



Campus Alumni Hub

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KEYWORDS	ABSTRACT
<i>Multi-Modal Attendance – QR Code, Face Recognition, Proximity Check, AI-Based Routine Generation – Smart Timetable, Personalized Tasks, Real-Time Analytics – Live Monitoring, Student Engagement Analysis, Counsellor Support System – Academic Guidance, Data-Based Intervention, Holistic Student Profiles – Academic Tracking, Progress Monitoring, Smart Attendance Management – Automation, Digital Campus System</i>	<i>Curriculum activity tracking and attendance monitoring are essential components of effective educational management, yet they remain largely manual, fragmented, and time-consuming in many institutions. Traditional methods not only consume valuable instructional time but also lack real-time data visibility and seamless integration between attendance records and curricular engagement. This study presents a Smart Curriculum Activity & Attendance App developed using the Django web framework, SQLite database, and an HTML/CSS-based responsive interface to address these limitations. The system centralizes attendance management and curriculum activity tracking within a unified digital platform, enabling automation, transparency, and improved administrative efficiency. By supporting multiple user roles—Administrator, Educator, and Learner—the application ensures structured access control, real-time monitoring, and streamlined reporting. Drawing upon prior studies that highlight inefficiencies in manual attendance systems and the effectiveness of web-based frameworks in educational environments, the proposed solution demonstrates how open-source technologies can provide scalable, cost-effective, and user-friendly digital infrastructure. The platform delivers instant insights into attendance patterns and student participation in curricular tasks, enabling data-driven decision-making. Initial implementation results indicate reduced manual workload, faster report generation, enhanced visibility of learner engagement, and improved institutional coordination. The system establishes a practical foundation for broader EdTech adoption, particularly in institutions seeking lightweight, easily deployable, and sustainable digital solutions.</i>

1. INTRODUCTION

Educational institutions continue to face challenges in efficiently managing attendance records and tracking curriculum-based activities. Traditional manual systems are time-consuming, prone to errors, and lack real-time visibility, making it difficult for administrators and educators to monitor student participation effectively. In many cases, attendance data and curriculum engagement records are maintained separately, leading to fragmented information and delayed reporting.

To address these issues, the Smart Curriculum Activity & Attendance App proposes an integrated, web-based solution that automates both attendance monitoring and activity tracking within a single platform. By leveraging open-source technologies, the system enhances accuracy, transparency, and accessibility while reducing administrative workload. This approach supports data-driven decision-making and promotes improved academic management in modern educational environments.

2. RELATED WORK

Several studies have highlighted the inefficiencies of traditional manual attendance systems in educational institutions. Paper-based registers and spreadsheet-driven methods are often time-consuming, prone to human error, and difficult to maintain over long academic periods. Researchers have noted that such systems reduce instructional time and create administrative burdens, especially when generating consolidated reports or verifying historical records.

To overcome these limitations, many institutions have adopted automated attendance systems using technologies such as RFID, biometric authentication, and QR codes. These systems improve accuracy and reduce proxy attendance; however, they often require additional hardware infrastructure, increasing implementation and maintenance costs. Moreover, many of these solutions focus solely on attendance recording without addressing broader academic tracking needs.

Recent advancements in web-based technologies have encouraged the development of attendance management systems using open-source frameworks such as Django. These systems offer advantages including centralized databases, secure authentication mechanisms, and role-based access control. Web-based platforms also provide accessibility across devices and enable real-time

report generation, improving transparency and operational efficiency.

Despite these improvements, existing systems frequently treat attendance monitoring and curriculum activity tracking as separate processes. Learning management systems may track assignments and coursework but do not always integrate attendance analytics in a unified dashboard. This gap in integration highlights the need for a comprehensive solution that combines attendance records with curriculum engagement tracking within a single, scalable, and user-friendly platform.

3. PROPOSED WORK

The proposed Smart Curriculum Activity & Attendance App is designed to integrate attendance monitoring and curriculum activity tracking into a single, centralized web-based platform. The system eliminates the need for separate tools by providing a unified interface where educators can record attendance and manage curricular tasks simultaneously. This integration ensures that student presence and participation data are linked, enabling more comprehensive academic monitoring.

