

1. INTRODUCTION

1.1 Project Overview

LearnHub is a full-stack educational web platform inspired by GeeksforGeeks. It is designed to support real-time learning through structured courses, coding practice environments, role-based dashboards (Student, Teacher, Admin), certification, and analytics. Built with modern frontend and backend technologies, LearnHub offers interactive UI/UX, multi-language support, and scalable architecture.

1.2 Purpose

The purpose of LearnHub is to provide a centralized platform where students can learn, practice, and get certified, while teachers can create courses and monitor progress. Admins oversee platform operations, manage users, and review analytics.

2. IDEATION PHASE

2.1 Problem Statement

Students often face difficulty finding a single platform that provides learning content, assessments, certifications, and coding practice. Teachers lack tools to publish and manage courses interactively.

2.2 Empathy Map Canvas

I am a student/teacher/admin seeking a better learning/teaching experience
I'm trying to find a platform to either learn and get certified or publish and manage educational content
but most existing platforms are either incomplete, too complex, or costly
because they lack real-time interaction, unified access to resources, or dedicated role-based functionality
which makes me feel frustrated, unsupported, and disengaged.

2.3 Brainstorming

- Real-time code practice section
- Course-based structure
- Certificates on course completion
- Role-based dashboards
- Admin controls
- Multi-language (i18n)
- Mobile responsive
- Animated/3D landing page

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

Visit website → Register/Login → Based on role (Student/Teacher/Admin) redirect to dashboard → Access/Create Courses → Practice problems → Complete course → Get certificate

3.2 Solution Requirement

- Authentication System
- Course Management
- Code Compiler API
- PDF Certificate Generator
- Payments (Stripe/UPI)

3.3 Data Flow Diagram

- User → Auth API → Dashboard
- Teacher → Course CRUD API
- Student → View Courses → Attempt Quizzes → Practice Code → Certification API

3.4 Technology Stack

- Frontend: React.js, Tailwind CSS, Framer Motion
- Backend: Node.js, Express.js
- Database: MongoDB
- Deployment: Vercel (frontend), Render (backend)
- Other Tools: jsPDF, i18next, Compiler API, Stripe

4. PROJECT DESIGN

4.1 Problem Solution Fit

LearnHub addresses the fragmented education-tech experience by combining learning, practice, and certification in a single platform.

4.2 Proposed Solution

A full-stack role-based educational platform featuring:

- Dynamic routing and authentication
- Responsive and animated UI
- Student dashboards with practice and quiz sections
- Teacher dashboard to create/edit courses
- Admin panel for user and course management

4.3 Solution Architecture

[Client-Side] → React App → API Requests → [Backend Server] → MongoDB

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Week 1-2: Ideation, Wireframing

Week 3-4: Frontend Development

Week 5-6: Backend Development

Week 7: Integration & Testing

Week 8: Deployment & Documentation

6. FUNCTIONAL AND PERFORMANCE TESTING

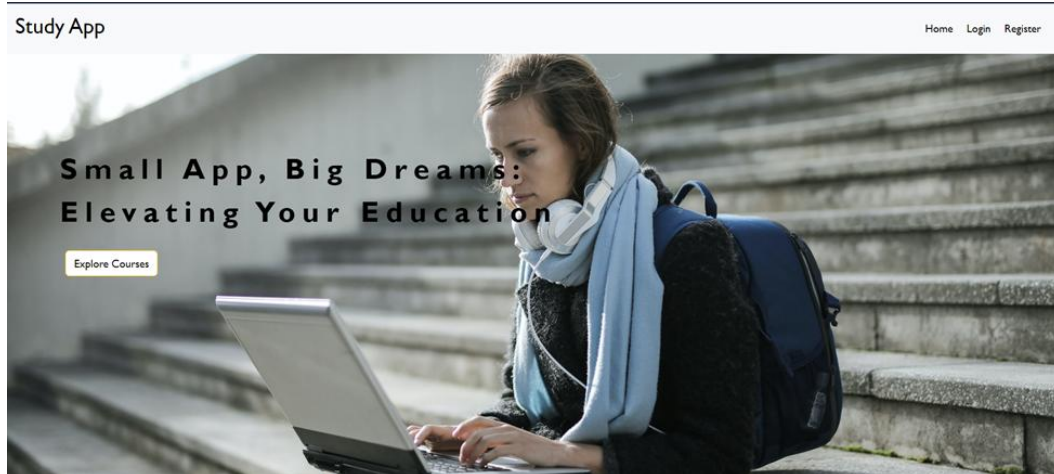
6.1 Performance Testing

- Tested using Lighthouse & PageSpeed Tools
- Optimization: Code splitting, lazy loading, caching

7. RESULTS

7.1 Output Screenshots

Landing Page



Trending Courses

Trending Courses

Search By:

title

All Courses

Modules

Title: l

Description: t

Title: n

Description: h

many more to watch..

