

ABSTRACT

In the digital age, the demand for efficient, accessible, and interactive educational platforms has grown rapidly. This project presents the design and development of a Learning Management System (LMS) aimed at enhancing educational experiences for students, instructors, and administrators through a unified online environment. The system serves as a centralized platform that facilitates course management, learning content delivery, user engagement, performance tracking, and communication within academic institutions or training environments. The project is developed using the MERN stack—MongoDB, Express.js, React.js, and Node.js—offering a full-stack JavaScript solution for scalability, flexibility, and fast development. MongoDB is utilized as a NoSQL database to efficiently manage user data, course material, and system logs. React.js is used to build an interactive and responsive frontend interface, while Express.js and Node.js power the backend with RESTful APIs for smooth client-server communication. The application includes two major modules: the Admin Module and the Login/User Module. The Admin Module allows administrators to create and manage courses, assign instructors, view user statistics, and control content delivery. The Login/User Module offers personalized dashboards for students and instructors, including features such as course enrollment, content access, assignment submission, discussion forums, and performance reports. A key focus of the system is usability and security. Role-based access control is implemented to ensure that users only access data relevant to their roles. JWT-based authentication secures user sessions, while proper validation and error handling improve system reliability. The project also incorporates responsive design, ensuring accessibility across devices such as desktops, tablets, and smartphones. The Learning and Management System was tested across multiple user scenarios to validate its functionality, usability, and robustness. Initial feedback indicates that the system effectively streamlines the learning process, improves communication between stakeholders, and simplifies administrative tasks.