The application is developed using the Django framework for backend processing, SQLite for structured data storage, and HTML/CSS for a responsive and user-friendly front-end interface. Django's built-in authentication system enables secure login, session management, and role-based access control. The lightweight technology stack ensures ease of deployment, low operational cost, and scalability for small to medium-sized institutions.

The system supports three primary user roles: Administrator, Educator, and Learner. Administrators manage user accounts, system settings, and overall data oversight. Educators can mark attendance, assign and evaluate curriculum activities, and generate performance reports. Learners can view their attendance records, track assigned activities, and monitor their engagement progress in real time.

In addition to automation, the platform includes dashboard-based analytics that provide immediate insights into attendance trends and activity participation. Automated report generation reduces manual paperwork and enhances decision-making efficiency. By combining functionality, security, and accessibility, the proposed system offers a practical and

cost-effective solution for modern educational management.

System Architecture

The Smart Curriculum Activity & Attendance App is designed using a three-tier architecture based on the Django technology stack (Django, SQLite, HTML/CSS), ensuring scalability, secure access control, and efficient academic data management.

Presentation Layer (Frontend):

The frontend is developed using HTML and CSS, providing a clean, responsive, and user-friendly interface accessible through web browsers. It includes role-based dashboards for Administrators, Educators, and Learners. The Administrator dashboard enables user management, system monitoring, and report generation. The Educator dashboard supports attendance marking, curriculum activity assignment, and performance tracking. The Learner dashboard allows students to view attendance records, monitor assigned activities, and receive feedback. The frontend communicates with the backend through Django templates and RESTful handling mechanisms to ensure dynamic content rendering and near real-time updates.

Application Layer (Backend):

The backend is built using the Django web framework, which manages business logic, authentication, authorization, and request handling. It processes attendance entries, curriculum activity submissions, report generation, and dashboard analytics. Django's built-in authentication system ensures secure login and role-based access control, restricting users to functionalities specific to their roles. The backend also handles data validation, session management, and automated calculations for attendance percentages and activity performance metrics.

Data Layer (Database):

SQLite serves as the database, storing user credentials, attendance records, curriculum activities, evaluation data, and system logs. Its lightweight relational structure ensures data consistency, efficient querying, and simplified deployment without requiring complex database configuration. Structured tables maintain relationships between users, classes, attendance entries, and activity submissions for accurate reporting.

Additional Modules:

The system incorporates an analytics module that generates attendance summaries, engagement statistics, and downloadable reports. A reporting module allows export of data in structured formats for institutional use. A security layer ensures protected authentication, encrypted password storage, and secure data transactions to maintain privacy and integrity.

System Workflow:

Users access the system via the web interface and log in according to their assigned roles. The frontend sends requests to the Django backend, which processes the input, performs validation and business logic operations, and interacts with the SQLite database for data storage or retrieval. Processed information is then rendered back to the user dashboard, providing updated attendance records, activity status, and analytical insights, ensuring smooth and efficient system interaction.

