LEARNING MANAGEMENT SYSTEM

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Problem Statement

Current Learning Management Systems (LMS) often lack personalized support and intelligent feedback mechanisms. As a result, students face challenges in clarifying doubts and monitoring their learning progress effectively. There is a growing need for a unified platform that offers personalized learning pathways, real-time doubt-solving assistance, and smart progress tracking to enhance the overall learning experience.
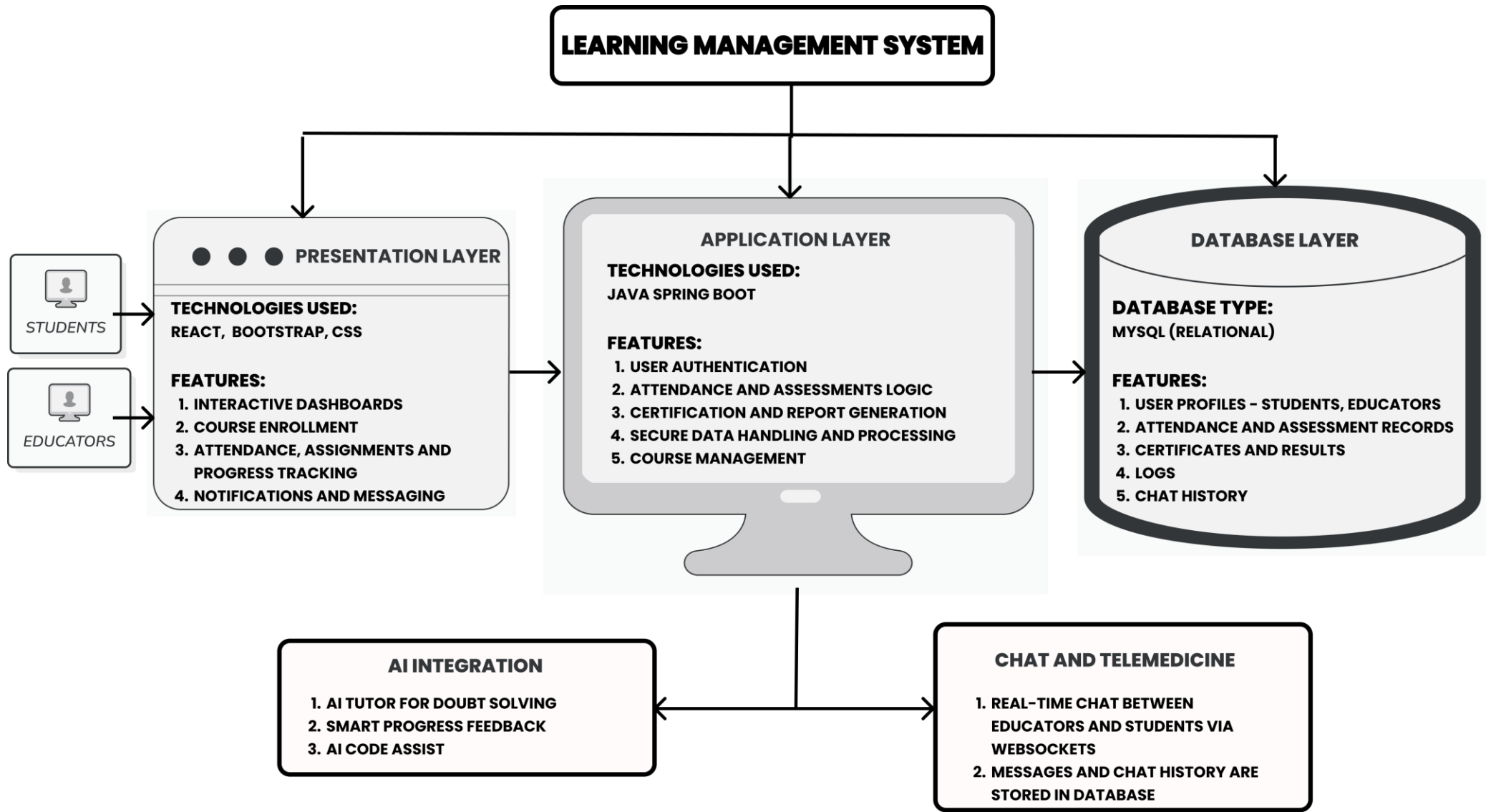
Real World Significance

❑ **Improves Learning Experience:** Personalized learning and AI doubt-solving help students understand concepts better and learn at their own pace.

❑ **Saves Time for Educators:** Automation in attendance, assessments, and progress tracking reduces manual work for teachers.

