

Unlocking Interactive Learning: Building a Robust Quiz Portal with MERN Stack Technology"

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Abstract: *Online learning has become increasingly popular in the digital era, necessitating innovative platforms to effectively engage students. This research outlines the development and implementation of an interactive quiz portal utilizing the MERN (MongoDB, Express.js, React.js, and Node.js) stack to enhance learning outcomes. The portal features a user-friendly interface for easy navigation and access to a diverse range of quizzes on various subjects. To ensure scalability, performance, and real-time interactions, Node.js handles backend operations, React.js manages dynamic interfaces, Express.js is used for server-side development, and MongoDB stores data. The portal includes instant feedback mechanisms, gamification elements, and personalized user profiles to enhance user motivation and involvement. Furthermore, adaptive algorithms are employed to adjust quiz content based on user proficiency levels. This paper presents the design, development, and implementation of an online test platform using the MERN (MongoDB, Express, React, and Node.js) stack. The portal functions as an all-inclusive platform for administering tests, assessments, and learning evaluations in an online setting. The portal provides smooth integration of frontend and backend activities, guaranteeing strong performance and user interaction, by utilizing the adaptability and scalability of the MERN stack. The portal enables quick development and deployment cycles with the help of MongoDB's document-based data storage, Express.js's effective middleware and routing, React.js's dynamic UI components, and Node.js's event-driven architecture. To improve user experience and learning results, features including interactive feedback mechanisms, real-time performance monitoring, quiz design and administration, and user authentication are easily integrated.*

Keywords: MERN.