# Project Hub: Collaborative Platform for Student and Faculties

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## Abstract

In academic programs, especially for students pursuing a degree, projects are essential because they serve as a vital bridge between theoretical knowledge and practical application. It offers students the chance to take on real-world problems, which develops their creativity, critical thinking, and problem-solving skills. Centralized platforms revolutionize project-based learning by connecting students and faculty, streamlining management, and fostering innovation. The existing systems provide a number of features such as task assignment, document sharing, and communication tools. While they facilitate some level of collaboration, these platforms often lack comprehensive functionalities for diverse project exploration, real-time progress tracking, and efficient project allocation. These platforms predominantly rely on traditional methods, often failing to adequately promote student-faculty collaboration and efficient project management. Very often the Project Management Systems in the institute require a lot of paperwork, unable to efficiently track progress of project development and it is a time-consuming process. This platform emerges as an innovative solution to address multiple deficiencies faced by existing systems by providing a comprehensive project management system by fostering collaboration between students and faculty, offering remote accessibility, offering advanced project management tools, and enhancing user engagement through responsive design. It is providing features such as group formation, project tracking, ratings and feedback from faculties. Hence, Project Hub 's main goal is to transform an institution's project management system by establishing a creative and cooperative environment that improves the educational experience for faculties and students at educational institutions.

**Keywords: Project Management, Project Collaboration, Workflow Management, Project Coordination, Project Planning**

## 1. Introduction

In today's fast-paced educational landscape, fostering effective collaboration and innovation for the development of projects between students and faculty has become more critical than ever. The general idea about this study states that collaborative platforms for students and faculty revolutionize education by optimizing project-based learning. Acting as centralized hubs, these platforms connect students and faculty, streamline project management, and foster innovation. Offering features like efficient project allocation and real-time progress tracking, they empower students to explore diverse topics and contribute to interdisciplinary initiatives. Simultaneously, these platforms facilitate effective communication, creating a collaborative ecosystem that transcends traditional classroom boundaries. This paradigm shift signifies a holistic approach to education, embracing technology to create a dynamic and engaging global learning environment.

To gain more insights about the existing systems, it is seen that collaborative platforms in educational systems generally offer fundamental project management features, such as task assignment, document sharing, and communication tools[1]. Additionally, they may incorporate basic progress tracking functionalities. However, these systems often fall short in providing a diverse range of projects for exploration, fostering real-time collaboration, and optimizing the allocation of projects. The user interfaces may vary, and while they serve some collaborative purposes, there is room for improvement in creating a more engaging and comprehensive environment for students and faculty.

These existing collaborative platforms in educational systems often lack advanced features essential for an enriched learning experience. Specifically, these systems may not provide comprehensive tools tailored for faculty, resulting in challenges for efficient project allocation, real-time progress tracking, and seamless

collaboration. Additionally, there is a noticeable gap in offering a diverse range of projects for exploration, limiting students' exposure to varied topics and hindering their ability to engage in interdisciplinary initiatives. They are also constructed using outdated technology stacks, notably PHP and Vue3.0 Framework [2], which may limit their functionality and responsiveness. Moreover, this research reveals that many existing collaborative platforms are primarily designed for student use [6], lacking comprehensive functionalities tailored to the specific needs of faculty members.

Recognizing all the above issues, this study proposes a platform, "Project Hub: Collaborative Platform for Students and Faculty," emerges as an innovative solution aimed at redefining the educational experience. This is an innovative digital platform designed to enhance collaboration and project management within educational institutions. It empowers students to efficiently manage their academic projects while providing faculty members with real-time insights into project progress. The platform aims to overcome resistance to technological change, fostering a culture of collaboration and innovation. It offers various features, including project showcase, group formation, project collaboration, rating and feedback to enrich the educational experience. This project seeks to improve learning outcomes by promoting interaction, knowledge sharing, and creative engagement among students and faculties.

