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Team ID	LTVIP2026TMIDS71135
Project Name	LearnHub – Online Learning Platform

LearnHub: Online Learning Platform (OLP)

Prerequisites & Installation Guide

1. Project Overview

LearnHub is a full-stack **Online Learning Platform (OLP)** developed using modern web technologies. The application is designed to provide learners with access to online courses, track learning progress, and support interactive learning. It also includes role-based functionality for **students, teachers, and administrators**.

The system follows a **client-server architecture**, where the frontend provides the user interface and the backend handles server-side logic, database connectivity, and API communication.

2. Technology Stack

LearnHub is developed using the following technologies:

Frontend

- **React.js** (User Interface Development)
- **Vite** (Frontend Build Tool)
- **Axios** (API Integration)
- **Bootstrap & Material UI** (Responsive and Modern UI Design)

Backend

- **Node.js** (Server Runtime)
- **Express.js** (Backend Framework)

Database

- **MongoDB** (NoSQL Database)
 - **Mongoose** (ODM Library for MongoDB)
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3. Prerequisites

Before running LearnHub on your local machine, ensure the following tools are installed and configured properly.

3.1 Vite

Vite is used as the frontend build tool for LearnHub. It provides a faster development environment compared to traditional React setups.

Key features of Vite:

- Fast dev server startup
- Hot Module Replacement (HMR)
- ES module support
- Production build using Rollup

To create a Vite project:

```
npm create vite@latest
```

3.2 Node.js and npm

Node.js is required to run JavaScript code on the backend.

npm is required to install all dependencies for both frontend and backend.

Download Node.js from:

<https://nodejs.org/en/download/>

Installation guide:

<https://nodejs.org/en/download/package-manager/>

To initialize a Node.js project:

```
npm init
```

3.3 Express.js

Express.js is used for backend development. It is responsible for:

- API creation
- Routing
- Middleware management
- Handling client-server requests

To install Express:

```
npm install express
```

3.4 MongoDB

MongoDB is used to store application data such as:

- Users (students, teachers, admin)
- Courses and modules
- Enrollment details
- Progress tracking
- Certificates and records

MongoDB download link:

<https://www.mongodb.com/try/download/community>

MongoDB installation guide:

<https://docs.mongodb.com/manual/installation/>

3.5 React.js

React.js is used to build the user interface of LearnHub. It supports:

- Component-based UI
- Fast rendering
- Reusable UI modules
- Dynamic content handling

Since the project uses Vite, React is already included when the Vite project is created.

3.6 HTML, CSS, and JavaScript

Basic knowledge of the following is required:

- **HTML** (structure of pages)
- **CSS** (styling and layout)
- **JavaScript** (logic and interactivity)

These are essential for customizing the LearnHub frontend.

3.7 Database Connectivity (MongoDB + Node.js)

LearnHub connects MongoDB to the backend using:

- MongoDB Driver OR
- **Mongoose** (recommended)

Mongoose is used to:

- Create schemas and models
- Perform CRUD operations
- Validate data
- Simplify database queries

Reference for MongoDB + Node.js connection:

<https://www.section.io/engineering-education/nodejs-mongoosejs-mongodb/>

3.8 UI Libraries

LearnHub uses modern UI libraries to provide a better user experience:

- **Bootstrap** for responsive layout and design
 - **Material UI** for modern UI components and styling
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4. Installation & Setup Guide

Follow the steps below to install and run LearnHub on your local machine.

4.1 Install Dependencies

Step 1: Navigate to the Project Directory

Open your terminal and go to the cloned repository:

```
cd containment-zone
```

Step 2: Install Frontend Dependencies

```
cd frontend
```

```
npm install
```

Step 3: Install Backend Dependencies

```
cd ../backend
```

```
npm install
```

4.2 Start the Development Server

To start the application, run:

```
npm start
```

4.3 Access the Application

Once the server starts successfully, open the browser and visit:

```
http://localhost:5172
```

The LearnHub application will now be running locally.

5. Conclusion

You have successfully installed and set up the **LearnHub Online Learning Platform** on your local machine. The project is built using a modern full-stack architecture with:

- React + Vite for frontend
- Node.js + Express for backend
- MongoDB for database storage
- Bootstrap + Material UI for better UI
- Axios + REST APIs for client-server communication