# Prototype Development of Final Year Project Management System to Monitor Student's Performance

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**ABSTRACT**

The university requires students to complete a comprehensive software development project in their final year of study in all Information Technology (IT) and Computer Science (CS) programmes, run by the Faculty of Computing & Multimedia (FCOM), Universiti Poly-Tech Malaysia. As the number of students increases by semester, manual procedures for managing student projects become a major issue. Ineffective supervision and monitoring of student progress are more likely to occur as the number of students to supervise per lecturer also increase. This circumstance may contribute to an increase in the number of students who will fail to complete project development within the time frame specified. A log book is currently used to document meetings and discussions between supervisors and students. Although a detailed schedule has been proposed, a monitoring process that triggers specific actions to ensure all deadlines are met is required. The objective of this research is to improve project monitoring and supervision by developing a prototype of a web-based Final Year Project Management System (FYPMS). The initial prototype is built on the dashboard approach concept, where students can see their progress and lecturers can use this centralized system to monitor students' performance. This system's users are divided into three groups: students, lecturers, and coordinators where they can communicate efficiently and effectively by using this system. By using the FYPMS, the faculty can look forward to better project management, improved supervision, fewer project delays, and a more efficient final year project process.

## 1. Introduction

A management system to monitor student academic performance is essential in ensuring efficient operation of a higher education institution [1-3]. A study by Abdullah *et al.,* [4] proposed a new approach to replace the manual procedure of FYP management in a Malaysian university. Their proposal was to have an electronic system in monitoring students' FYP progress. The system's main feature was to provide a centralized database where the data can be monitored regularly. Also, it could calculate marks automatically based on the marks given by the supervisor and examiner. As a

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result, this had led to a reduced paperwork, increased visibility and better coordination [4]. Monitoring the students' progress to complete the project development and dissertation is one of the necessary procedures in the FYP process [5,6]. The purpose is to ensure that all students finish the project successfully within the allocated time. A project by Bakar *et al.,* [7] developed a system to manage final year project supervision. The system replaced the conventional logbook that had been used to record the meeting and progress. Also, it provided an effective method to monitor students' progress and eased the communication between students and supervisors [7]. Additionally, a study by Khamaruddin *et al.,* [8] also supported the idea of managing a final year project by using a centralized system. This project aimed to provide an online platform by using Moodle as a one-stop centre to coordinate student submissions and online evaluations. Based on the result presented in the paper, the project had successfully helped the coordinator to monitor and manage the FYP effectively through a centralized data management system [8].

The electronic FYP management however, does not present without issues. Skoumpopoulou & Waring [9] explained that complexity of universities procedure due to different department approach in managing student records may prove to be difficult to integrate in a single system. They also had mentioned about the difficulty of understanding an informal work practice – a user led innovation that can 'work around' the system. Wahid [10] found similar issues, where there were complicated documentations and different terminologies used by different department. As a result, it would be a challenge for system developer to capture the requirement and translated them into a working system. Hence, the paper will document the process of developing a FYP management system (FYPMS) in order to understand the procedure. The following section will discuss on the problem statement and the objectives of the project.

Student records management (SRM) is important in ensuring the efficient delivery of education service [11]. They consist of evidence of students' performances that are monitored and evaluated periodically. This is to ensure quality services are provided to the students. In higher education institutions, SRM has become essential in ensuring student satisfaction [12,13]. In this paper, the SRM's focus would be on the management of student's final year project reports. The discussion will evolve around the development of the system which is used to monitor final year project in a private university based in Kuala Lumpur.

All of the information technology (IT) courses offered by the university require students to complete a comprehensive software development project in their final year of studies. This is known as the final year project (FYP). The aims of the course are to provide an integrated training on students' practical skills, technical knowledge learnt from various courses in the previous semester, as well as their project management skills. Slower implementation has been discussed as one of the main issues in managing FYP manually [4]. For a small number of students, manual administration might not be a problem to the coordinator as well as the supervisors and students themselves. As the number of students gets bigger, this can be a troublesome. Thus, it is vital to use a system so that different parties can communicate more efficiently.