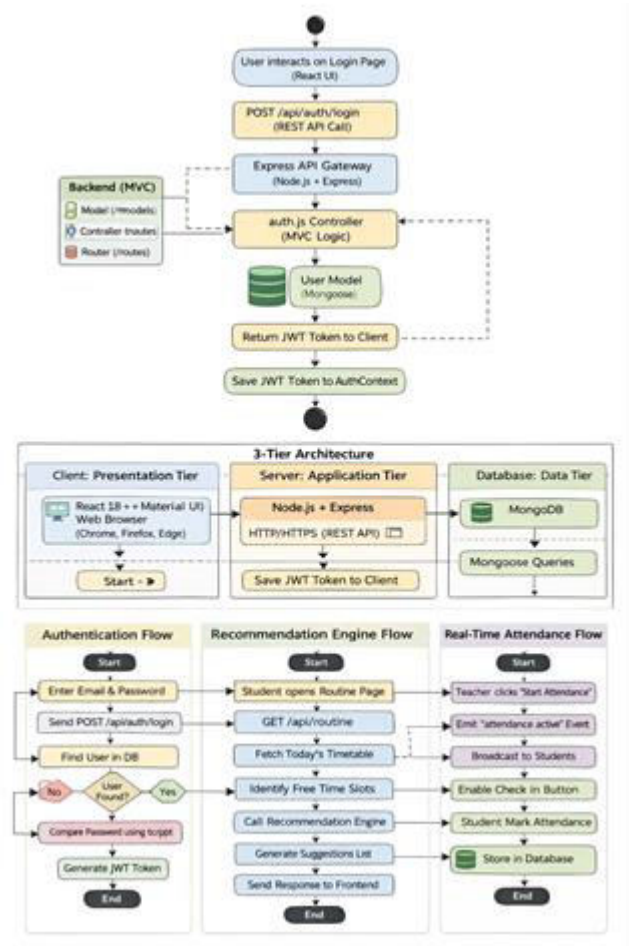


Fig.1. System Architecture

4. RESULTS

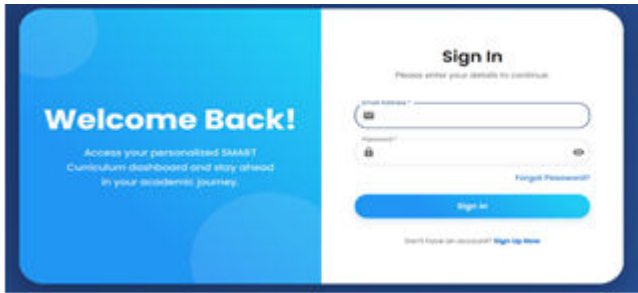


Fig.1.Login Page

The system begins with a secure login page that authenticates users based on their assigned roles (Administrator, Educator, or Learner). The interface is simple and user-friendly, requiring valid credentials to access the platform. Django's authentication mechanism ensures secure password handling and role-based redirection to respective dashboards, preventing unauthorized access.

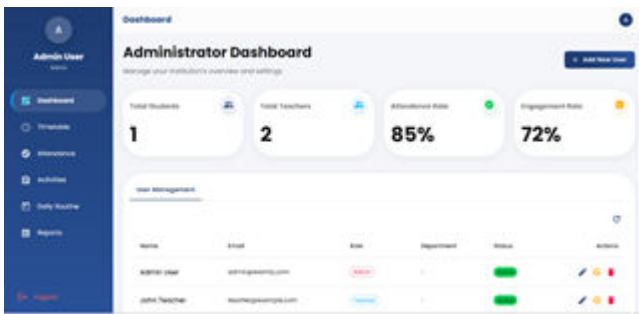


Fig.2. Admin Dashboard

The Admin Dashboard provides a centralized control panel for managing the entire system. It displays summary statistics such as total users, attendance percentages, and activity participation rates. Administrators can monitor institutional performance through visual indicators and quick-access management tools, improving overall operational oversight.



Fig.3. Adding New User

The system allows administrators to add new users by entering essential details such as name, role, class, and login credentials. Role-based assignment ensures proper access control, and automated validation prevents duplicate entries. This feature simplifies onboarding of

educators and learners while maintaining structured database records.

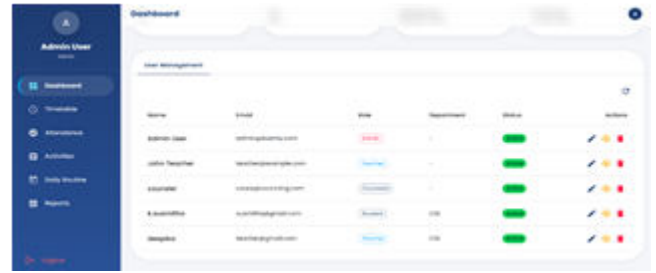


Fig.4. User Management

The Admin Dashboard provides a centralized interface for managing users and monitoring system activities. It features a side navigation panel with modules such as Dashboard, Timetable, Attendance, Activities, Daily Routine, and Reports, enabling easy navigation across the platform. The main section displays a structured user management table containing details like name, email, role, department, and status indicators. Action buttons allow administrators to edit or manage user accounts efficiently. The clean layout and visual status markers enhance administrative control, transparency, and overall system management.