## 2. Literature Survey

M. Pannu et al [1] build a platform "Web based Project Management Systems for small to midsize businesses" which is an integrated application platform that combines project management with communication tools to automate tasks and record user actions. It offers detailed insights into company time, resources, and user utilization, enhancing business efficiency and optimizing resources. The system fosters transparency and teamwork through layered communication styles, eliminating micromanagement tendencies and promoting positive relationships. Adaptations were made to align with business needs and technical constraints, ensuring robust reporting and management capabilities.

The design and implementation of Project Management System Based on Vue3.0 Framework [2] paper presents a lightweight project management system based on the Vue3.0 framework for enterprise daily project management. The system facilitates the viewing, searching, creation, modification, and detailed information access of projects. Employing modular thinking in its design, it ensures a seamless transition between interfaces with a straightforward web design. Additionally, the system supports real-time updates of project management personnel's information related to the company's projects.

Information Technology (IT) companies face challenges in project management due to discrepancies in project scopes, timelines, and budgets, historically managed through time-consuming manual processes. Project Management Information Systems (PMIS) [3] have emerged as crucial tools to address these challenges, offering automated planning, scheduling, monitoring, and reporting capabilities. Successful PMIS implementation in Latvia and Slovenia is highlighted, emphasizing the importance of transparency, role clarity, alignment with organizational strategy, and top management support. Overall, PMIS is seen as a potential revolutionizing force.

The WebUPMS: A Web-based Undergraduate Project Management System [4] paper discusses the need to improve undergraduate graduation project administration in China due to rising student numbers and traditional methods' limitations. It highlights the potential of web-based learning platforms to revolutionize education by offering more opportunities at reduced costs. The paper introduces WebUPMS, a web-based undergraduate project management system developed by XIPT's Department of Computer Science. It discusses challenges, rationale for developing a custom database-backed web solution, functionality, implementation, experiments, and insights for future development.

Project Management and Evaluation system Using Node JS [5] is a social platform for students to showcase their projects in a dynamic environment. It aims to help students understand and contribute to others' projects, especially major projects that are essential for graduation. The application helps students identify their capabilities and develop projects accordingly. It also provides a live project tracking system based on factors like interest, milestones, and grades. The homepage showcases the top 10 projects, organized by their rankings. This feature aids students in efficiently discovering solutions to problems and managing their projects more effectively.

The Engineering Final Project Supervised in an Adaptive Way With Moodle Support [6] paper discusses the evolution of Final Degree Projects (FDPs) in Spanish engineering degrees within the European Higher Education Area (EHEA), emphasising the need for personalised learning experiences. It highlights the unique

characteristics of FDPs, such as the absence of traditional lectures and individual tutoring, and the challenges associated with administering them. The authors propose an adaptive hypermedia system to customize learning experiences according to students' profiles, progress, and needs, drawing on successful experiences in adaptive systems in various educational contexts. The proposed method aims to improve student outcomes, understand the impact of adaptive learning systems, provide valuable information for FDP course management, and identify weaknesses in the current process.

The Online Project Assessment and Supervision System (oPENs) [7] serves as the standard platform for Final Year Project (FYP) courses within UiTM campuses that offer the Diploma in Electrical Engineering (DEE). Its primary objective is to streamline communication and coordination among lecturers, students, and course coordinators throughout the FYP process. oPENs incorporates two key components: project evaluation and weekly report monitoring. In contrast to the current system, where hard copies of FYP1-related documents, including project approval forms, evaluation forms, and project progress validation forms, must be physically submitted to the course coordinator, oPENs offers a digital solution for enhanced efficiency.

The paper A Streamlined Approach to Enhance the Capacity of Undergraduate IT Students to Deliver High Quality and Demand-Driven Final Year Project: A Conceptual Framework on Collaboration between Industry and University [8] tells that the Final year projects (FYPs) are crucial in academic training, especially in fields like computer science and information systems. They provide a capstone experience, allowing students to deepen their understanding of complex phenomena. However, challenges like poor planning, unrealistic expectations, methodological difficulties, isolation, and inadequate supervision can arise. FYPs develop both hard and soft skills, and are incorporated into degree programs. The Malaysian Ministry of Higher Education mandates the incorporation of soft skills into degree programs. Educational approaches like outcome-based education and project-based learning have been shown to positively impact student performance and skills development.