As the number of student increases, archiving and storing the Final Year Project (FYP) works will be a challenge too. The preceding records are tough to look for because of no centralized storage [14]. Due to the limited storage capacity, the records also have a tendency to be removed after a certain period. This might create redundancy in Final Year Project (FYP) titles for the students which is not desirable at all.

By implementing the FYPMS, the Faculty can expect improved project management, better supervision, reduced chances of project delays, and enhanced overall efficiency in the final year project process. Hence, we will highlight the importance of a system in order to manage and monitor students' Final Year Project (FYP) efficiently with less time-consuming. We will also do a preliminary

study on what such system might needed, including the functional and non-functional requirements. The following paragraph will continue with a literature review before going into details with the current process of registration and management of the students' FYP.

## 2. Methodology

This section discusses the methodology used in this project. The methodology used comprises of six phases:

    i.     Requirement Gathering
    ii.    Design & Analysis
    iii.   Software Development
    iv.   Testing
    v.    Launch
    vi.   Maintenance as shown in Figure 1.
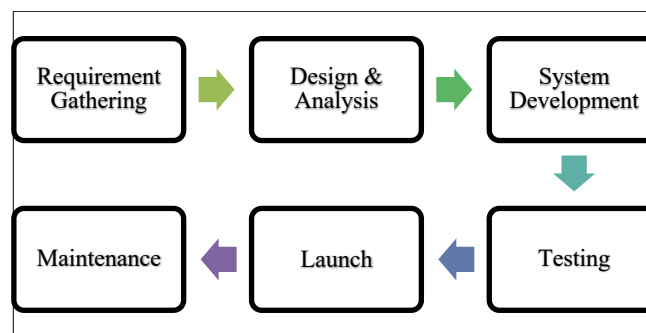


**Fig. 1.** Project development methodology

The first step, known as requirement gathering, which entails conducting an in-depth analysis of the project requirements and compiling a list of the characteristics necessary for the system. We conducted few interviews with the users and we investigated the criteria for selecting the most effective requirements in order to develop the system. Preparing the essential requirements and installing the software on the system are both required steps in this process. Finally, analysing the costs involved is the most crucial step in this phase, where the costs must consider all the project's functional and non-functional requirements that will be implemented in this system. The second phase is design & analysis, where this stage is fundamental to analyse the requirements gathered. Again, system analysis is vital in determining the project's needs. This phase will describe the confirmed specifications, features, and operations that will satisfy the functional requirements identified in the early stage.

After all the components are approved, the designing phase will visualize the idea in a few related diagrams. The diagrams are essential to the developer's development as a guideline. The third stage is the development stage. During this phase, the developer will develop the system using the software and tools that had been selected earlier. The system will be developed according to the scheduled timeline that had been established. Then, the finished system will undergo a testing phase. The testing phase will involve numerous stages, such as unit testing, system testing, and user acceptance testing. This phase aims to determine whether or not the application developed is ready for implementation. This phase will be conducted for a couple of times using different testing techniques. Once the testing phase is completed, the launch and installation steps will be executed to ensure the system is ready to be used by the user. The user manual will be presented in this phase,

as it is essential for the user to have it as a guideline. Finally, the system will be monitored regularly in the maintenance phase, where the system will undergo a trial period for one semester. We will collect data on user feedback for improvement and future enhancements during this trial period. In this paper, we will only discuss until software development. A prototype will be the output for this discussion.