❑ **Supports Skill Development:** Real-time feedback and course recommendations guide students in building the right skills for future careers.

Objectives

- ❑ **Build a Unified LMS Platform –** Create a centralized system for students, teachers, and admins to manage learning activities.

- ❑ **Enable Seamless Course Management –** Allow easy course enrollment, tracking, and access to structured learning pathways.

- ❑ **Automate Attendance and Certification –** Implement auto-attendance tracking and certificate generation on course completion.

- ❑ **Personalize the Learning Experience –** Provide adaptive learning based on student progress and performance.

- ❑ **Integrate AI Features –** Include AI tutor for doubt-solving, smart feedback on learning progress, and code assistance for programming courses.

- ❑ **Support Communication and Collaboration –** Add discussion forums for peer interaction and teacher-student communication.

System Architecture

LEARNING MANAGEMENT SYSTEM

STUDENTS

EDUCATORS

PRESENTATION LAYER

TECHNOLOGIES USED:
REACT, BOOTSTRAP, CSS

FEATURES:
1. INTERACTIVE DASHBOARDS
2. COURSE ENROLLMENT
3. ATTENDANCE, ASSIGNMENTS AND PROGRESS TRACKING
4. NOTIFICATIONS AND MESSAGING

APPLICATION LAYER

TECHNOLOGIES USED:
JAVA SPRING BOOT

FEATURES:
1. USER AUTHENTICATION
2. ATTENDANCE AND ASSESSMENTS LOGIC
3. CERTIFICATION AND REPORT GENERATION
4. SECURE DATA HANDLING AND PROCESSING
5. COURSE MANAGEMENT

DATABASE LAYER

DATABASE TYPE:
MYSQL (RELATIONAL)

FEATURES:
1. USER PROFILES – STUDENTS, EDUCATORS
2. ATTENDANCE AND ASSESSMENT RECORDS
3. CERTIFICATES AND RESULTS
4. LOGS
5. CHAT HISTORY

AI INTEGRATION
1. AI TUTOR FOR DOUBT SOLVING
2. SMART PROGRESS FEEDBACK
3. AI CODE ASSIST

CHAT AND TELEMEDICINE
1. REAL-TIME CHAT BETWEEN EDUCATORS AND STUDENTS VIA WEBSOCKETS
2. MESSAGES AND CHAT HISTORY ARE STORED IN DATABASE

Modules

1. **User Management Module:** Handles registration, login, role-based access (student, teacher, admin), and user profile management.

2. **Course Management Module:** Allows teachers to create, edit, and manage courses. Students can browse and enroll in available courses.

3. **Attendance Tracking Module:** Automatically records attendance based on user activity or live session participation.

4. **Assessment & Evaluation Module:** Conducts quizzes/tests, evaluates student performance, and provides scores/grades.

5. **AI Tutor Module:** Students can ask doubts and receive step-by-step explanations using GPT-based AI.

6. **Smart Feedback Module:** Provides personalized feedback on course progress and estimated completion time.

Modules

7. AI Code Assistant Module: Helps students by offering code suggestions, identifying errors, and explaining concepts in programming tasks.

8. Certification Module: Generates and verifies certificates automatically upon course completion.

9. Discussion Forum Module: Enables students and teachers to interact through course-specific discussions or Q&A.

10.Teacher Dashboard: Teachers can track student progress, manage course content, respond to doubts, and view analytics.

11. Student Dashboard: Students can view enrolled courses, track progress, attend sessions, submit assignments, and interact in discussions.

Technology Stack

Frontend (Client-Side):

- ❑ **React JS –** Building dynamic and responsive user interfaces.

- ❑ **Tailwind CSS / Bootstrap –** For styling and layout.

- ❑ **Axios / Fetch API –** To handle API calls.

- ❑ **Chart.js / Recharts –** For displaying progress & performance visually.

Backend (Server-Side):

- ❑ **Spring Boot –** REST API development and business logic

- ❑ **Spring Security –** For authentication and role-based authorization

Database:

- ❑ **MySQL –** To store user data, course details, assessments, progress, etc.