The project's goal is to create a web portal for project management that will allow Project Coordinators, Project Guides, and Students to collaborate more effectively. Currently, these tasks are completed manually, resulting in inefficiencies and time-consuming processes. The proposed system [9] aims to automate a variety of processes, including project proposal requests, project guide allocation, project activity submission and evaluation, and report generation. By implementing this web portal, all three entities' workloads will be significantly reduced, streamlining communication and documentation processes. This initiative addresses the growing demand for efficient project management systems in educational institutions.

Project management adopts a collaborative approach encompassing planning, organization, direction, and resource control to attain short-term goals. It brings together teams, public entities, and agencies, crafting a vision for success. Proper project management has a positive impact beyond the delivery of tasks. Projects in Nepal [10] face issues due to inadequate planning, poor communication, inefficient task management, lack of accountability, inadequate monitoring, and haphazard scheduling. Improving project management, implementing policies, controlling corruption, and controlling politicization are major actions needed for overall success.

## 3. Problem Statement

The educational institute faces a notable challenge in fostering meaningful collaboration between students and faculty during the phase of project development, while providing efficient mechanisms for project management and evaluation. The lack of a centralized platform inhibits students from showcasing their skills and project ideas, hindering community-based learning and knowledge sharing. Traditional methods, often paper-based, lack flexibility and interactivity, impeding effective knowledge exchange. Faculty, though experts, may struggle with adapting to the digital age, limiting their guidance in project-based learning. Current educational institutions lack effective tools for project management and evaluation, resulting in a fragmented process. The project, "Project Hub: Collaborative Platform for Students and Faculty," endeavors to tackle these challenges by presenting a cohesive platform that fosters collaboration, showcases projects, and enables real-time progress tracking. This transformative solution seeks to promote a culture of collaboration, innovation, and skill development, enhancing educational opportunities and preparing students for the modern workforce.

# 4. Proposed System

### A. Requirement Gathering

Identifying the need of a project is a crucial step in the software development phase. The primary objective in the requirement analysis stage of the project management platform is to correctly determine the functional and non-functional requirements of the wide user base, which includes Administrators, Faculties, and Students. To promote a safe environment, we must make sure the platform provides intuitive user authentication and role-based access management. To optimize project workflows and improve co-operation, functionality like task management, group formation, progress tracking , guide allocation and powerful communication tools are crucial. To ensure a responsive, reliable, and user-friendly experience, non-functional criteria like scalability, security, usability, and performance are equally important.

### B. System Flow Diagram

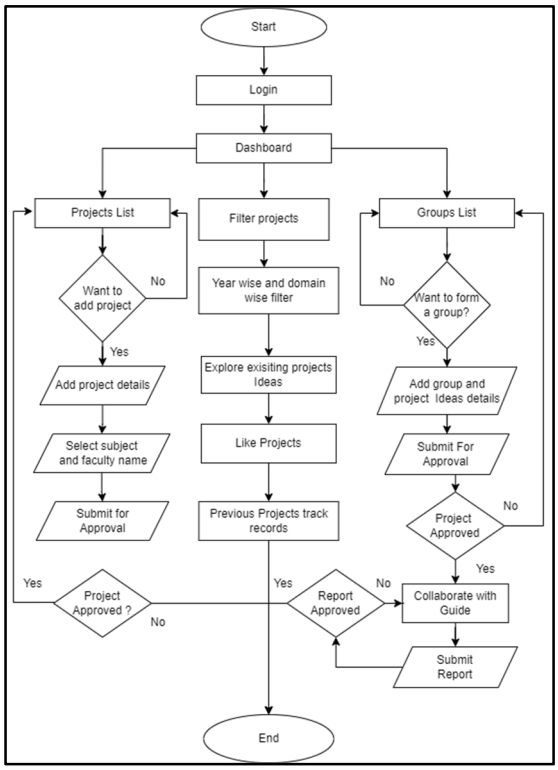


Fig (1). Flow Diagram

### C. Designing and Modelling

Building an interactive design and model is required to successfully develop a project. It involves creating a blueprint that outlines the platform's architecture, user interfaces, and data structures. Designing and modelling a project management platform includes the following steps:

**1. Database Schema:**

To manage user profiles, project data, tasks, files, and related information successfully on this platform, a well-structured database schema must be created. The relationships and constraints between the different database tables is clearly defined by the schema. NoSql database is used to store project and user details. Such a structured schema improves data organisation, retrieval, and system performance, improving the platform's overall usability.

- Each Student can be a member of multiple Groups (many-to-many relationship).
- Each Group can submit multiple Project Ideas (one-to-many relationship).
- Faculty can be a guide of multiple groups (one-to-many relationship).
- Every Project Idea must be submitted by one group (one).
- Each Project Idea is approved by one or more Faculty members (many-to-many relationship) as shown in figure (2)

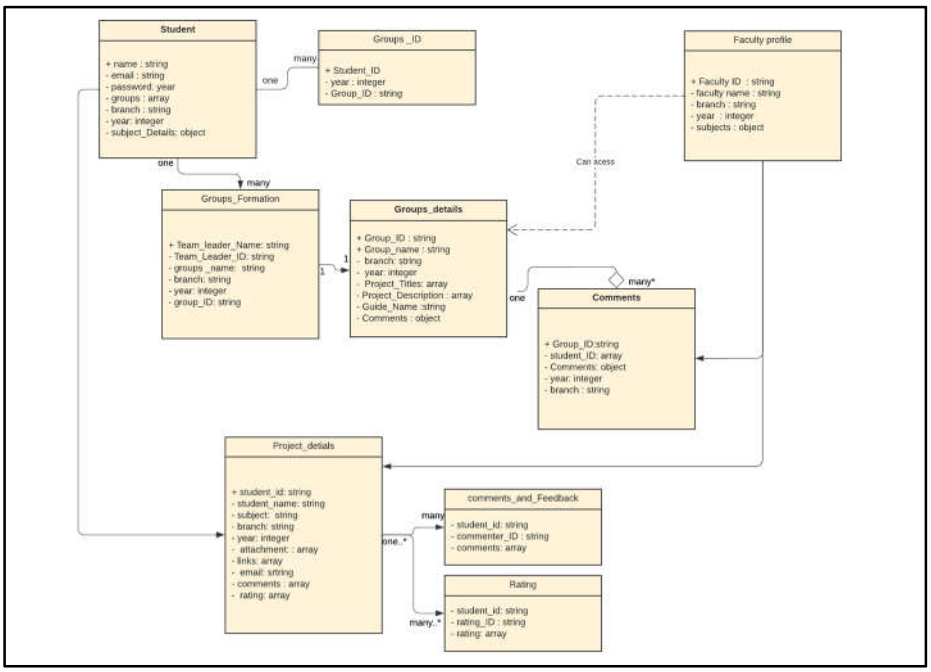


Fig (2). ER Model

**2. Use Case Diagram:**

The use case diagram will provide a visual representation of interaction between Students, Faculty and Admin in a particular institute as shown in figure (3). This platform comes with three different dashboards: student dashboard, faculty dashboard and admin dashboard ensuring seamless performance and security. Each user of this system comes with different accessibility. Each Panel has a different login system as shown in figure (4).

