PROJECT REPORT

LearnHub - Online Learning Platform (MERN Stack)

1. INTRODUCTION

1.1 Project Overview

LearnHub is a Full Stack Web Application developed using the MERN Stack (MongoDB, Express.js, React.js, Node.js).

It provides an online platform where students can enroll in courses, teachers can create and manage content,

and administrators can monitor and control the system.

1.2 Purpose

The purpose of this project is to develop a scalable, secure, and user-friendly online learning platform

that simplifies digital education and course management.

2. IDEATION PHASE

2.1 Problem Statement

Many students lack access to structured online learning platforms that provide organized course materials

and proper management features for teachers and administrators.

2.2 Empathy Map Canvas

Students need easy access to courses, teachers need content management tools, and admins require

system control and monitoring features.

2.3 Brainstorming

Proposed ideas included role-based login, course enrollment system, dashboard analytics,

JWT authentication, and responsive UI design.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

User Registration → Login → Browse Courses → Enroll → Access Dashboard → Track Progress.

3.2 Solution Requirement

Functional Requirements:

- User Registration & Login
- Course Creation & Management
- Enrollment System
- Role-Based Access Control

Non-Functional Requirements:

- Security (JWT Authentication)
- Performance Optimization
- Responsive Design
- Scalability

3.3 Data Flow Diagram

Level 0: Users (Student/Teacher/Admin) interact with LearnHub System.

Level 1: Authentication Module, Course Module, Enrollment Module, Admin Module.

3.4 Technology Stack

Frontend: React.js

Backend: Node.js & Express.js

Database: MongoDB

Authentication: JSON Web Token (JWT)

4. PROJECT DESIGN

4.1 Problem Solution Fit

The platform provides centralized learning management with secure authentication and course control.

4.2 Proposed Solution

Developed a web-based solution using MERN stack to handle frontend UI, backend APIs,

database storage, and authentication.

4.3 Solution Architecture

Client (React) → REST API (Express/Node) → MongoDB Database.

JWT is used for secure communication and authorization.

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Week 1: Requirement Gathering & Design

Week 2: Backend Development

Week 3: Frontend Development

Week 4: Testing & Deployment Preparation

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

Manual testing was performed for authentication, course creation, enrollment,

and admin management. System handled multiple users without performance issues.

7. RESULTS

7.1 Output Screenshots

Login Page, Registration Page, Course Dashboard, Enrollment Page, Admin Panel were tested successfully.

8. ADVANTAGES & DISADVANTAGES

Advantages:

- User-friendly interface
- Secure authentication
- Scalable architecture
- Role-based access control

Disadvantages:

- No payment integration (current version)
- Limited advanced analytics

9. CONCLUSION

The LearnHub platform successfully implements a secure and scalable online learning system

using MERN stack. All functional modules operate correctly.

10. FUTURE SCOPE

- Payment Gateway Integration
- Video Streaming Support
- Certificate Generation
- AI-based Course Recommendation System
- Cloud Deployment

11. APPENDIX

Source Code: Available in Project Repository

Dataset Link: Not Applicable

GitHub & Project Demo Link: (To be added)