- ❑ **JPA/Hibernate –** For easy database interaction with Java

AI & Machine Learning Integration:

- ❑ **OpenAI GPT API –** For AI tutor, code assistant, and doubt-solving

- ❑ **Custom Logic –** For smart progress tracking and feedback

Testing Tools:

- ❑ **Postman –** API testing

Work Done so far

Student Dashboard (Frontend):

❑ **Authentication Page:** Login & Registration UI for students

❑ **My Learning Page –** Lists enrolled courses with progress bars

❑ **Explore Courses Page –** Browse and enroll in available courses

❑ **Profile Page –** View profile, attendance, assessments grades and certifications achieved

Teacher and Admin Dashboard (Frontend)

❑ **Course Management Interface –** Create, edit, and manage course contents

❑ **Student List View –** See enrolled students and their performance

❑ **Attendance and Assessment Management Page –** View and respond to student attendance and assessment

❑ **Assessment Upload Interface –** Add and evaluate tests/quizzes

Backend Integration (In Progress)

❑ Connected Student login to Spring Boot

❑ Fetch and display courses and progress using MySQL

❑ Connected AI components with placeholder APIs

Testing and Validation

Frontend Testing:

- ❑ Tested student and teacher login flow for valid and invalid inputs
- ❑ Verified course enrollment and display on "My Learning" page
- ❑ Ensured responsiveness across different devices (mobile/tablet/desktop)
- ❑ Checked UI validations for empty fields, incorrect formats, etc.

Backend Integration Tests:

- ❑ Testing data sync between frontend and MySQL database
- ❑ Validating REST API responses (status codes, data structure)

Bug Fixes Done:

- ❑ Fixed issue where enrolled courses weren't saving correctly
- ❑ Solved slow loading of course thumbnails
- ❑ Fixed broken links in the "Explore Courses" page

Challenges Faced

Frontend Challenges:

❑ **UI Consistency:** Designing a clean and responsive layout for both student and teacher dashboards.

❑ **Dynamic Content Handling:** Displaying course content and announcements data smoothly without reloads.

Backend Integration:

❑ **API Communication:** Handling async data fetch and ensuring the UI updates correctly.

❑ **Data Structure Sync:** Matching frontend data needs with backend models (like course details).

Testing & Debugging:

❑ **Cross-Device Compatibility:** Ensuring the app looks and works well on mobile and desktop.

❑ **Bug Fixes:** Debugging issues that arise from frequent changes in data flow and component updates.

Design Screenshots

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About   Courses   My Learning   A

Aswin R C
Student

Email : rcaswin6@gmail.com
Education : B.Tech IT

My Attendance   My Certifications   Assessments

Git and GitHub Crash Course
By Esther Howard

82% completed

Total Hours : 28
Hours Attended : 23
Attendance % : 82%

Figma UI UX Design
By Jane Cooper

95% completed

Total Hours : 90
Hours Attended : 86
Attendance % : 95%

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About   Courses   My Learning   A

Aswin R C
Student

Email : rcaswin6@gmail.com
Education : B.Tech IT

My Attendance   My Certifications   Assessments

Git and GitHub Crash Course
By Esther Howard

100% completed

View   Download   Share

Figma UI UX Design
By Jane Cooper

100% completed

View   Download   Share

JavaScript
By Esther Howar

100% completed

View

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skillwave

About   Courses   My Learning   A

Aswin R C
Student

Email : rcaswin6@gmail.com
Education : B.Tech IT

My Attendance   My Certifications   Assessments

Git and GitHub – Assessment
Finished   Mar 15,2025 • 10.00 AM • 20 Questions

Accuracy 85%   Answered 19/20   Retake Quiz

JavaScript Fundamentals
Finished   Mar 15,2025 • 10.00 AM • 20 Questions

Accuracy 85%   Answered 19/20   Retake Quiz

Figma UI UX Design
Finished   Mar 15,2025 • 10.00 AM • 20 Questions

Accuracy 85%   Answered 19/20   Retake Quiz

My Learning

Track your progress and manage your courses

Search enrolled courses...

Enrolled Courses

All   In Progress   Completed   Not Started

Java Programming for Beginners   In Progress

Web Development Fundamentals
Learn HTML, CSS, and JavaScript basics

Progress   60%

Continue Learning

Java Programming for Beginners   Completed

UX Design Principles
Master the fundamentals of user experience design

Progress   100%

Review   View Certificate

Java Programming for Beginners   Not Started

Data Science Essentials
Intro to data analysis and visualization

Progress   0%

Start Learning

Upcoming & Ongoing Classes

Live sessions and recorded classes

Advanced React Patterns
Learn how to implement complex React patterns
Today   3:00 PM – 4:30 PM

Starts in: 2h 15m
Join Class

Database Design Fundamentals
Learn relational database design principles
Tomorrow   2:00 PM – 3:30 PM

Starts in: 1d 4h 45m
Add to Calendar

API Development with Node.js
Building RESTful APIs with Express
May 2, 2025   Duration: 1h 15m

