LearnHub: Your Center for Skill Enhancement

PROJECT REPORT

1.Introduction

1.1 Project Overview

LearnHub is an online learning platform designed to simplify skill development and course management.It allows students to enroll in courses, track progress, and earn certificates.Instructors can create, manage, and deliver course content effectively.The platform features secure authentication, role-based access, and cloud file handling.LearnHub ensures scalability, user-friendly design, and personalized learning experiences.

1.2 Purpose

The purpose of **LearnHub** is to provide a structured, accessible, and secure platform for online learning, where students can enhance their skills and instructors can effectively create and manage courses. The goal is to make education engaging, flexible, and scalable for a wide range of users.

2.IDEATION PHASE

2.1 Problem Statement

Many learners struggle to find a structured and interactive platform to enhance their skills, while instructors face challenges in managing and delivering content effectively. Existing platforms often lack simplicity, role-based features, and personalized progress tracking, making it hard for users to engage in a seamless learning experience.

2.2 Empathy Map Canvas

The **Empathy Map** for LearnHub highlights the needs and experiences of a typical student user. Learners often think about finding a structured, easy-to-use platform that helps them gain real skills and track their progress. They feel frustrated with complex or cluttered systems and are motivated by visible achievements like certificates.

They observe that many platforms lack consistency or personal guidance and often hear from peers and social media about the importance of upskilling. Students say they want a simple, distraction-free environment and tend to drop out of courses that lack engagement or clear progress paths.Their main pain points include difficulty in tracking progress, lack of motivation, and overwhelming interfaces. What they truly seek is a clean, guided, and personalized learning experience that allows self-paced growth, skill validation, and real outcomes.