The general idea of this project is depicted in the use case diagram, as shown in Figure 2 below. Typically, use case diagram is produced for the early stage of development to identify the context and requirements and validate a system architecture. Based on those figures, it shows the initial requirement of the system based on the early investigation and expected to change to achieve the project's objective and fulfil the user's needs. The diagram describes that the system will have four users, the FYP Coordinator, Students, Lecturer/Supervisor, and Examiner, as pictured by the four actors in the diagram. The accessibility of each user totally depends on the role and responsibility that they will take. They will be given the authority to the system by using the credential identity. As for students, they will start by registering the project title. Students can also view the suggested title entered by the potential supervisor.
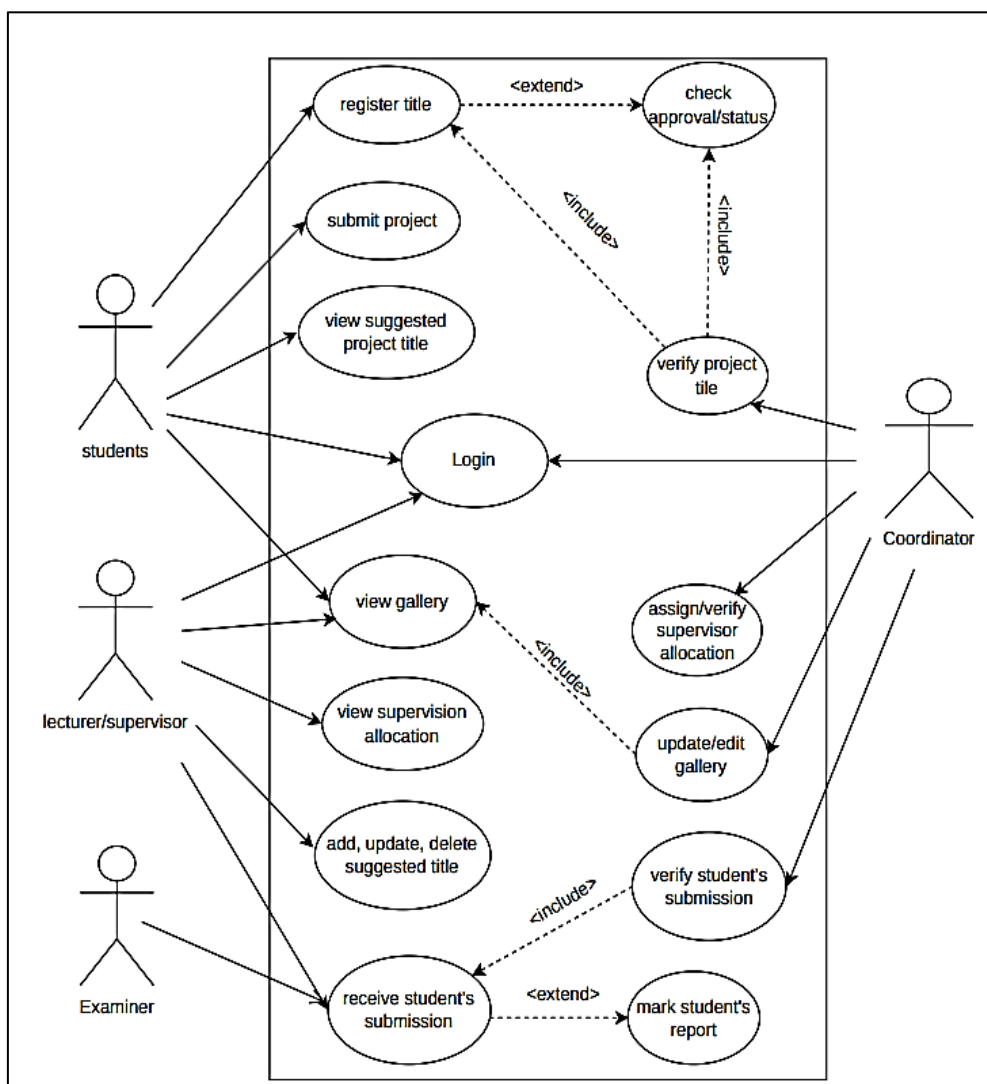


