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User and Dashboard Management System

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ABSTRACT

A course management system's dashboard and user management modules are essential components. It supports a variety of user roles, including parent, student, teacher, and administrator. According to their duties, users are given designated roles with restricted access during registration. Role-Based Access Control (RBAC) is used by the system to make sure that just the information that each user needs is visible. All users and announcements can be managed by administrators. Instructors can post assignments, make class schedules, and monitor student progress. Students have the ability to view their personal progress, grades, assignments, and classes. Parents are able to keep an eye on their child's performance and attendance.

A key finding is that real-time notifications and role-specific dashboards greatly boost stakeholder communication, lessen misunderstanding, and improve user experience. Instructors view announcements, their timetable, and student progress. Students view their grades, assignments, and forthcoming classes. Parents get access to school updates and their child's development. All users will have a seamless, quick, and safe experience thanks to the integration of React.js, Next.js, and MongoDB. This approach enhances communication between educators, parents, and kids while also assisting schools in maintaining organization.

KEYWORDS: *Course Management System, React.js, Next.js, MongoDB, Role-Based Access Control, User Management, Dashboard, Real-time Notifications, Education Technology, Student Progress Tracking.*

I. INTRODUCTION

Teaching is a dynamic activity that needs to be constantly monitored and adapted to changes in the social context and needs of students in order to ensure high quality learning and teaching process [1]. In traditional learning, teachers can easily get an insight into how their students work and learn. However, in online learning, especially when using systems like learning management systems (LMSs), it is more difficult for teachers to see how individual students behave and learn in the system [2]. So, this paper focuses on an effective User Management that is required by every platform where multiple users can login [4] and interactive Dashboards which empowers teachers and motivates students to make informed decisions about the learning process, mainly through visualizations of collected student data through dashboards. [1]

- **User Management:**

In this module, users are able to create new account and sign in based on the new registration. Users are able to login based on their credentials and every time they log in, authentication is done. The user is redirected to the same page in case an invalid attempt is made. [4] Also after successful registration the user can update information and changed their password as when required.

The role of the educational administration system created by the admin. Each role has a unique symbol/identity which helps to authenticate the identity through the authentication module when logging in the system. Only users with identity and password authentication during logon can perform their own privileges in the system. [7]

User has of four types, student, teacher, parent and admin. A student can register as user and can add, edit and delete his profile. Admin has the power to add new user and can edit and delete a user also edit and delete marks for the student. All the users can see the marks [6].

The smooth integration of email notifications and remainders in this project ensures that tasks are not only organized but also completed on time. [9] .

- **Dashboard:**

An education dashboard for teachers will include some type of visual aids that encourage teachers to reflect upon learner behaviour patterns and to act in accordance to it. It may be useful to think of teachers as decision-makers. [10] By providing teacher dashboard that presents the list of courses and arrange the class schedule. Teacher allows to create and manage assignments for their courses for the better performance of students. [5] Also they can view student progress, grades, and can make the important announcement regarding to course or exam.

After student registration, they can capture personal and academic details [5] on their dashboard such as the classes scheduled by teacher's, their progress and grades in course, their attendance in each subject, how was their performance during the session, how many assignments they have to complete or completed. As mentioned above, parent is also our user. Like student dashboard parent can also view their child's performance in course, child's exam grades, their everyday attendance, and can view the academic details.

II. RELATED WORK:

A variety of learning management systems (LMS) have been developed to facilitate blended and online learning by providing resources for user communication, evaluation, and material delivery. Basic features like user administration, grade monitoring, and content sharing are offered by already-existing platforms like Moodle, Google Classroom, and Blackboard. Many of these solutions, however, lack user-personalized dashboards created with more recent technologies like React and Next.js, as well as scalable real-time interaction and modern UI responsiveness.

In an effort to fill these shortcomings, recent studies and open-source initiatives have integrated data visualization, role-specific dashboards, and mobile-friendly interfaces

utilizing contemporary JavaScript frameworks. According to studies, role-based dashboards are crucial for increasing user engagement since they only display relevant data to users, such as parents keeping an eye on their child's attendance and performance, teachers managing assignments and evaluating class progress, and students checking grades and deadlines.

By building a modular, scalable LMS with React.js for a responsive user interface, Next.js for safe and quick backend processing, and MongoDB for adaptable, role-linked data storage, this project builds upon the shortcomings and advantages of current systems. Enhancing real-time communication, streamlining user onboarding, and customizing user experiences according to roles—all of which are frequently neglected in conventional LMS designs—are the goals of the system.

III. DATA AND SOURCES OF DATA:

Data is essential to the management of users, classes, assignments, and dashboards for various roles, including administrator, teacher, student, and parent, in this Learning Management System (LMS) project. Class and course details (course name, subject, class schedule, and assigned teachers), assignment data (titles, descriptions, deadlines, submissions, and grades), user information (name, email, encrypted password, role, and contact details), attendance records (date, presence status, associated class and teacher), and system notifications or announcements are the main categories of data utilized.