Example: LearnHub

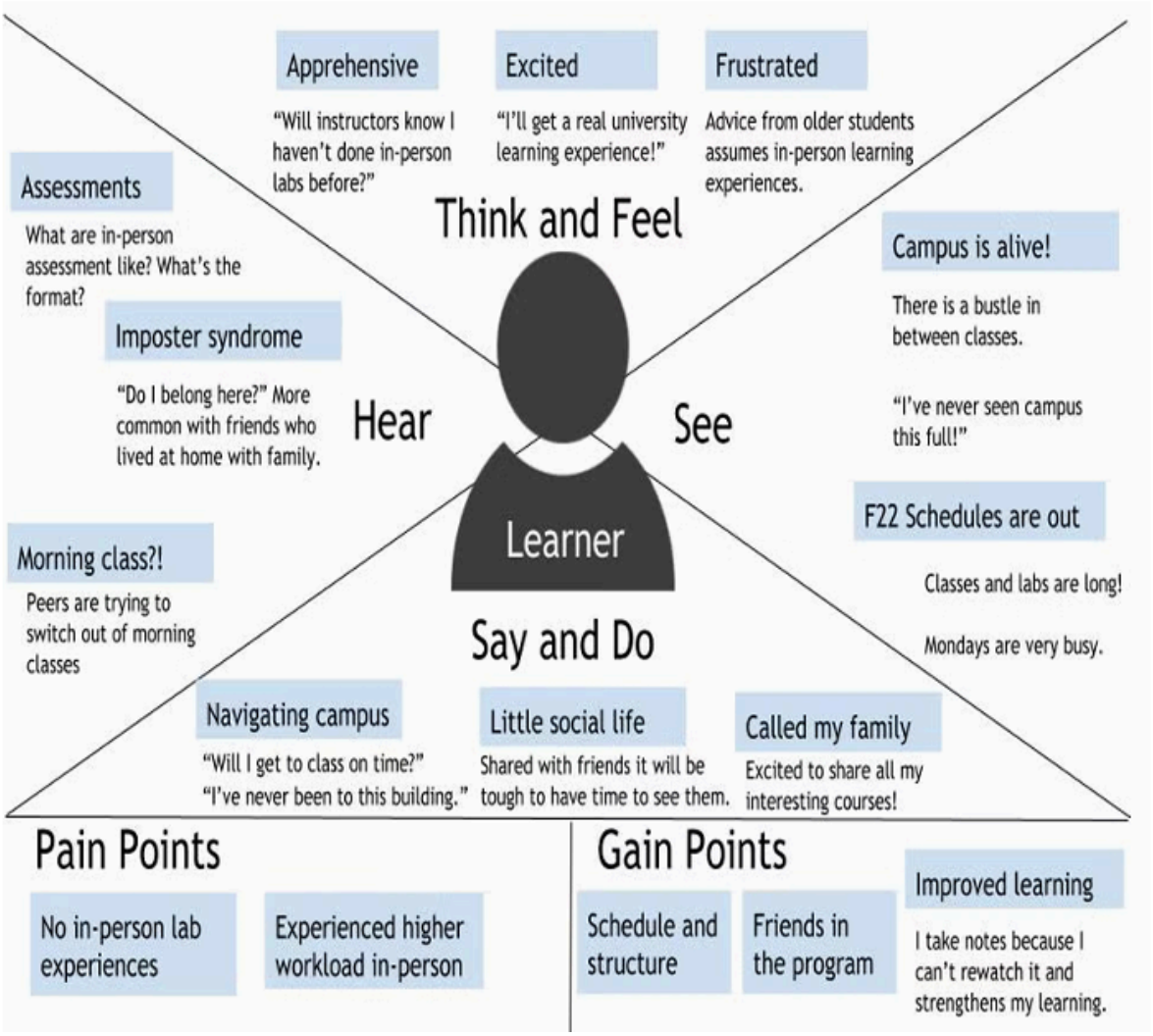


Fig: Empathy Map Canvas for LearnHub

2.3 Brainstorming

The brainstorming process for **LearnHub** focused on identifying the core challenges in existing online learning platforms and generating innovative solutions to address them. Key problems included a lack of structured learning paths, poor progress tracking, and limited tools for instructors to manage content effectively. To overcome these, ideas such as role-based dashboards, course creation with multimedia content, quizzes, automated certificate generation, and real-time interaction features were proposed. Technically, the platform would use MongoDB for scalable data storage, Cloudinary or AWS S3 for media uploads, and secure JWT-based authentication.Additional enhancements like live class

integration, AI-based course recommendations, gamification elements, and notification systems were also considered to boost engagement and personalization.

