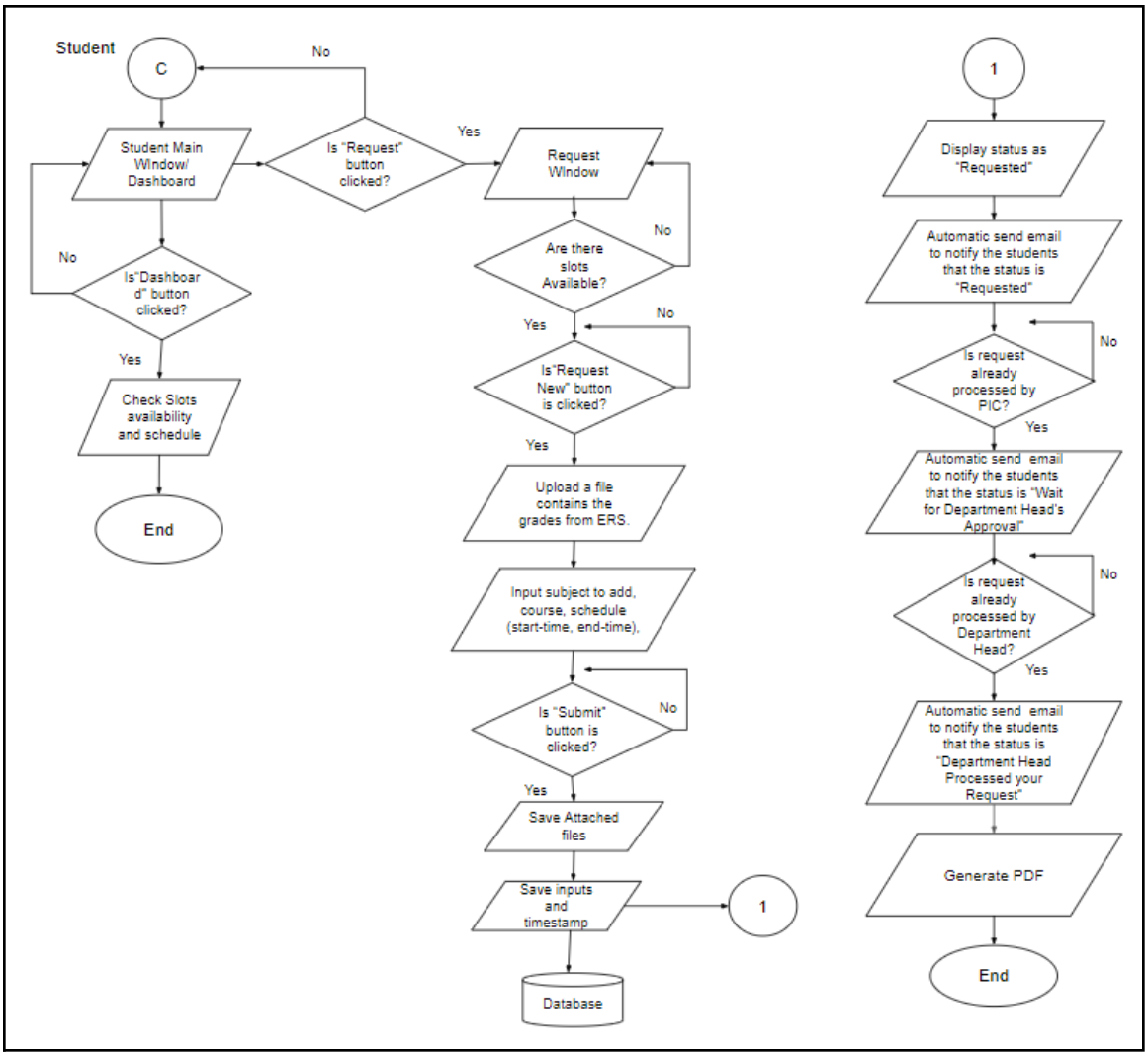

Figure 42. Flowchart for Students.

Program In Charge

Figure 43 shows how the Program in Charge (PIC) page looks and operates. First, the PIC will see the main page or the dashboard. If the request button was clicked, the Check Request Window page will open. In the Request Window, this can be filtered by inputting date modified, year, or section. Next, if the Edit button was clicked, the checking and process request page will open. And then, the process of checking the subjects to add, schedule, and course of the student request can be done. If a request is approved or check was checked, the PIC will add comment and reason of approval then record and save it to the database; if it is not checked or disapprove, the PIC will add comment of disapproval then record and save it to the database. In addition, in the main page, if the record button was clicked, it will display the queue list of student requests which can be filtered by inputting date modified, year, or section. In the queue list; if the view button was clicked, the view and process request history page will open; if not, it will remain on the list of requests.

