

Final Project Report: Learnhub (StudyNotion)

1. Introduction

Learnhub (also known as StudyNotion) is a full-stack, AI-enhanced e-learning platform designed to improve online education through personalized experiences. The platform uses modern technologies such as React.js, Node.js, and MongoDB, along with Machine Learning (ML) and Natural Language Processing (NLP) to provide tailored learning paths and course suggestions for users.

2. Project Initiation

The initiation phase involved recognizing the need for a scalable, modern learning platform. Key goals included bridging gaps in existing online education systems, ensuring seamless user experience, and integrating intelligent features using AI technologies. Stakeholders include students, educators, and administrators.

3. Project Planning

Planning focused on modular development, user-centric design, and cloud integration. Tasks were divided into frontend, backend, ML integration, and deployment. GitHub was used for version control and project tracking. The project was deployed using Netlify and integrated third-party services for video and payment handling.

4. System Design

Learnhub uses a MERN architecture with React for the frontend, Node.js/Express for backend logic, and MongoDB for data storage. Components include course management, student dashboard, instructor tools, authentication, and ML-driven recommendations. The system emphasizes scalability, responsiveness, and security.

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5. Performance and Testing

Performance optimization techniques include lazy loading, responsive design, and minimized API latency. The team tested individual modules using unit tests, integration tests, and manual UI testing to ensure robust functionality across platforms.

6. Requirement Analysis

Functional requirements: user login, course enrollment, dashboard management, course creation, reviews. Non-functional: security, responsiveness, performance, scalability. Tools and services include JWT for authentication, cloud storage, and Stripe for payments.

7. Final Outcome and Future Scope

The project successfully delivered a dynamic and user-friendly e-learning platform. It integrates real-world technologies and AI, offering scope for future additions such as real-time chat, mobile apps, and more advanced learning analytics.

8. Conclusion

Learnhub demonstrates how AI and full-stack development can transform online education. It is a scalable, feature-rich application that serves as a model for future learning platforms. The GitHub repository and deployment highlight solid implementation and development practices.