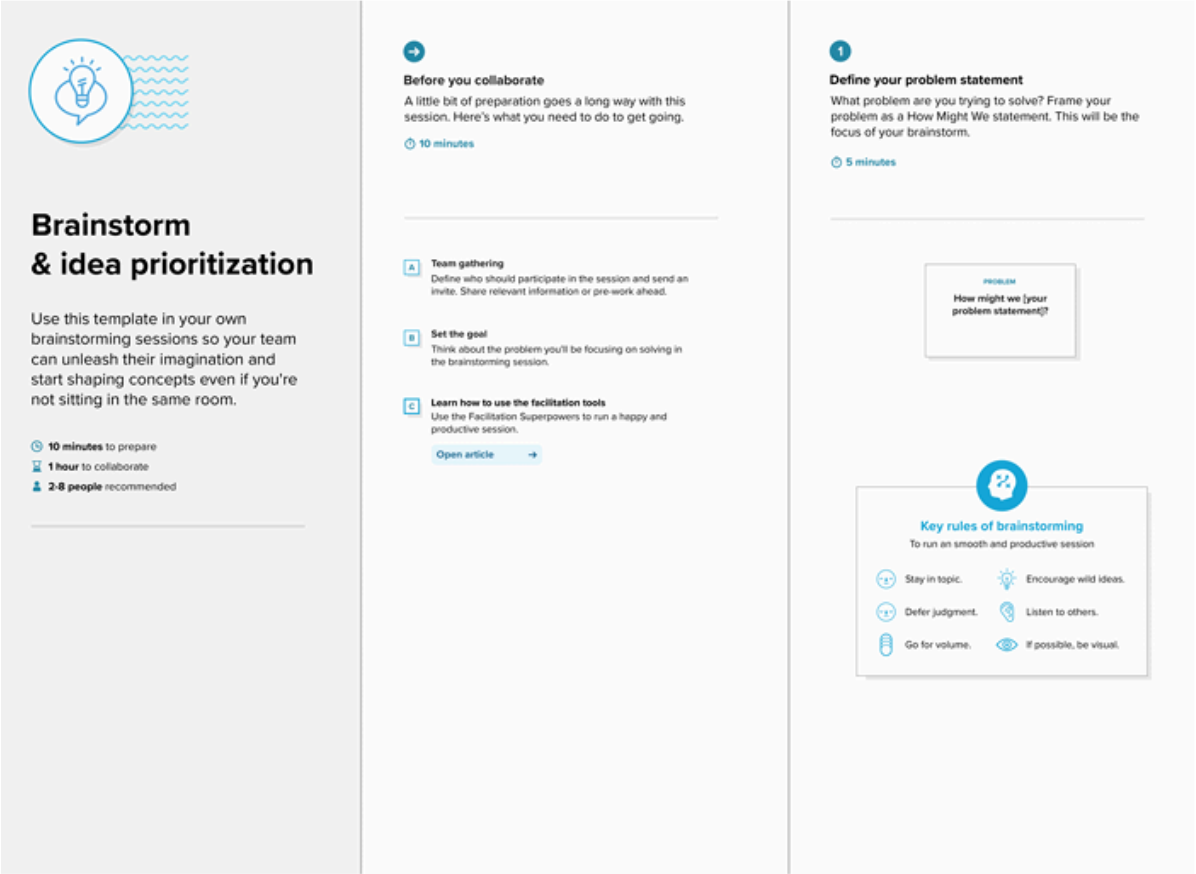


Fig: Brainstorming

- To address these, LearnHub is designed with role-specific dashboards (student, instructor, admin), intuitive course management tools, interactive quizzes, and auto-generated certificates.
- Additional features like progress tracking, discussion forums, and personalized dashboards ensure an engaging and structured learning experience.
- On the technical side, ideas included using a MERN stack (MongoDB, Express, React, Node.js), JWT for secure login, cloud storage for handling large media, and CI/CD pipelines for streamlined deployment.
- Future enhancements were also brainstormed, such as real-time chat between learners and instructors, integration of video conferencing tools for live sessions, AI-based skill path suggestions, gamification through badges and leaderboards, and multilingual support to reach a wider audience.
- The vision is to create a scalable, interactive, and student-centered platform that empowers both learners and educators through technology.

3. REQUIREMENT ANALYSIS

3.1 Solution Requirements

Functional Requirements-Learnhub

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	**User Authentication**	Sign up,Login,Password Reset OAuth login using Google/Github
FR-2	**Course Creation**	Instructors can create new courses.
FR-3	**Application & Enrollment**	Student will log course,Learn a course

Non-functional Requirements:

NFR No.	Non-functional Requirement	Description
NFR-1	**Usability**	The platform provides a simple and effective platform for users to learn, teach, and track skill development.
NFR-2	**Security**	It ensures secure user data and access through encrypted authentication, role-based permissions, and protected content delivery.
NFR-3	**Performance**	This delivers high performance with fast content loading, smooth user experience, and scalable infrastructure to support growing users.
NFR-4	**Availability**	That ensures high availability with reliable uptime, cloud-based hosting, and continuous access to learning resources anytime, anywhere.
NFR-5	**Scalability**	Built to scale efficiently, supporting increasing users, courses, and features without compromising performance or

		reliability.

3.3 Data Flow Diagram (DFD)

- Level 0: User -> Login/Register -> Dashboard -> Registration Form -> Progress Tracking
- Level 1: Admin -> Manage Users & Agents -> Assign Course -> Update new Course

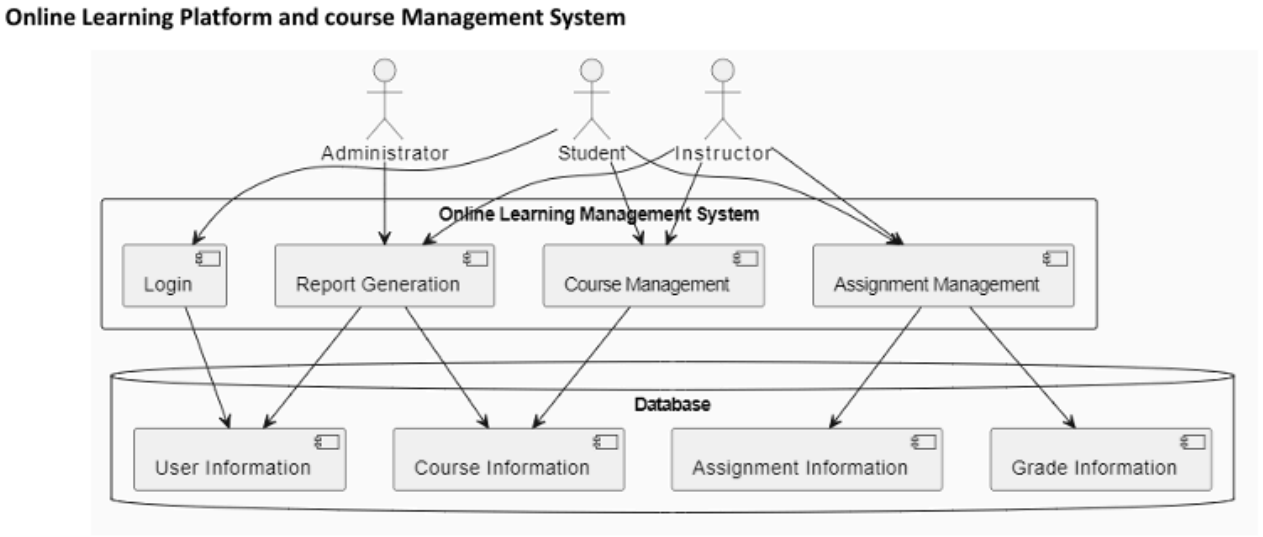


Fig: Data Flow Diagram of LearnHub

3.4 Technology Stack

- Frontend: React.js, Bootstrap, Material UI
- Backend: Node.js, Express.js
- Database: MongoDB, Mongoose
- Authentication: JSON Web Tokens (JWT)
- Tools: Postman, Github, VSCode