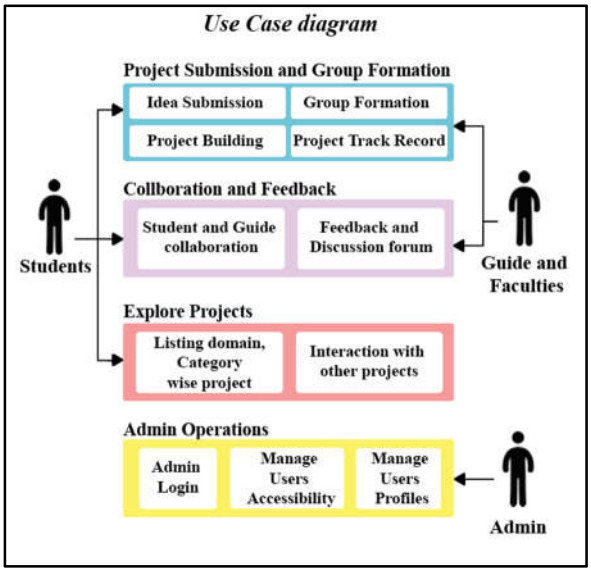


Fig (3). Use-case Diagram

A. **Student Dashboard:** This dashboard offers a variety of features, including

- Idea submission: Students can submit various ideas to their respective guide.
- Explore existing project ideas: As shown in figure (5) students can explore various projects on the basis of different domains, categories and technologies.

- Group Formation: Students can form groups for their projects according to their choice as shown in figure (6).
- Student Guide Discussion: Students can communicate with guides during the development of their projects using this platform.
- Project Track Record: Students can keep a track record of their semester wise projects. This will help them to create a portfolio of their academic projects as shown in figure (7).

B. **Faculty Dashboard:** This dashboard offers a variety of features, including
- Collaboration and Feedback: During the development of the project, faculties can communicate with students and help them to solve their queries by giving them valuable feedback.
- Task allotment and Project Approval: As shown in figure (8) faculty members can assign multiple tasks to students during the development of their projects and can simultaneously approve projects.
- Project Records: Faculties can maintain students' project records as per their subjects remotely as shown in figure (9).

C. **Admin Dashboard**: This dashboard offers a variety of features, including
- Manage user Profile: Admins can manage profiles of different users such as students, faculties and admin itself.
- Access management: The admin can manage the access of various users using this platform.
- Maintain Database: As shown in figure (3) admin can manage databases of user academic project records using this centralized platform.

## 5. Hardware and Software Requirements

**A. Hardware Requirements:**
- Desktop Computer / Laptop with Internet Connection
- Min 2 GB RAM
- 32/64 Bit CPU

**B. Software Requirements:**
- Web Browser: Google Chrome, Mozilla, Firefox (all latest versions).
- HTML5, CSS Javascript5, React.js, Nodejs (all latest version)
- MongoDB Database
- Tailwind CSS (Styling)

## 6. Results and Discussion

The project has successfully integrated a robust authentication system for students and faculty, prioritizing security measures. It has accomplished the development of a streamlined process for project submission and approval as shown in figure (9), enhancing overall project management efficiency. Additionally, it has also achieved a responsive design for both student and faculty dashboards, ensuring a seamless and optimized user experience across a variety of devices.