**Fig. 2.** Use Case Diagram FYPMS

Furthermore, students will use this system to turn in their progression works, which involves the proposal, chapters, and any related tasks. At the same time, lecturers will use the system to receive students' report and use this platform to grade the students' work. Lecturers can also post any suggested project idea according to their field. Lecturers are technically known as supervisors and examiners to the FYP students. Besides that, lecturers will have all administrative functions as they can edit, add or delete any related data that are included in their accessibility. Finally, the ultimate user is the coordinator. As the role of the coordinator is essential in Final Year Project management, the coordinator will have the most accessibility control as she/he is capable of doing many tasks in the system. The most significant task is to approve the students' project title by accessing the verification functions. The coordinator can also assign a student to any available supervisor if the student cannot find the supervisor alone. All the verification process is under coordinator accessibility as the coordinator plays a considerable role in managing FYP in the faculty. The detail of each task for each user are shown in Figure 2.

## 3. Results

This section discusses the project's system prototype. The PHP (Hypertext Preprocessor), JavaScript, and HTML (Hyper Text Markup Language) languages were used to write the system, and CSS (Cascading Style Sheets) code was used to design the interface. The system's database is MySQL. This system was created using Visual Studio Code, TablePlus, and SourceTree.

As mentioned in the previous section, this system has three (3) types of users. All users must log in to the system using their official institution email, which utilizes the Google domain. Figure 3 shows the login page of the system. Once a successful login is done, users will need to register their profile by entering their particular details. For lecturers, elements like position, area, and specialization are among the details they need to key in. Otherwise, students need to key in the details, such as their FYP course code and program. In UPTM, FYP is taken by final year students from both diploma and degree programs. This system can accommodate these two category levels of study.
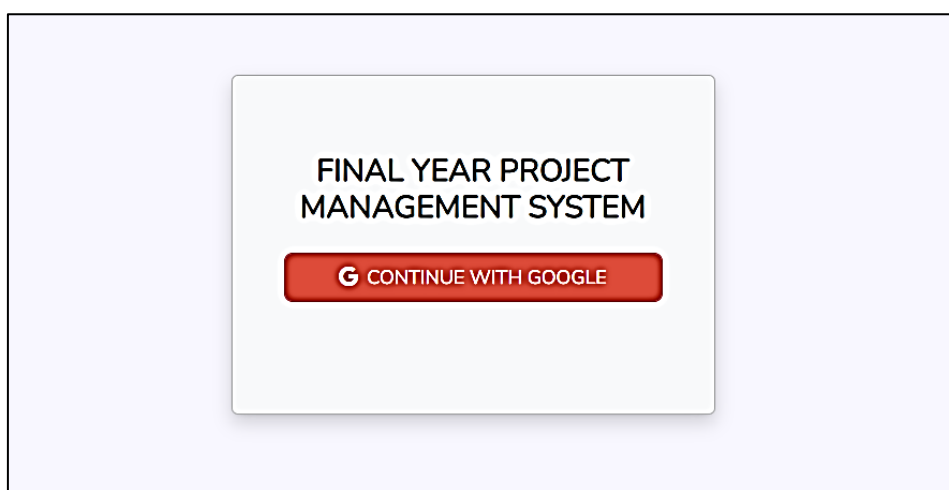