4. PROJECT DESIGN

4.1 Problem-Solution Fit

Many learners struggle to find a structured, engaging, and easy-to-use platform for developing skills, while instructors face challenges in creating and managing content efficiently. Most existing platforms either lack personalization, are too complex, or fail to track student progress effectively.

Purpose:

- To provide a structured and accessible platform for online learning.
- To help students learn new skills, track progress, and earn certifications.

- To enable instructors to create, manage, and deliver courses easily.
- To ensure a secure, scalable, and user-friendly digital learning experience.

Problem Statement:

- Learners face difficulty finding a structured and user-friendly platform for skill development.
- Existing platforms often lack personalized progress tracking and certification.
- Instructors struggle with complex tools for course creation and content management.
- There is a need for a secure, scalable, and interactive learning environment for all users.

Solution:

LearnHub, a full-stack online learning Platform,which offers:

- Provide a structured and intuitive platform for students to learn and track progress.
- Offer role-based dashboards for students, instructors, and admins with tailored features.
- Enable instructors to easily create, manage, and deliver multimedia-rich courses.
- Ensure secure authentication, cloud storage, and scalable performance for all users.

4.2 Proposed Solution

Proposed Solution for Learnhub:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Learners struggle to access structured, flexible online education with progress tracking and certification. Instructors face difficulties in managing and delivering engaging course content effectively.
2.	Idea / Solution description	LearnHub provides a user-friendly platform where learners can take structured courses, track progress, and earn certificates. Instructors can easily create, manage, and deliver content to engage students effectively.
3.	Novelty / Uniqueness	1.Different views for students, teachers, and admins. 2.Tracks learning progress step by step. 3.Chat, live classes, and instant certificates.
4.	Social Impact / Customer Satisfaction	1.Accessible Learning for all, anytime and anywhere. 2.Easy Course Experience with smooth navigation and progress tracking. 3.Empowers Instructors to teach and reach more students online.

5.	Business Model (Revenue Model)	Free access for users.

4.3 Solution Architecture

The **solution architecture** of LearnHub is designed to be scalable, secure, and user-friendly, enabling a seamless online learning experience. The frontend is built using **React.js**, offering a responsive, role-based interface for students, instructors, and admins to interact with course content and track progress. The backend, developed with **Node.js and Express.js**, handles core functionalities such as user registration, login, course management, certificate generation, and secure API routing.

- **MongoDB** with **Mongoose** is used as the database to store structured data like users, courses, progress, and feedback in a flexible and scalable way.
- For media content such as videos and PDFs, **cloud storage solutions** like Cloudinary or AWS S3 are integrated to ensure efficient and secure file handling. **JWT** and **bcrypt** are used for secure authentication and role-based access control, ensuring data protection and privacy.
- The platform is deployed using **Vercel** for the frontend and **Render or Railway** for the backend and database, with CI/CD pipelines supporting automated deployment and updates.