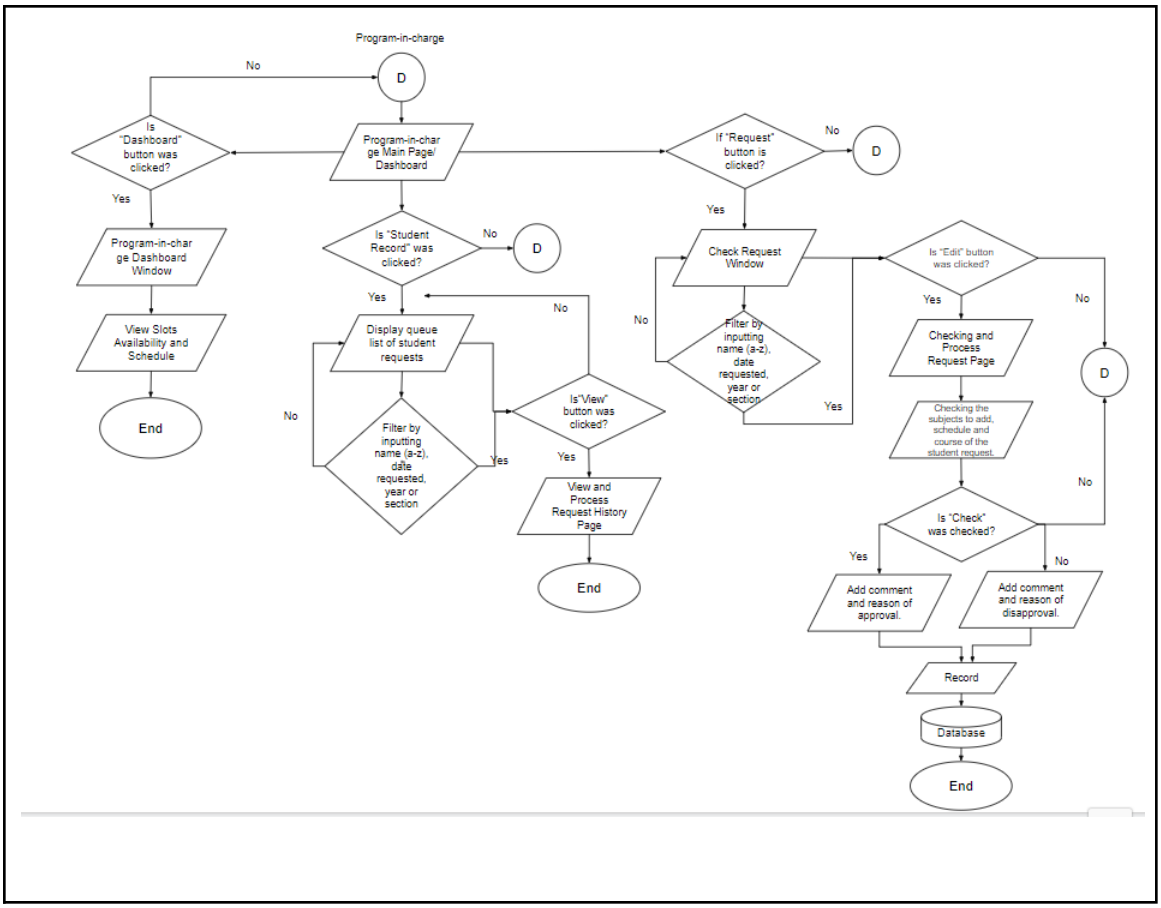

Figure 43. Flowchart for Program in Charge

Department Head

Figure 44 shows the process in the Department Head's page. In the Department Head's main page or dashboard; if the dashboard was clicked, it will display the Dashboard window, showing the class number slots availability. In the dashboard window; if the delete button was clicked, it will display the alert message asking " Are you sure you want to delete?", if the ok button was clicked, the record will be updated and saved to the database. Also, in the dashboard window, if the add button was clicked, the user will input course, year, section, and slots availability. If the information is valid, the record will be updated and saved to the database; if not, the user will input again. In addition, in the dashboard window, if the edit button was clicked, the user may input fields to be updated. If it is valid, the record will be updated and saved to the database. In the dashboard if the delete, add, or edit was not clicked, it will remain on the dashboard. In the Department Head's main page, If the request approval button was clicked, the Check Request Window page will open. In the Request Window, this can be filtered by inputting date modified, year, or section. Next, if the Edit button was clicked, the checking and process request page will open. And then, the process of checking the subjects to add, schedule, and course of the student request can be done. If a request is approved or check was checked, the PIC will add comment and reason of approval then record and save it to the database; if it is not checked or disapprove, the PIC will add comment of disapproval then record and save it to the database.