Watch Recording

Learning Progress

Study Time   5h 30m
+2h 15m compared to last week

Lessons Completed   12
+3 compared to last week

Learning Streak   3 days
1 2 3 4 5 6 7
Keep going! 4 more days for a perfect week

Assignments & Assessments

Track your pending and completed assignments

Due Soon   **Build a Responsive Landing Page**
Web Development Fundamentals
Due: Wed May 07 2025

Submit Assignment

Submitted   **User Persona Development**
UX Design Principles
Submitted: Wed Apr 30 2025

Grade: 92/100
View Feedback

Recommended Next

Based on your learning progress

JavaScript DOM Manipulation
15 min lesson

CSS Flexbox Layout Quiz
10 min assessment

Bookmarked Lessons

Quick access to your saved content

View All >

CSS Grid Layout Techniques
Web Development Fundamentals • Module 3

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Java Programming

Beginner JavaScript 12 Weeks

Full Stack Web Development

Course Overview

Instructor

Alex Johnson

Senior Software Engineer with 10+ years of

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Course Overview

A comprehensive course to master modern web development from frontend to backend.

This course is designed to take you from zero to hero in web development. You'll learn everything from HTML/CSS basics to advanced React and Node.js concepts, along with database integration, authentication, and deployment strategies.

What You'll Learn

- Build responsive websites using HTML5, CSS3, and JavaScript
- Implement authentication and database integration
- Deploy applications using Git, Vercel, and Netlify
- Develop backend APIs using Node.js and Express
- Create dynamic web applications with React and Next.js
- Work with modern development tools and workflows

Course Content

Module 1: Web Development Fundamentals
12 lessons • 10 hours   +

Instructor

Alex Johnson
★ 4.8 • 12,450 students

Senior Software Engineer with 10+ years of experience. Previously worked at Google and Meta, now teaching full-time.

View Profile

Course Duration

🕐 Total Hours   **45 hours**
🗓 Duration   **12 weeks**

Start Date
June 15, 2025

End Date
September 7, 2025

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Netlify   workflows

Course Content

51 lessons • 45 total hours

Module 1: Web Development Fundamentals
12 lessons • 10 hours   +

Module 2: Frontend Development with React
15 lessons • 12 hours   +

Module 3: Backend Development with Node.js
14 lessons • 11 hours   +

Module 4: Full Stack Integration
10 lessons • 8 hours   +

Course Format

Course Type
Hybrid (85 videos)

Assessments
Quizzes, Assignments, Projects

Instructor

Alex Johnson
★ 4.8 • 12,450 students

Senior Software Engineer with 10+ years of experience. Previously worked at Google and Meta, now teaching full-time.

View Profile

Course Duration

🕐 Total Hours   **45 hours**
🗓 Duration   **12 weeks**

Start Date
June 15, 2025

End Date
September 7, 2025

$349 $499 30% off

Certification

[Certificate Preview]

Certificate of Completion

Upon successful completion of the course, you'll receive a verified certificate that you can share with employers.

Requirements to earn:

80% completion + 75% on final assessment + all projects submitted

Instructor

Alex Johnson

★ 4.8 • 12,450 students

Senior Software Engineer with 10+ years of experience. Previously worked at Google and Meta, now teaching full-time.