**Fig. 3.** Login page for all users

The system will redirect the user to the dashboard page once the registration is complete. Figure 4 depicts the lecturer's dashboard, which allows lectures to monitor all supervision operations. This system enables them to recommend project titles, review and accept proposals, assess, and perform a variety of other functions, as illustrated in the image. The interface's sidebar menu provides an alternate navigation link available in the lecturer's dashboard.
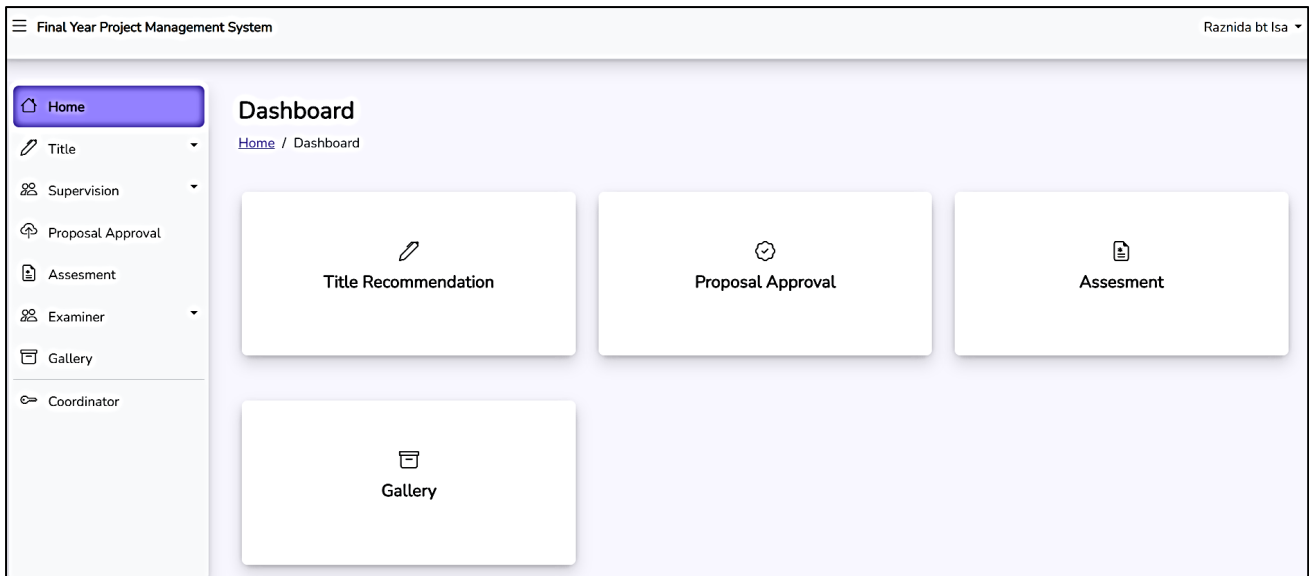
**Fig. 4.** Lecturer's dashboard

Figure 5 shows the admin/coordinator dashboard, which indicates the number of users, project title to approve, and semester session. As a system administrator, the coordinator has an extensive access to the system because they are responsible for monitoring the overall process of the FYP. This system significantly simplifies the coordinator's work because they can simply refer to this centralized information. Admin would also be able to examine all registered users and perform some action, such as double-checking the student's information to ensure it is correct and full. The admin page's detail function is displayed in the interface's sidebar menu. These are the tasks that the coordinator should perform during one semester of managing the FYP.
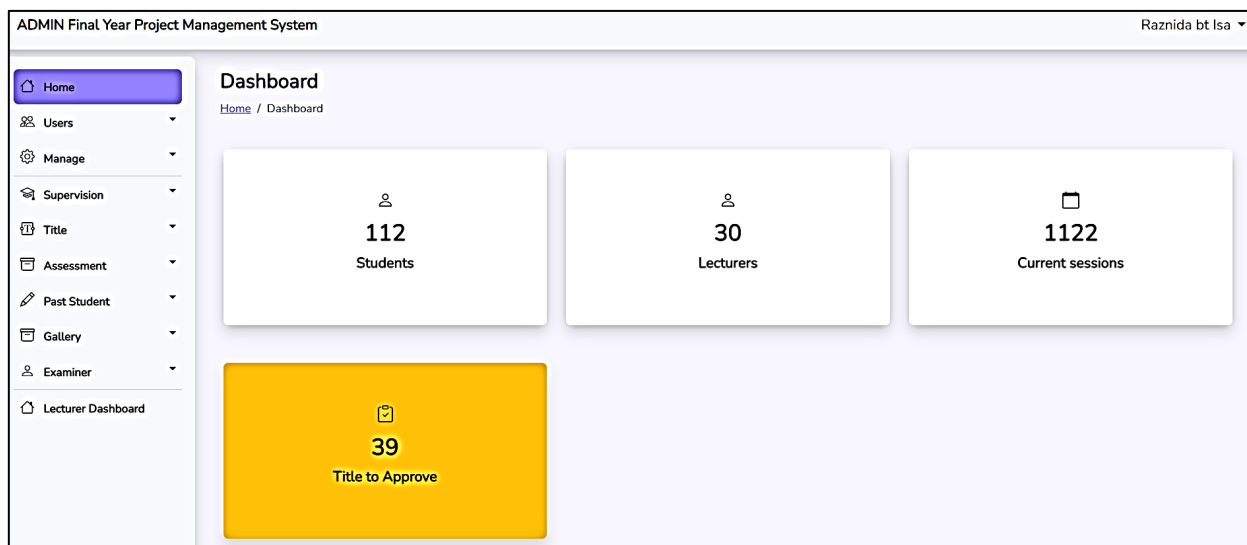