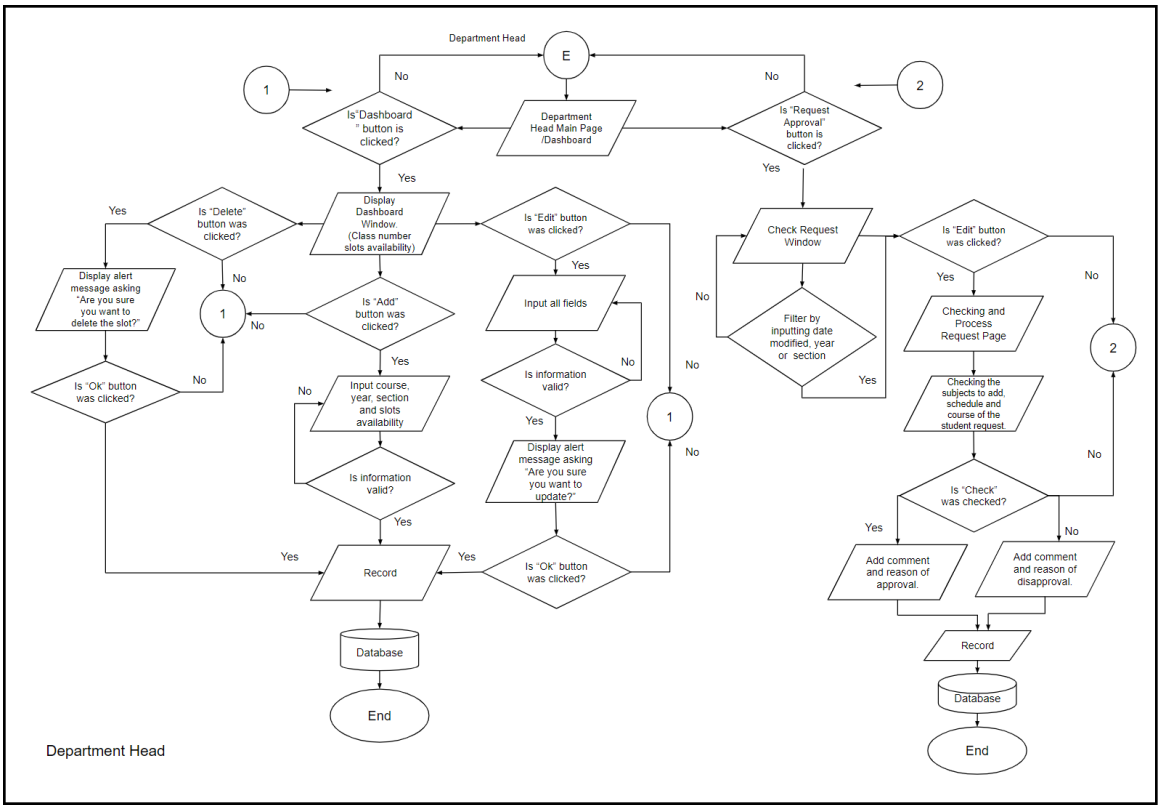

Figure 44. Flowchart of Department Head

Registrar

Figure 45 shows the process in the Registrar Page. First, it shows a Registrar Mains Window and there navigation bar with three buttons (Schedule button, Student Record, and Offer Subjects) that the user can check or access. In the Schedule button if the user didn't click the button, it will remain in the Registrar Main Window else the user clicks the Schedule button, it will proceed to the next page. In the Schedule page there are two buttons (Clear All Table button and Import Button) that the user can click. If the user didn’t click the buttons, it will remain in the Schedule page, else the user clicks the Clear All Table button and Import button both events are going to Refresh and Save it to the database. Second is the Student Record button, it will show the Student Records Window then if the user didn’t click the button, it will remain in the current page else the

user click the View button from the Student Records Window it will view the student request window from there the user can also view the subjects grade and schedule of the student. Third in the Offer Subject Page The user can click any of the two buttons on the Schedule page (Import or Clear All Table). If the user doesn't click the buttons, the information will stay on the Schedule page; however, if the user clicks the Import and Clear All Table buttons, the information will be refreshed and saved to the database.