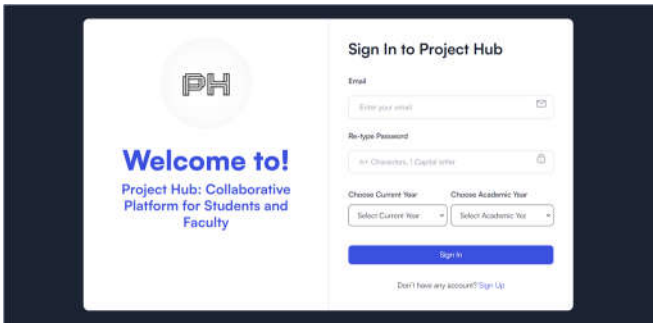

Fig (4). Login Page

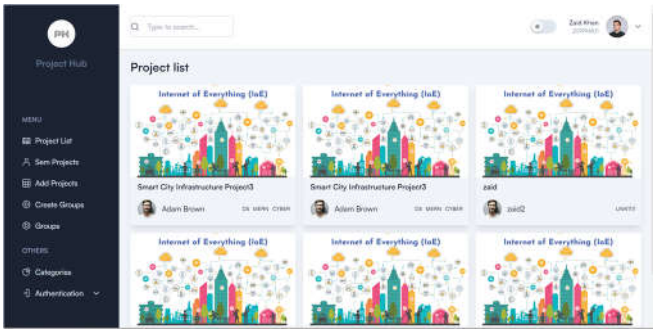


Fig (5). Homepage

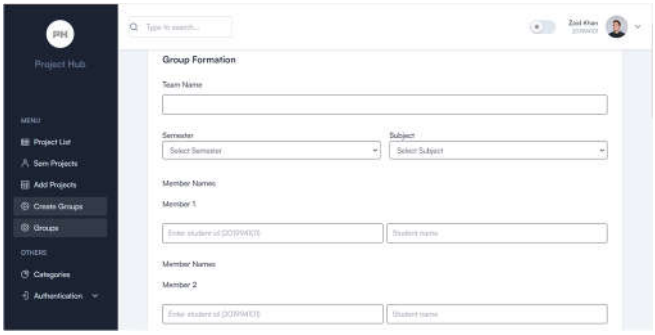


Fig (6). Group Formation Page

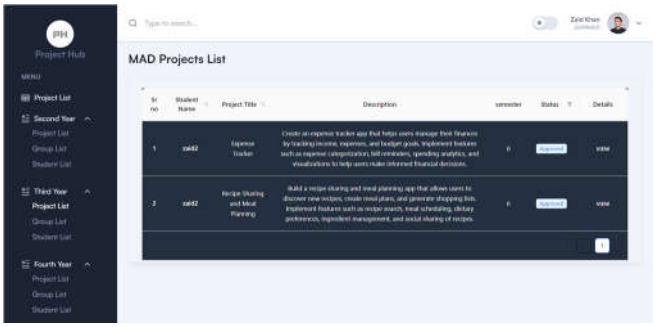


Fig (7). Project Tracking Page

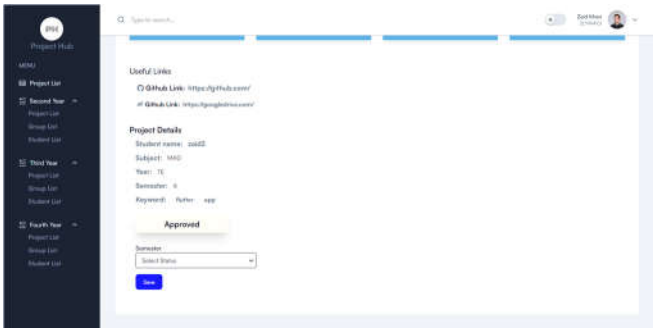


Fig (8). Project Approval Page At Faculty Side

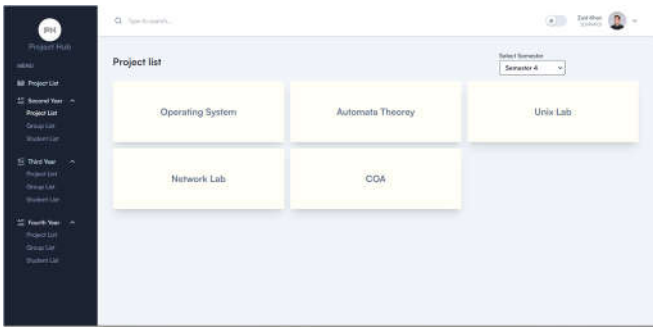


Fig (9). Subject Wise Project

## 7. Conclusion

In summary, "Project Hub" signifies a significant advancement in transforming the educational landscape by addressing challenges related to collaboration, engagement, and innovation in educational institutions. It offers a dynamic and user-friendly platform for students and faculty to interact, manage projects, and improve the overall learning experience.

"Project Hub" serves as a hub for networking, skill development, and exposure to novel ideas, nurturing a vibrant educational ecosystem. Faculty members find it more convenient to monitor project progress and offer timely guidance, thereby enhancing the educational process. This platform enables faculties to oversee student progress and project development skills, crucial for providing guidance at the right junctures. By leveraging cutting-edge technology, dynamic data loading, meticulous record tracking, and ensuring both security and cost-effectiveness, Project Hub innovates the field of project management.

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