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Register Page

Study App

Home Login Register

Register

Full Name

Email Address

Password

Select User

SIGN UP

Have an account? Sign In

localhost:5173/register

Login Page

Study App

Home Login Register

Sign In

Email Address

Password

SIGN IN

Have an account? Sign Up

localhost:5173/login

Admin Dashboard

Study App

Home

Courses

Hi Admin

Log Out

User ID	User Name	Email	Type	Action
652e2c7a142cd5b142f7b25	Admin	admin@mail.com	Admin	DELETE
652eaf64ed508d4f04e07247	Teacher 1	t1@mail.com	Teacher	DELETE
652eaf7ded508d4f04e0724a	Student 1	s1@mail.com	Student	DELETE
652eaf93ed508d4f04e0724d	Student 2	s2@mail.com	Student	DELETE
65c60be23605815293624232	Teacher 4	t4@mail.com	Teacher	DELETE

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Search

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Teacher Dashboard

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Home

Add Course

Hi Teacher 4

Log Out

Add Course

Course Type

Select categories

Course Title

Enter Course Title

Course Educator

Enter Course Educator

Course Price(Rs.)

for free course, enter 0

Course Description

Enter Course description

+ Add Section

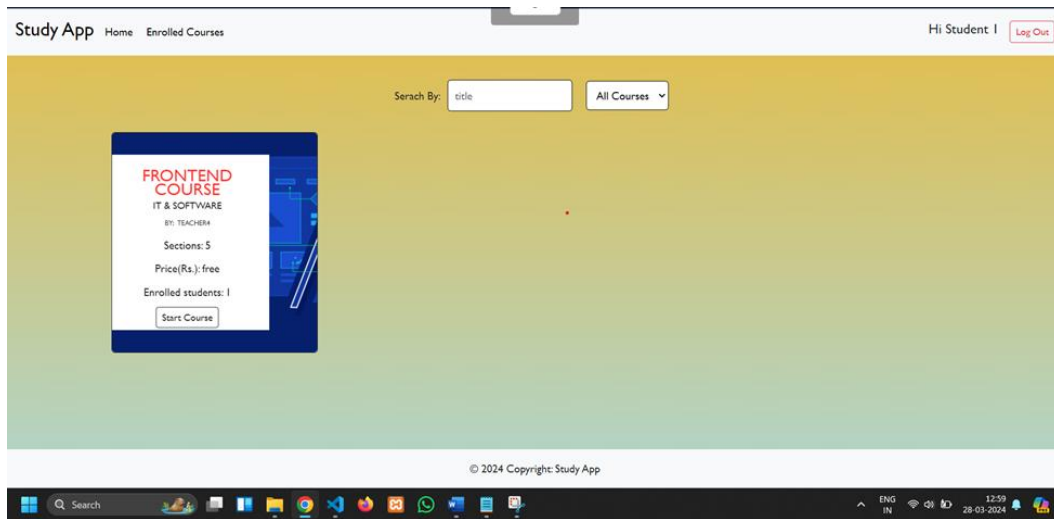
Submit

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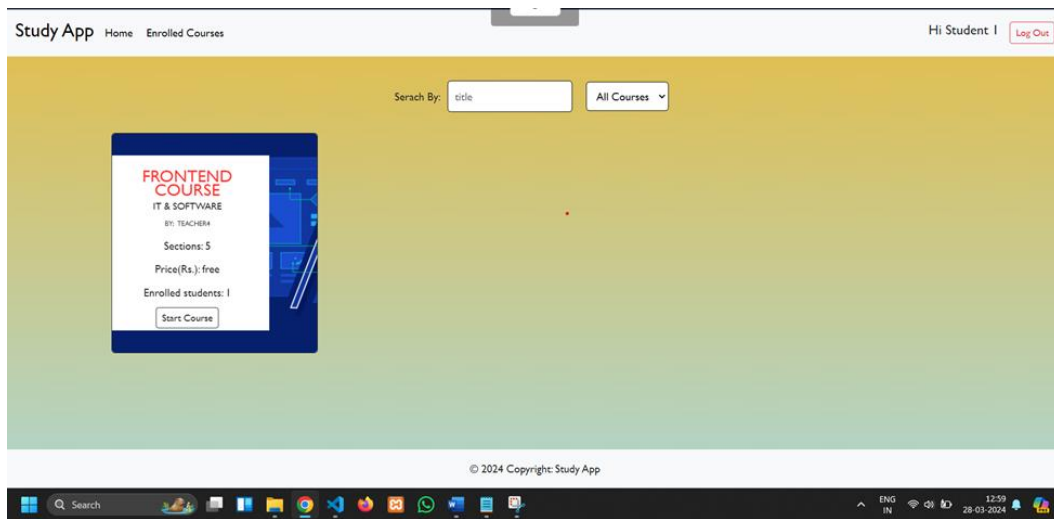
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Student Dashboard



Student Enrolled View



8. ADVANTAGES & DISADVANTAGES

Advantages:

- Centralized learning experience
- Certification and analytics
- Supports multiple roles
- Interactive UI with animations

Disadvantages:

- Heavy initial load for animations
- Needs continuous course content update

9. CONCLUSION

LearnHub effectively solves the challenge of fragmented e-learning by integrating multiple roles and functionalities into one powerful platform. It is scalable, maintainable, and user-friendly.

10. FUTURE SCOPE

- Add live mentor sessions
- Mobile App version
- AI-based progress tracking
- Gamification for learning paths

11. APPENDIX

Source Code:

GitHub & Project Demo Link: <https://github.com/KranthiVidnagiri/LearnHub>