View Profile

Course Duration

🕐 Total Hours — **45 hours**

📅 Duration — **12 weeks**

Start Date
June 15, 2025

End Date
September 7, 2025

$349 $499 30% off

Prerequisites

✓ Basic computer skills

✓ Familiarity with using the internet

✓ No prior programming experience required

✓ Laptop with at least 8GB RAM recommended

Community & Support

✓ No prior programming experience required

✓ Laptop with at least 8GB RAM recommended

🕐 Total Hours — **45 hours**

📅 Duration — **12 weeks**

Start Date
June 15, 2025

End Date
September 7, 2025

Community & Support

Discussion Forums
Connect with peers and discuss course topics

Live Q&A Sessions
Weekly sessions with the instructor

Course Resources

Complete Course Code Repository	CODE

HTML/CSS/JavaScript Cheat Sheets	PDF

Web Development Roadmap	PDF

Design Assets for Projects	ASSETS

Database Schema Templates	CODE

$349 $499 30% off

Limited time offer • 3 days left at this price

Enroll Now

Try Free Lesson

30-day money-back guarantee

✓ Full lifetime access

✓ Access on mobile and desktop

✓ Certificate of completion

✓ All course resources included

Dashboard

Overview   Analytics   Recent Activities

Download Report   Add New

Total Students
2,853
+12% from last month

Active Courses
145
+4 new this week

Completion Rate
78.5%

Instructor Count
32
+2 new instructors

Overview

1600
1200
800
400

60
45
30
15

Recent Enrollments
Latest student enrollments

A   Alex Johnson   In Progress
    Advanced JavaScript

M   Maria Garcia   Completed
    Python for Data Science

J   James Wilson   Just Started
    UI/UX Design Fundamentals

S   Sarah Lee   In Progress
    Full Stack Development

Dashboard

User Management

Instructor Management

Course Management
  All Courses
  Add Course
  Assign Instructors

Assessment & Tests

All Courses

Search   + Add Course

Search courses...   Category   Status

Grid View   List View

Showing 12 of 24 courses

Web Development Bootcamp   Published
A comprehensive course covering HTML, CSS, JavaScript, and modern frameworks.
⏱ 12 weeks   👥 245 students
James Wilson   ...

Data Science Fundamentals   Published
Learn the basics of data analysis, visualization, and machine learning.
⏱ 8 weeks   👥 189 students
Sarah Lee   ...

Mobile App Development   Published
Build native mobile applications for iOS and Android platforms.
⏱ 10 weeks   👥 156 students
Michael Miller   ...

UI/UX Design Principles   Draft
Master the art of creating intuitive and engaging user interfaces.
⏱ 6 weeks   👥 112 students
Emily Davis   ...

Data Science   Published
Data Science   Published
Data Science   Draft
Data Science   Published

Timeline and Future Plans

Phase	Duration	Status
Planning	February Week 4	Completed
UI/UX Design	March Week 1 to Week 2	Completed
Student Dashboard Frontend	March Week 2 to Week 3	Completed
Student Dashboard Backend	March Week 4 to April Week 1	Completed
Teacher Dashboard Frontend	April Week 2 to April Week 3	In Progress
Teacher Dashboard Backend	April Week 4 to May Week 1	In Progress
Integrating AI Features	May Week 2	Planned
Testing and Validation	May Week 3	Planned
Make Reports, PPT and Final Submission	May Week 4	Planned

Conclusion

The Learning Management System (LMS) provides a centralized and user-friendly platform for managing courses, tracking progress, and enhancing learning experiences. With features like course enrollment, attendance tracking, assessments, and certification, it ensures a seamless interaction between students, educators, and administrators. By integrating modern technologies, this LMS improves efficiency, engagement, and accessibility in education.

Literature Survey

	Title	Author(s)	Publisher / Journal	Year	Demerits
1	A Survey of Learning Management Systems	S. Graf, C. Ives, T. Rahman	International Conference on Interactive Mobile and Computer Aided Learning	2007	Limited user-centric adaptability; does not consider mobile compatibility.
2	Evaluation of Blackboard Learning Management System for Use in Advanced Learning	A. Cavus, D. Momani	Journal of Information Technology Education	2009	Focuses only on Blackboard; lacks comparison with other LMS platforms.
3	Moodle: A Learning Management System in Education	D. Dougiamas, M. Taylor	EdMedia + Innovate Learning	2003	Limited scalability and performance under heavy user load.
4	Analysis and Evaluation of Open Source LMS	M. Al-Ajlan, H. Zedan	IEEE Transactions on Learning Technologies	2008	Ignores commercial LMS systems; lacks end-user feedback.
5	Comparative Study of Open Source LMSs	M. Cavus	Procedia - Social and Behavioral Sciences	2011	Only basic features compared; doesn't include usability or security analysis.

Literature Survey

	Title	Author(s)	Publisher / Journal	Year	Demerits
6	Challenges in Implementing LMS in Higher Education	H. Selim	The Internet and Higher Education	2007	Focuses more on challenges than proposing concrete solutions.
7	Cloud-based LMS: A New Trend	S. Alshahrani, A. Ally	International Journal of Advanced Computer Science and Applications	2016	Security and data privacy concerns not fully addressed.
8	Usability Evaluation of LMS	A. Zaharias	British Journal of Educational Technology	2009	Evaluation lacks diverse learner profiles; mostly teacher-centered.
9	Impact of LMS on Student Performance	J. Coates, R. James, R. Baldwin	Journal of Computer Assisted Learning	2005	Focuses only on academic performance; neglects soft skill improvement.
10	Adoption of LMS in Developing Countries	R. Bhuasiri, O. Xaymoungkhoun	Computers & Education	2012	Limited data sources; generalizes challenges across diverse regions.

THANK YOU