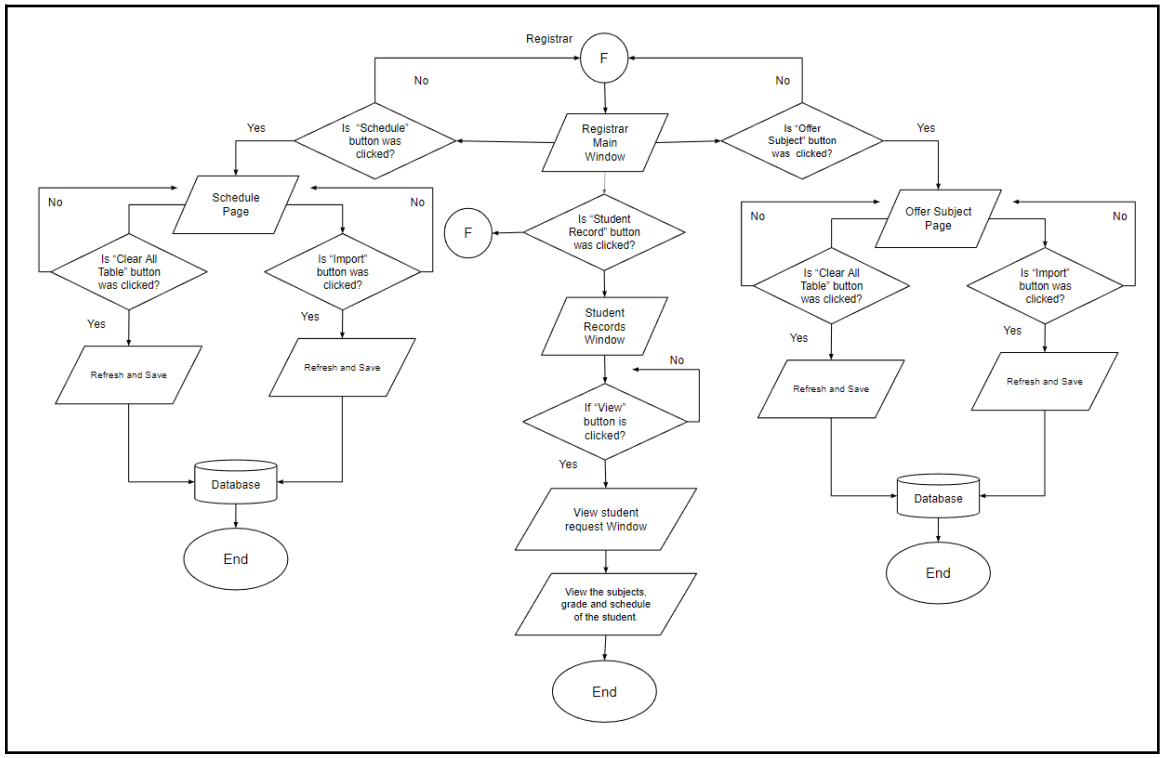

Figure 45. Flowchart of Registrar

Evaluation Procedure

The proposed project will be evaluated using the following procedure:

1. The researchers will demonstrate how the system works and explain the project's scope and limitations.

2. For better evaluation, the researchers will allow the Irregular Students respondents to operate the system.

3. The researchers will conduct a survey based on the designed Irregular Students evaluation form.

4. This will be distributed to thirty (30) respondents, comprised of target users and experts in the field related to the project, in order to evaluate the system based on its overall expected output.

5. In evaluating the system we will use the Likert Scale shown in Table 1,T

6. The researchers will collect the raw data and calculate the mean.

7. The results will be interpreted using the descriptive interpretation of the mean shown in Table 2.

Operation and Testing Procedure

In order to operate the Adding of Subjects for Irregular Students, an operational procedure is listed below for the system to perform its whole functions.

In testing Adding of Subjects for Irregular Students, the researchers manage to create a series of tests to check the functionality, accuracy and reliability. According to the following conditions:

1. Test the functionality of the Adding of Subjects for Irregular Students:

Project Test Results

Table No. 1

Likert Scale

Numerical Rating	Descriptive Rating
5.0	Excellent/Highly Acceptable
4.0	Very Good/Very Acceptable
3.0	Good/Acceptable
2.0	Fair/Fairly Acceptable
1.0	Poor/Not Acceptable

Table No. 2

Descriptive Interpretation of the Medium

Table no. 2 shows the numerical rating and the corresponding interpretation rating.

Numerical Scale	Statistical Limit	Verbal Interpretation
5	4.51 - 5.00	Excellent
4	3.51 - 4.50	Very Good
3	2.51 - 3.50	Good
2	1.51 - 2.50	Fair
1	1.00 - 1.50	Poor

Project Test Results

This shows the following results of the tests conducted in terms of Functionality, Accuracy and Reliability for displaying post wirelessly

Table number 3-6 shows the Functionality of the Adding of Subject in the overall system.

