

FINAL PROJECT REPORT

Project Name: Learn Hub : Your Center for Skill Enhancement

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1. INTRODUCTION

1.1 Project Overview

Learn Hub is a full-stack MERN-based online learning platform designed to provide accessible, affordable, and structured digital education. The system enables users to register, log in securely, browse courses, enroll in selected courses, track their learning progress, and download certificates upon successful completion. The platform follows a three-tier architecture consisting of a React frontend, Node.js & Express backend, and MongoDB database.

1.2 Purpose

The purpose of this project is to develop a scalable and user-friendly online learning application that addresses challenges such as high education costs, lack of structured learning systems, and absence of progress monitoring in self-learning environments.

2. IDEATION PHASE

2.1 Problem Statement

Students and working professionals face difficulty accessing affordable, structured, and trackable online education platforms. Many available resources lack progress tracking and certification features, which reduces learner motivation and credibility.

2.2 Empathy Map Canvas

An empathy map was developed to understand the user's thoughts, emotions, needs, and frustrations. Users expressed concerns about high costs, lack of structured content, and absence of recognized certification.

2.3 Brainstorming

Brainstorming sessions resulted in identifying core features such as authentication system, course management, enrollment module, video-based learning, progress tracking, and automatic certificate generation.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

The customer journey begins with user registration, followed by login, browsing courses, enrollment, learning through video modules, tracking progress, and downloading certificates.

3.2 Solution Requirement

Functional requirements include user registration, login, course creation, enrollment, progress tracking, and certificate generation. Non-functional requirements include security, scalability, performance, usability, and availability.

3.3 Data Flow Diagram

The Data Flow Diagram (DFD) illustrates data movement between users, frontend, backend, and database. It represents authentication flow, enrollment process, and certificate generation.

3.4 Technology Stack

Frontend: React JS

Backend: Node.js and Express.js

Database: MongoDB

Authentication: JWT & Bcrypt

Certificate Generation: PDFKit

Version Control: Git & GitHub

4. PROJECT DESIGN

4.1 Problem Solution Fit

The proposed solution aligns with user needs by offering structured courses, secure authentication, progress monitoring, and recognized certification, thereby addressing accessibility and credibility concerns.

4.2 Proposed Solution

Learn Hub is implemented using the MERN stack to ensure scalability and maintainability. The system provides interactive learning, structured modules, and automated certification.

4.3 Solution Architecture

The architecture follows a three-tier structure: User Interface (React) → Application Server (Node.js & Express) → Database (MongoDB). JWT authentication ensures secure communication between frontend and backend.

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

The project was divided into three sprints conducted between 01 February 2026 and 19 February 2026. Each sprint focused on implementing and testing specific modules such as authentication, course management, enrollment, and certification.

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

The system was tested for functionality and performance, including login response time, course loading performance, and certificate generation efficiency. All core features performed within acceptable limits.