**Fig. 5.** Admin/Coordinator dashboard

Figure 6 depicts the page where the administrator/coordinator can manage users, either students or lecturers. Admin can access all registered user details and, if necessary, change or delete them. Aside from that, the admin might perform a variety of important activities to ensure that the process is properly controlled.
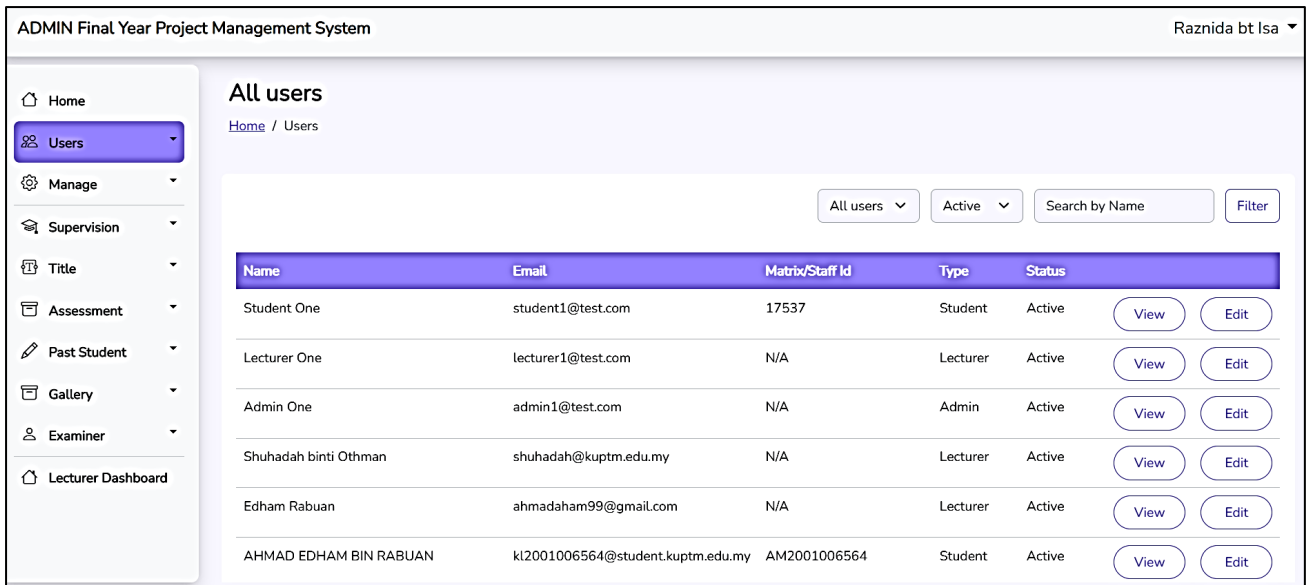
**Fig. 6.** Admin page to manage user (students)