Table No. 3

Functionality of Adding of Subjects for irregular students

Test Conducted	Expected Output	Actual Output		
		Test 1	Test 2	Test 3
Browse the system link within the network	System Log-in account will displayed			
Register with valid credentials	Accounts will be successfully registered			
Log-in with valid credentials	User account can access the system			
View slots availability, and schedule	Display slots availability, and schedule in the system.			
Uploading student's grades	Image file will be attached and saved to database			
Input subject to add, course, schedule (start-time,end-time)	Data will be saved to database			

Table 3. Test Conducted for Functionality for Irregular Students

Table No. 4

Functionality of Adding of Subjects for program-in-charge

Test Conducted	Expected Output	Actual Output		
		Test 1	Test 2	Test 3
Browse the system link within the network	System Log-in account will displayed			
Log-in with valid credentials	User account can access the system			
View slots availability, and schedule	Display slots availability, and schedule in the system.			
Check the student request	Able to check and comment on the subject request.			
Check the subject to add, course, schedule (start-time,end-time)	Changes will be saved to database			
Add comments for the reason of approval or disapproval of the subject to add.	Comments will be saved to the database. And able to view the student request page.			

Table 4. Test Conducted for Functionality for Program-in-charge

Table No. 5

Functionality of Adding Subjects for department heads.

Test Conducted	Expected Output	Actual Output		
		Test 1	Test 2	Test 3
Browse the system link within the network	System Log-in account will displayed			
Log-in with valid credentials	User account can access the system			
Inser, Edit, Delete Slots available per classes	Save changes in database			
Check the request approval	Able to check and comment on the request approval.			
Check the subject to add, course, schedule (start-time,end-time)	Changes will be saved to database			
Add comments for the reason of approval or disapproval of the subject to add.	Comments will be saved to the database. And able to view the student request page.			

Table 5. Test Conducted for Functionality for Department Heads

Table No. 6

Functionality of Adding Subjects for registrar.

Test Conducted	Expected Output	Actual Output		
		Test 1	Test 2	Test 3
Browse the system link within the network	System Log-in account will displayed			
Log-in with valid credentials	User account can access the system			
Display the student records	Able to view the student records from the database.			
Importing and clear schedule	Save changes in the database.			
Importing and clear offer subject	Save changes in the database			

Table 6. Test Conducted for Functionality for Registrar

Table number 7 shows the Accuracy of the test results of the Adding of Subjects in the system.

Table No. 7

Accuracy of the Adding Subjects.

Test Conducted	**Expected Output**	**Actual Output**		
		Test 1	**Test 2**	**Test 3**
Approve of subject to add	The subject to add will be approved and will be displayed			
Pending subject to add	The subject to add will be pending and be forwarded			
Disapprove subject to add	The subject to add will be disapproved and will be displayed			

Table 7. Test Conducted for Accuracy

Table number 8 shows the Reliability of the test results of the Adding of Subjects in the system.

Table No. 8

Reliability of the Adding Subjects

Test Conducted	**Expected Output**	**Actual Output**		
		Test 1	**Test 2**	**Test 3**
Stop Web Server	The browser will display “This site can’t be reached”			
Start Web Server	The system must be accessible			
Log-in invalid user account	The system is not accessible and “No user found.” will display			
Log-in valid user account	The user account can access the system			

Table 8. Test Conducted for Reliability

Project Capabilities and Limitations

The following are the capabilities of the project:

1. The developed system processes an automated system for adding subjects in a mirror board through the web-based application.
2. It can accommodate multiple displays of posts in static and fading representation of data such as text only, image only, video only, image with text and video with text posts or announcements.
3. The prototype has an LED indicator for the urgent announcement or post.
4. The prototype also has an IP restriction (Whitelist access) setting to avoid any unwanted user of the posting system.

The following are the limitations of the project:

1. The end-user can only access the system through a wireless local area network connection.
2. The system also needs an internet connection for the time and date to be displayed correctly.
3. The prototype is for a semi-outdoor environment only due to the display's visibility may vary.
4. The authorized user of the system manually checks the response of the officials if the post is approved or disapproved.

Project Evaluation Results

Table No. 9

Functionality performance of the Adding of Subjects

Indicators	Mean
Ease of operation	
Provision for comfort and convenience	
User friendliness	
Total mean average	

Table No. 10

Aesthetics Performance of the Adding of Subjects

Indicators	Mean
Color	
Attractiveness	
Appropriate in size	
Total mean average	

Table No. 11

Workability Performance of the Adding of Subjects

Indicators	Mean
Total mean average	

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