7. RESULTS

7.1 Output Screenshots

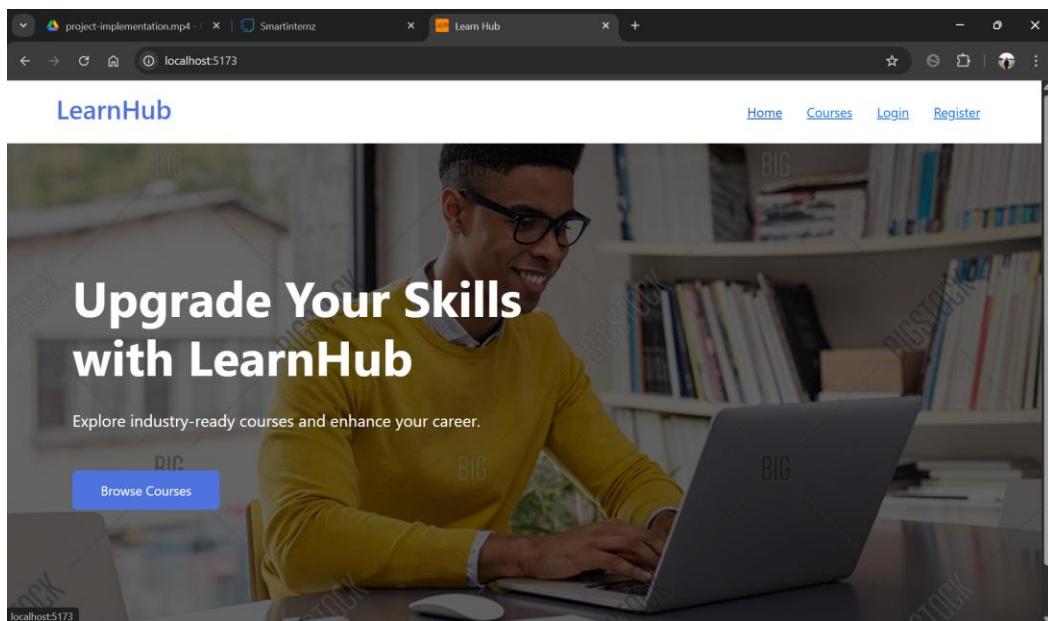


Fig 1: Home Page

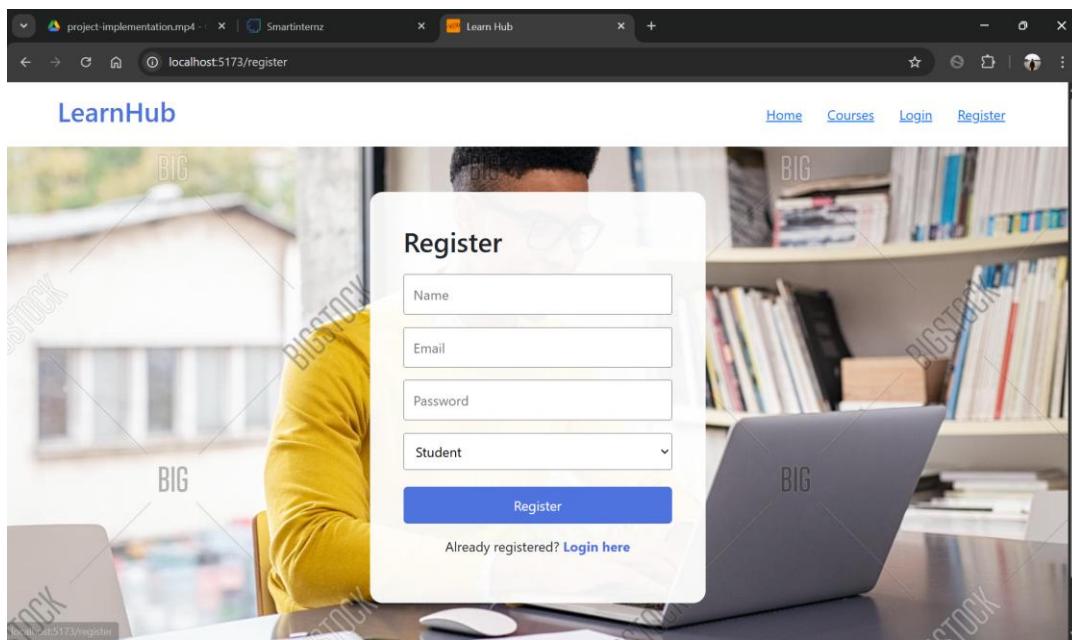


Fig 2: Registration page

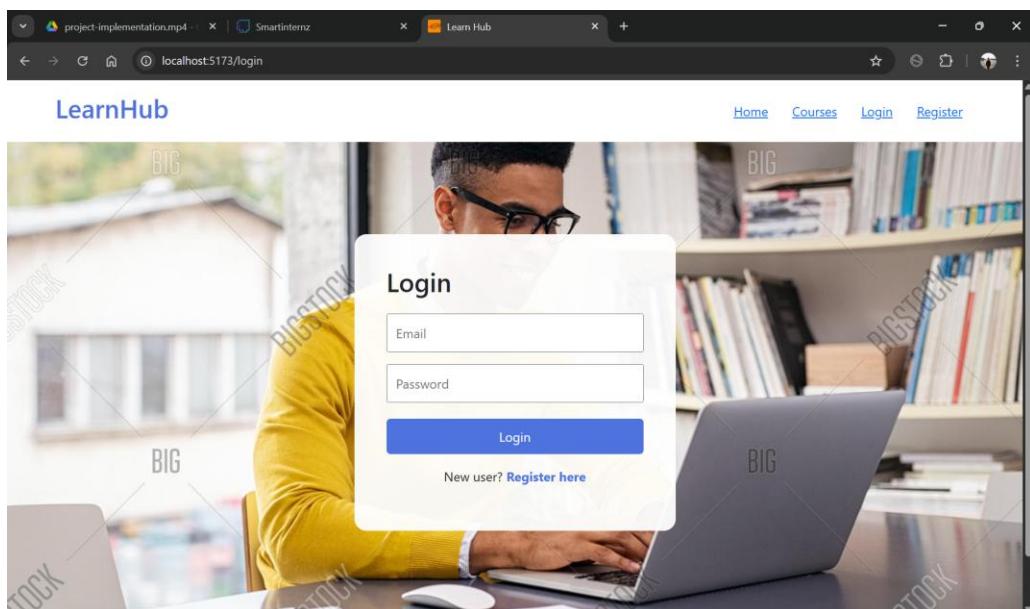


Fig 3: Login page

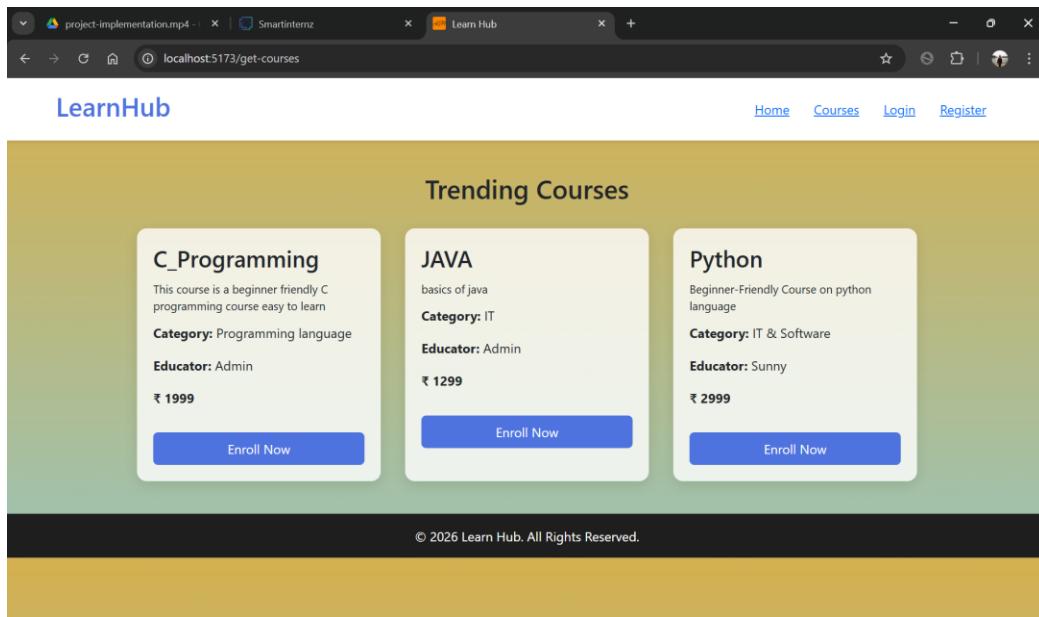


Fig 4: Course Page

8. ADVANTAGES & DISADVANTAGES

Advantages:

- Affordable and accessible learning platform
- Structured progress tracking
- Automated certificate generation
- Secure authentication mechanism

Disadvantages:

- Requires internet connectivity
- Does not include live interaction features

9. CONCLUSION

The Learn Hub platform successfully demonstrates the implementation of a full-stack web application using the MERN stack. It fulfills user requirements for structured online learning and certification.

10. FUTURE SCOPE

Future enhancements may include live classes, discussion forums, AI-based course recommendations, mobile application support, and cloud deployment.

11. APPENDIX

11.1 Source Code

The complete source code of the project is attached separately as a ZIP file.
The project repository is also available at:

GitHub Repository:

<https://github.com/Pranathi-collab/Learn-Hub>

The project includes the following main folders:

- frontend/
- backend/
- package.json
- README.md

The source code contains:

- User authentication module (JWT based)
- Course management module
- Enrollment system
- Progress tracking logic
- Certificate generation using PDFKit

Project Demonstration Link:

<https://drive.google.com/file/d/1yTByqq4RpRp6UUXIGWEZMctMLB7fDe02/view?usp=sharing>