User input and system-generated data are the two primary categories of data sources in the system. Registration forms are used to gather user input, and administrators, teachers, students, and parents fill them out with the relevant information. Additionally, instructors and administrators use the system to post announcements, upload assignments, make timetables, and enter course information. In the meantime, during regular operation, the system automatically creates information like login timestamps, notification histories, attendance logs, and assignment submission records.

Using programs like Faker.js, sample datasets were created during the first stages of development and testing in order to produce realistic-looking but fake user, class, and assignment data. MongoDB Atlas, which offers a scalable and adaptable cloud database solution, houses all of the generated and gathered data. React.js forms handle real-time data input and validation on the frontend, while Next.js API routes securely manage all data activities, including creation, retrieval, updating, and deletion. JWT (JSON Web Tokens) is also used to effectively manage session tokens and secure user authentication.

IV. RESEARCH AND METHODOLOGY:

Creating a role-based Learning Management System (LMS) that simplifies the administration of user profiles, courses, assignments, and student progress is the goal of this project. Following a successful login and authentication process, the system grants access to role-specific dashboards to four different user types: administrators, teachers, students, and parents.

The study's main focus was:
Recognizing the permissions and responsibilities of users on educational platforms, Researching safe methods for authentication and login, Creating a data flow that works well for handling user profiles and academic activity, Designing a dashboard that is user-friendly and responsive for any kind of user, Putting into practice scalable backend solutions for real-time data handling with Next.js and MongoDB. An effective school administration system must have role-based dashboards, secure authentication, and modular course management, according to the study's findings.

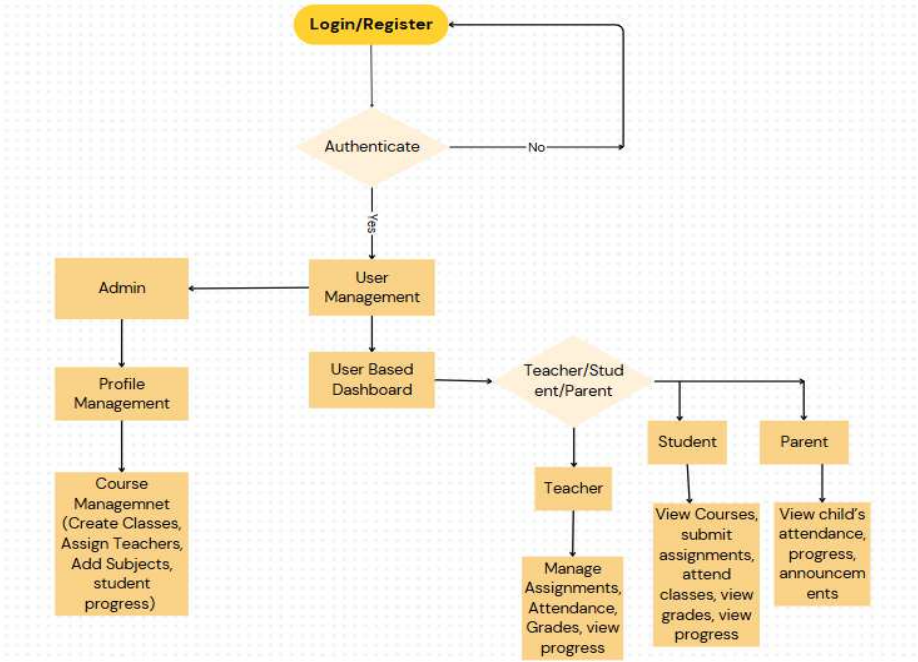

Fig 1: Data Flow Diagram of User Management and Dashboard Module

The accompanying data flow diagram illustrates the modular and role-based access methods used in the system development process:

1. Authentication and User Registration:

The Login/Register module is where users initially engage.

Backend APIs (Next.js) linked to the MongoDB database are used to securely handle authentication. In the event that authentication is unsuccessful, users are sent to a new login attempt.

2. Administration of Users:
Users are classified according to their roles—Admin, Teacher, Student, or Parent—after successfully completing the authentication process. Specific permissions and functionalities are allocated to each user role.

3. Managing Profiles:
Users and administrators have the ability to edit and manage their profiles, including academic and personal data.

4. Admin Dashboard with Role-Based Dashboard Access:
oversees the development of new courses, assignments, and subjects, and keeps track of each student's progress overall.

Dashboard for Teachers: oversees homework, records attendance, turns in grades, and keeps tabs on each student's development.

Dashboard for Students: observes classes, turns in assignments, shows up for class, looks up grades, and monitors personal development.

Dashboard for Parents: receives school announcements and can view their child's academic progress and attendance records.

5. Management of Courses:
Courses are created and managed by admin users. Teachers oversee the course material and are assigned to courses. Students sign up for and participate in classes.

6. Announcements and Notifications:
Teachers and administrators send out critical notifications. Announcements on attendance, performance, or new assignments are sent to parents and students.