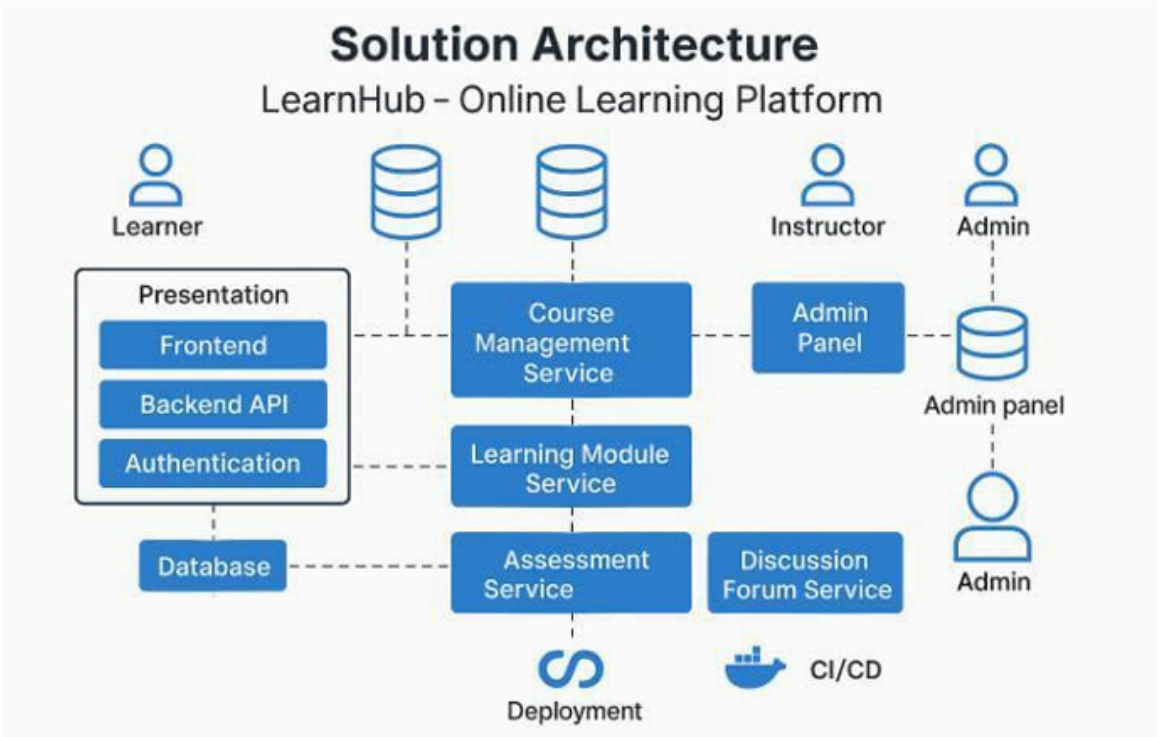


Fig: Solution Architecture for LearnHub

5. PROJECT PLANNING & SCHEDULING

5.1 Project Phases

- Requirement Gathering & Analysis
- Planning & Design
- Frontend & Backend Development
- Database Integration
- Cloud & Media Integration
- Testing & Debugging
- Deployment
- Feedback & Enhancement

Product Backlog & Sprint Schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	User Registration	USN-1	As a User,I can sign up and login securely.	2	High	Kondareddy Kiran Kumar
Sprint-1		USN-2	As a User, I can reset my Password.	1	High	Kondareddy Kiran Kumar
Sprint-2	Course Registration	USN-3	As a user, I can handle the course list.	2	Low	Kurra Madhu Priya
Sprint-3	Application	USN-4	As an instructor,I can instruct new courses.	2	Medium	Kistaparapu Sai Durga
Sprint-3		USN-5	As a Student,I can register for a course.	1	High	Kistaparapu Sai Durga
Sprint-4	Dashboard	USN-6	As a Student,I can earn a Course Certificate.	2	Medium	Kodipilla Poojitha

Sprint-4		USN-7	As an Instructor,I can review course progress.	3	Low	Kodipilla Poojitha

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	8 Days	16 June 2025	23 June 2025	20	23 June 2025
Sprint-2	20	8 Days	17 June 2025	24 June 2025	20	24 June 2025
Sprint-3	20	8 Days	18 June 2025	25 June 2025	20	25 June 2025
Sprint-4	20	8 Days	19 June 2025	26 June 2025	20	26 June 2025

6.FUNCTIONAL AND PERFORMANCE TESTING

Testing Scope:

- Functional Testing
- API & Database Testing
- UI/UX Testing
- Out of Scope

Requirements to be tested:

- As a Student, I should be able to sign up, log in, and access my dashboard.
- As an Instructor, I must be able to register and log in as an instructor.
- As an Admin, I should be able to manage all users (students and instructors).

Testing Environment:

- **URL:** https://learnhub.example.com

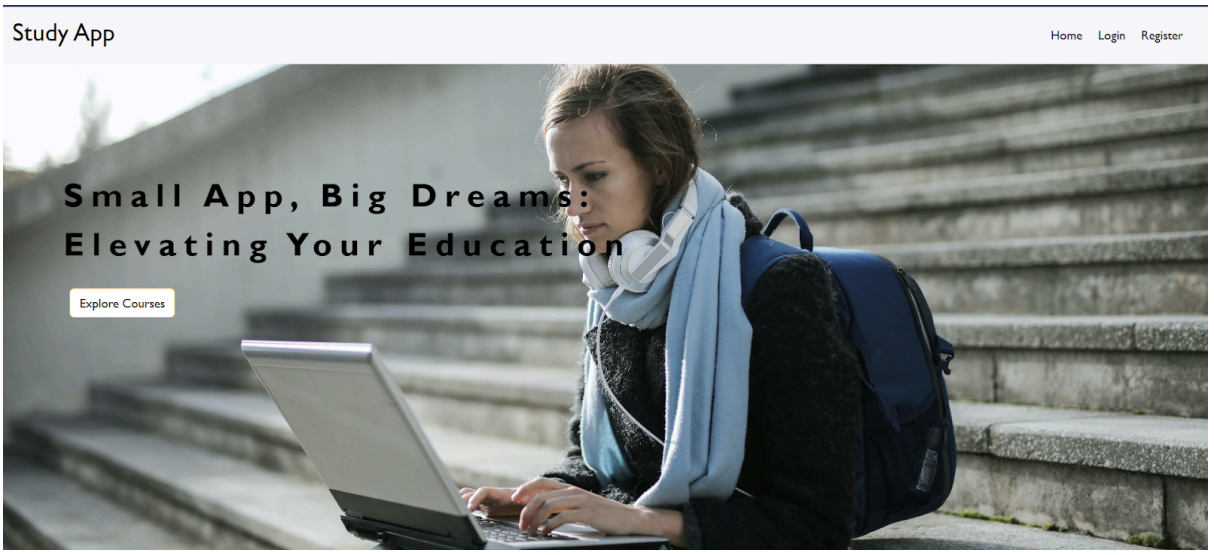
Test Cases:

Test Case ID	Test Scenario	Test Steps	Expected Result	Actual Result	Pass/Fail
TC-001	User Registration	1. Visit Site 2. Click Register 3. Enter required details and submit	To be registered.	Account created, Redirected to Home.	[Pass/Fail]
TC-002	Post a job (Student)	1. Login as Student 2. Go to Dashboard 3.Enroll a Course form	To get an Enrolled course.	Enrolled course appear in the dashboard	[Pass/Fail]

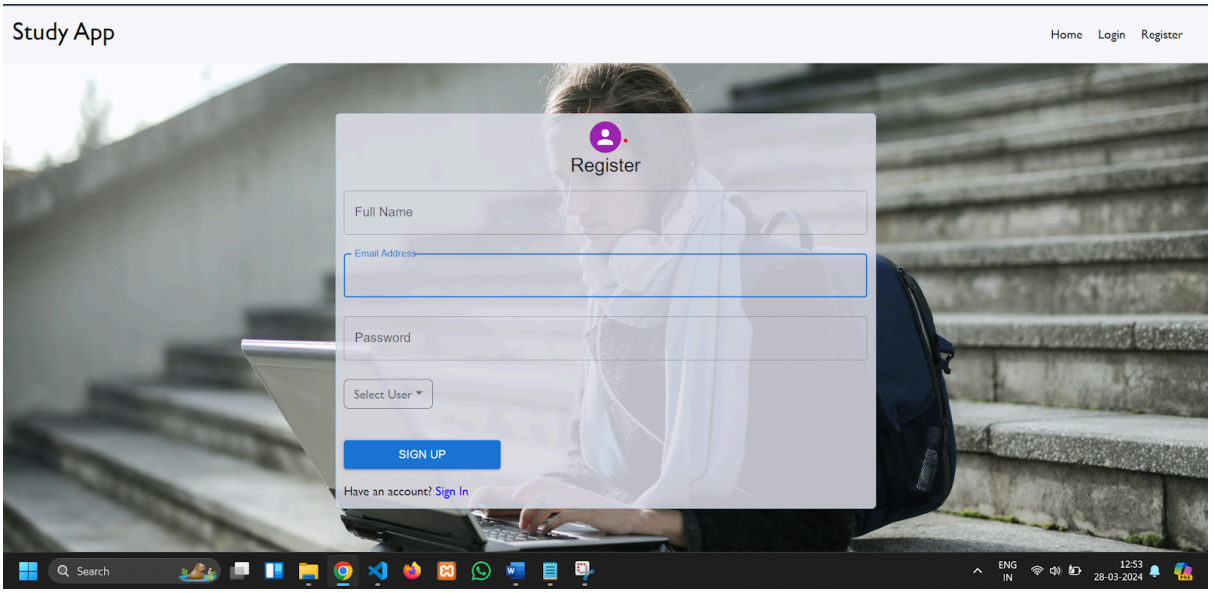
7.RESULTS

Screenshots:

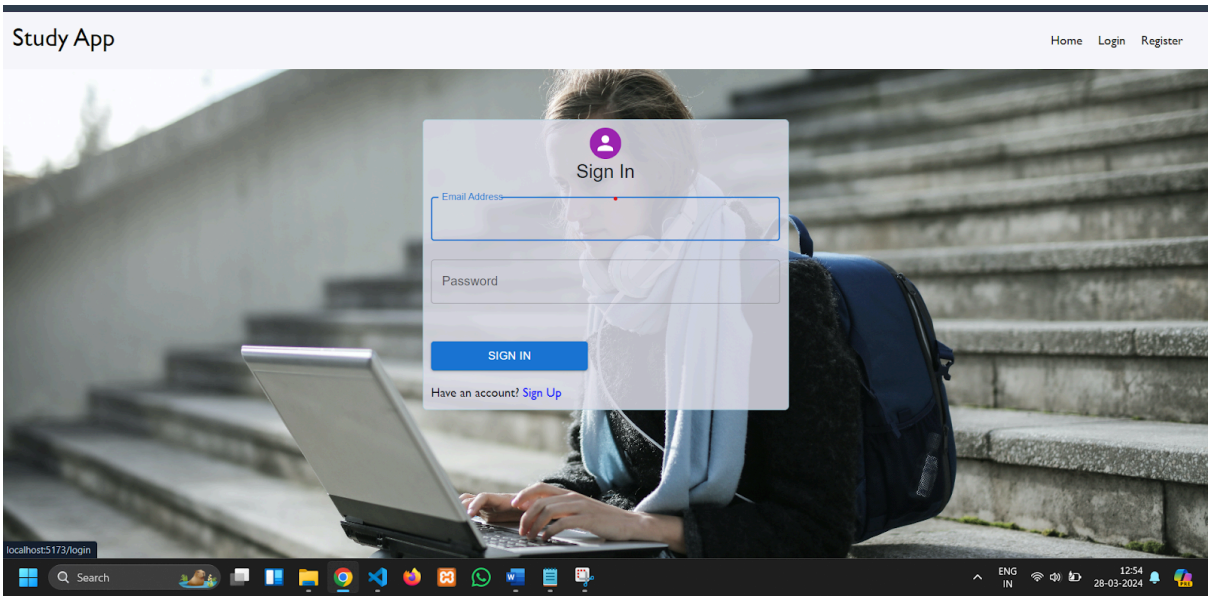
- **Home Page**



- **Register Page**

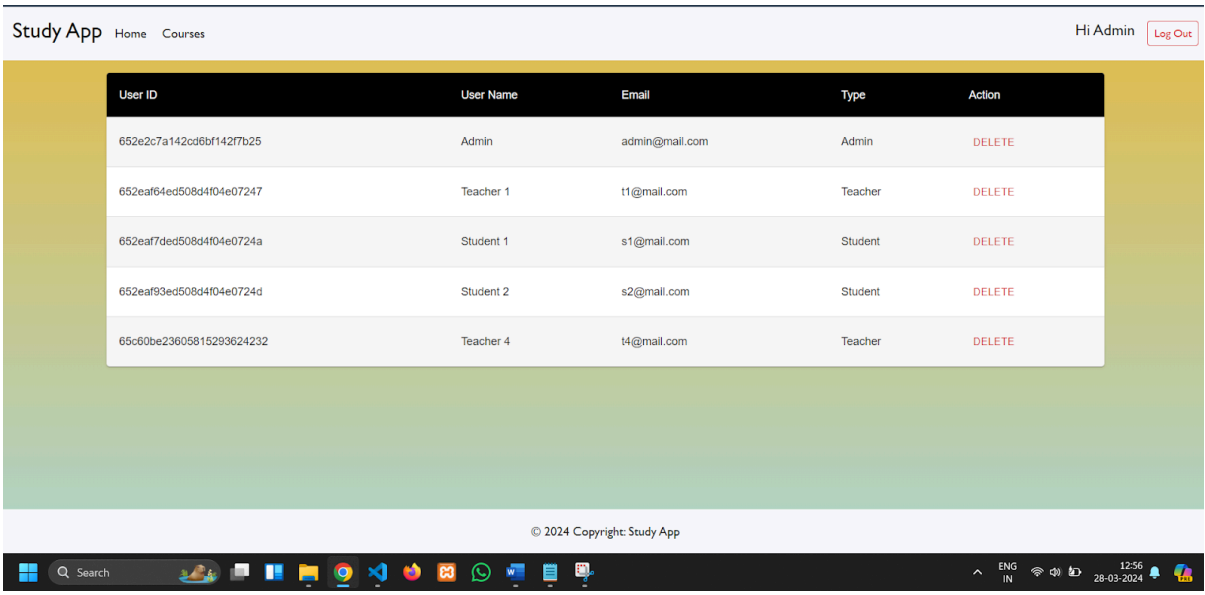


- **Login Page**

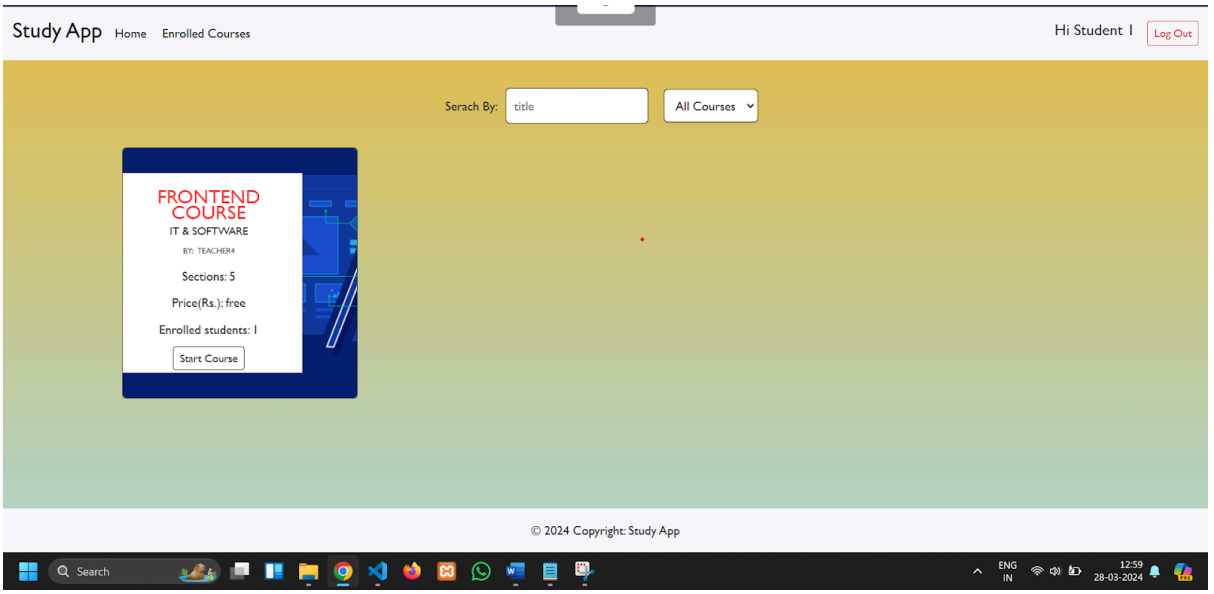


- **Registration Form**

- **Admin Dashboard**



- **Progress Dashboard**



8. ADVANTAGES & DISADVANTAGES

Advantages

- **Role-Based Access-** Different users (students, instructors, admins) get features suited to their roles.
- **Progress Tracking & Certificates**- Learners can track how far they've come and get certificates after completing courses.
- **Course Management Made Easy-** Instructors can create, manage, and upload course content without needing technical skills.
- **Flexible Learning-** Students can learn at their own pace from anywhere, anytime.

Disadvantages

- **Needs Good Internet**- Video-based content and uploads may not work well with slow internet.
- **No Personal Interaction-** Lacks real-time face-to-face interaction like in physical classrooms.
- **Dependency on Devices**- Requires a smartphone or laptop, which may not be available to everyone.
- **Security Risks (If Not Handled Well)-** If authentication or data isn't secured properly, it may lead to user data leaks.

9.CONCLUSION

LearnHub is a user-friendly and flexible online learning platform designed to help students enhance their skills, instructors manage and share courses easily, and admins maintain platform quality. By offering role-based access, progress tracking, and certification, it supports a complete learning experience. While it provides many benefits like anytime

learning and structured content delivery, it also requires strong internet connectivity and device access. Overall, LearnHub aims to bridge the gap between learners and educators by making digital learning more accessible, trackable, and effective.

10.FUTURE SCOPE

- Live Classes – Add real-time live sessions for better student-teacher interaction.
- Mobile App – Develop an Android/iOS app for easier access and learning on the go.
- AI Course Suggestions – Use AI to recommend courses based on user interest and activity.
- Multi-language Support – Offer content in different languages to reach a wider audience.
- Gamified Learning – Introduce badges, points, and leaderboards to make learning more engaging.

11. APPENDIX

Source Code (if any) :

- Complete Source Code is available in the GitHub repository.

GitHub & Project Demo Link:

- GitHub Repository:

  https://github.com/Madhu-Priya-Sai/LearnHub-Your-Platform-for-learning

  - Live Demo:

    https://drive.google.com/file/d/1OFpAsoydvrBTo8-qvKFPgdyE9sk-Xyc5/view?usp=drive_link