The student will also be forwarded to the dashboard page once successfully logged in to the system, as presented in Figure 7. On this page, the system provides all the functions students can perform when enrolling in the FYP course. The students can register the proposed title and request a supervisor from any available lecturers. Furthermore, students will also use this system to submit their proposals and their final report. Other submissions can also be made through this system. The left side of the navigation bar displays information about students' activities
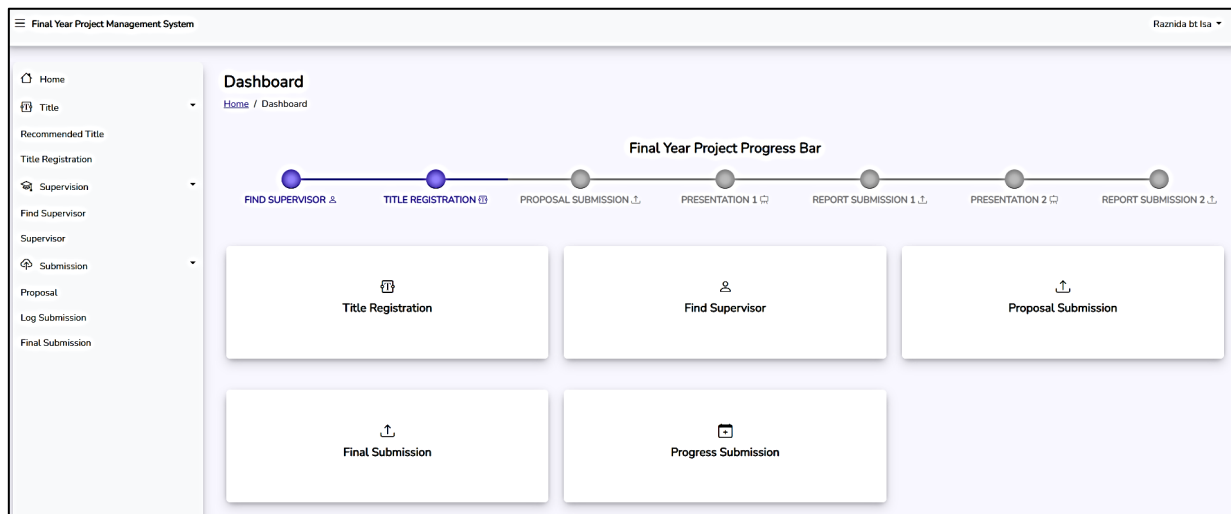