7. Data Retrieval and Storage:
All of the user profiles, assignments, courses, grades, and announcements are securely and scalablely stored using MongoDB.

8. Interaction between Frontend and Backend:
Frontend (React.js): Manages dashboard visualizations, form submissions, and user interface.

Database operations, role checks, authentication, and API responses are handled by the backend (Next.js).

V. RESULT AND DISCUSSION:

Role-based user management and a customized dashboard for the four main users—teachers, students, parents, and administrators—are features of the suggested solution. Specific access to pertinent elements is granted to each job, guaranteeing effective academic assignment administration. While students may keep track of their forthcoming classes, assignments, grades, and personal development, teachers can keep an eye on class schedules, assignments, and student progress. Parents are given information about their child's performance and attendance, which keeps them involved in their education. Overarching control gives administrators the ability to govern global announcements and user preferences. Users may register and create profiles with ease thanks to the simple onboarding procedure. After being onboarded, individuals are given customized dashboards that only provide the data they require, improving their capacity to handle administrative or academic responsibilities.

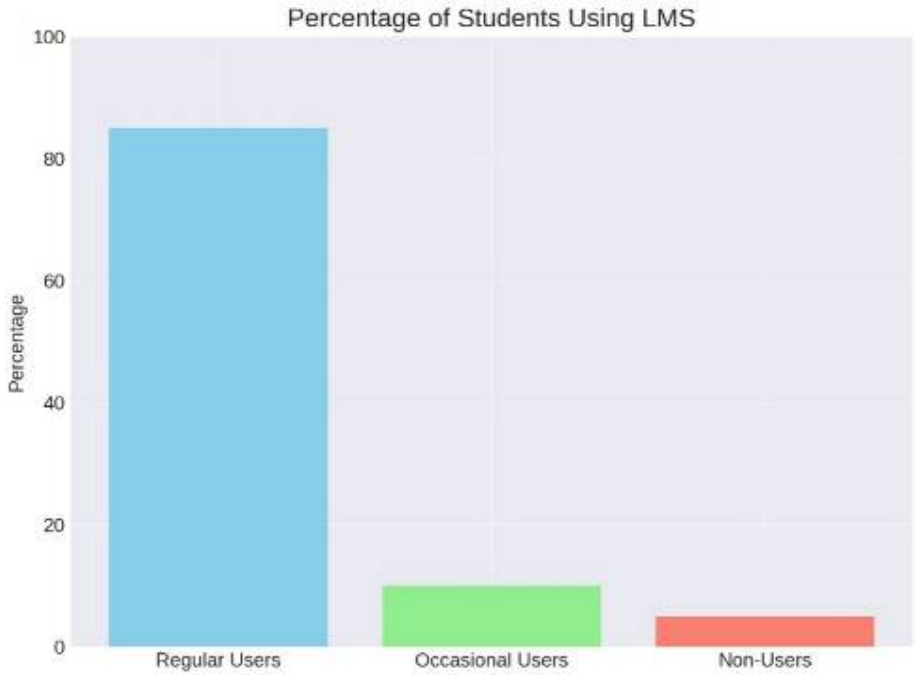

Fig 2: Percentage of Students

Functionality-wise, the system is very effective in raising user engagement. Simplified administration systems for class scheduling, assignments, and grading help teachers save a lot of administrative work. However, by having all of their class and assignment information in one location, students can maintain organization. Parents can take prompt action if necessary and obtain a better understanding of their child's academic progress. All users will be instantly notified of any significant modifications, like class changes, impending deadlines, or international announcements from the institution, thanks to the real-time alerts feature.

A more collaborative and supportive academic environment is fostered by the system's transparency and accountability, which allow students to easily access their grades and track their academic progress and parents to monitor their child's attendance and performance in real time. Additionally, the system prevents data overload while improving security by ensuring that each role has access to only the information they need.

All things considered, the system is a useful tool for educational institutions, promoting communication, boosting organizational effectiveness, and guaranteeing data transparency.

VI. CONCLUSION:

A role-based dashboard and user management system is presented in this study with the goal of enhancing academic administration in educational establishments. The technology simplifies the administration of timetables, assignments, grades, and attendance by creating personalized dashboards for educators, learners, parents, and administrators. By guaranteeing that each user has access to only the pertinent data, role-based access control improves efficiency and security. Furthermore, real-time notifications promote improved communication and engagement by informing all users of critical events, such as approaching deadlines and school announcements.

The method tackles major issues in educational institutions like poor communication and ineffective administration. An climate that is more open and cooperative is produced by the ease with which parents, teachers, and students may monitor academic achievement and get updates. The project provides a strong solution to update educational management, despite issues with data integration, scalability, and user adoption.

To summarize out, this system offers a thorough and effective method for handling educational assignments and enhancing each user's academic experience. To further improve its capabilities and satisfy the changing demands of educational institutions, future development could add features like mobile compatibility and advanced analytics.

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