**Fig. 7.** Student's dashboard

. Figure 8 depicts the Title Registration page, which appears after students enter their proposed title. The most important feature of the student dashboard is a progress bar or timeline. This development timeline may enable them to track the progress of their FYP. The colour of the progress bar will be changed once students have completed all of the required tasks and have been checked by their supervisors. This progress meter would indicate whether or not the students are on track.
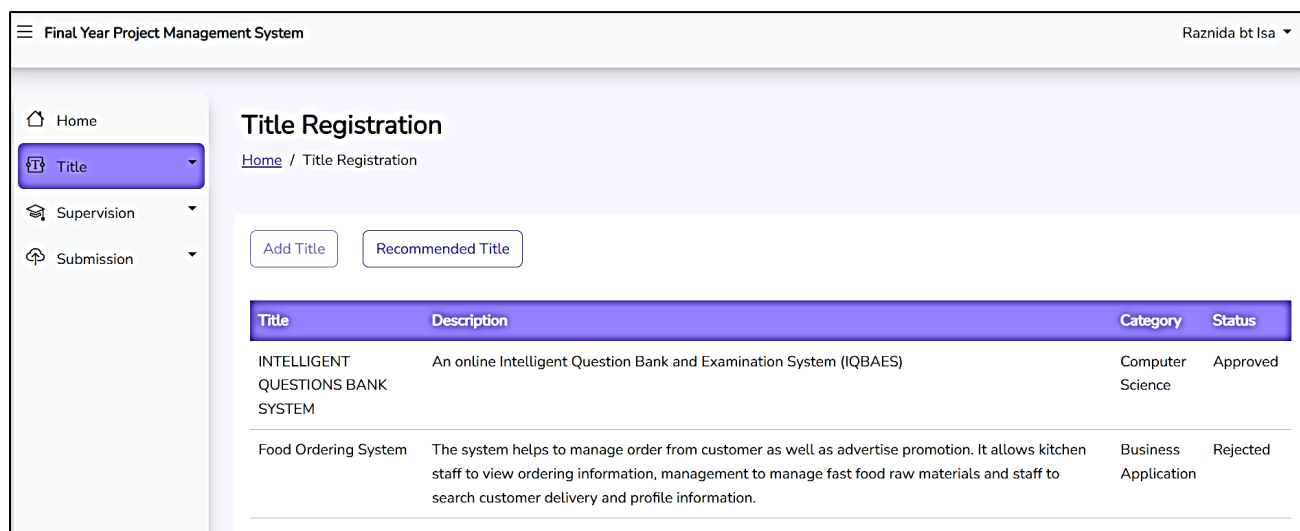
**Fig. 8.** Project Title Registration page

Technically, this system was built using visualization and dashboard approach concepts. This concept was chosen due to the large amount of information that must be processed and understood within this system. Data must be formatted thoroughly so that it can be easily viewed and understood. The dashboard concept allows for the visual display of various data in one location. Previously, data was only summarized in the form of a report. Technology advances, with dashboard concepts that are said to provide a high-level view of various data in one page [15]. Other research agrees on the use of dashboards due to the overload of information related to the continuous data increase that people must process in a short period of time [16]. As a result, business intelligence makes use of this dashboard tool to manage the situation. The main reason is to help stakeholders improve the performance of their tasks and make better decisions [17,18]. Despite the fact that the dashboard concept is widely used in managing financial information [19], sales information [20], health information [21], and human resource information [22], it is also appropriate for use in education. According to a study by [23], they use a dashboard concept approach to develop a system that can support students in an online learning environment. When students are participating in an online learning session, the system provides a recommender dashboard to assist them. In conclusion, a dashboard-based system is appropriate for use in the academic system because it includes decision-making processes that involves a large volume of data [24,25]. As a result, it would be preferable if the data could be visualized in a straightforward and simple manner. Since this FYPMS aims to centralize the information and processes involved in FYP management, it is very suitable to employ this approach.

## 4. Conclusions

A web based FYP Management System was developed to provide a comfortable environment of managing and monitoring academic performance of final year project in the Faculty of Computing and Multimedia UPTM. This project is a comprehensive solution to the problems faced by the previous manual FYP management process. This research will contribute to workload reduction of FYP coordinators, simplify the SOPs, protocol and increase the performance of all parties in the faculty. All the participants can interact with each other and exchange the information online. FYP progress can be monitored easily in one channel. The system enables multiple features for the coordinator and supervisor to monitor student assessments and markers' scores via the submission and grading module throughout the academic year. FYP supervisor will be able to utilize the system

to track the progress of student's projects using the project management tools included in the system. These features will help both students and supervisors, allowing the project to run more effectively even if face-to-face sessions are not held frequently. Students are given easy choice to manage and submit their work. Furthermore, the supervisor can keep track of all the FYPs that he or she has overseen, can do marking directly in the system. The lecturers also can view and keep track all the FYPs in the repository for each semester. The feasibility of the project is guaranteed so this project should really be developed and implemented. The FYP Management System is hoped to perform very well in enhancing the quality of FYP management in Faculty of Computing and Multimedia as well as in Universiti Poly Tech Malaysia.

## Acknowledgement

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