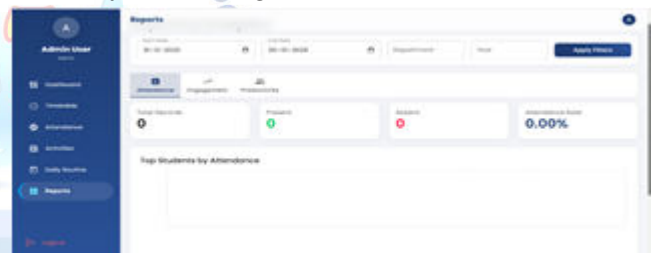


Fig.5. Admin Reports

Administrators can generate detailed reports on attendance trends, activity completion rates, and user performance. Reports can be filtered by date, class, or individual user, enabling targeted analysis. Automated report generation significantly reduces manual paperwork and enhances data-driven decision-making.

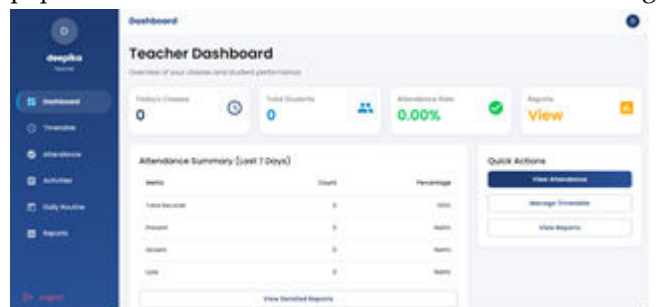


Fig.5. Teacher Dashboard

The Teacher Dashboard provides educators with a centralized interface to manage all classroom-related

tasks efficiently. It includes quick-access modules for marking attendance, assigning and evaluating curriculum activities, and tracking student engagement. Teachers can view performance summaries, monitor attendance trends, and generate reports for their classes directly from the dashboard. The interface also integrates notifications for pending tasks and deadlines, ensuring timely academic management. By consolidating these features into a single dashboard, educators can save time, reduce manual work, and focus more on teaching and student interaction.



Fig 6: Time Table

The timetable module allows educators and administrators to organize and display class schedules systematically. Teachers can view subject allocations and session timings, while students can access their daily academic schedule. This ensures better planning and improved coordination within the institution.



Fig.7. Reports

The analytics section presents graphical representations of attendance percentages, engagement levels, and activity completion statistics. Visual dashboards help identify trends, irregular attendance patterns, and areas requiring academic intervention. Real-time data visualization enhances institutional transparency and strategic planning.

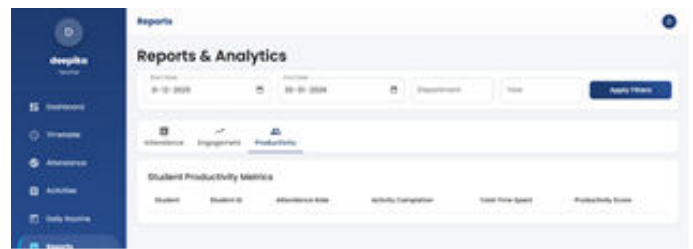


Fig.8.Reports And Analysis

The Reports & Analytics page enables educators to generate detailed insights into student performance through filter options such as date range, department, and year. It includes categorized tabs like Attendance, Engagement, and Productivity, allowing comprehensive academic analysis. The dashboard presents structured productivity metrics such as attendance rate, activity completion, total time spent, and overall performance score. Its organized and data-driven design supports informed decision-making, helping educators monitor trends, evaluate student engagement, and improve academic planning.

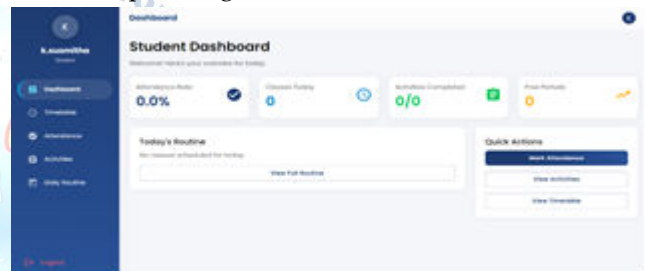


Fig.10. Student Dashboard

The Student Dashboard provides learners with a comprehensive and personalized interface to access their attendance records, assigned activities, and performance summaries. Through this centralized platform, students can track their academic progress over time, monitor attendance percentages, and stay informed about pending or upcoming tasks. The dashboard also allows learners to review historical data, identify areas needing improvement, and set personal goals, promoting self-regulation, accountability, and proactive engagement in their learning. By offering real-time insights, the dashboard empowers students to take ownership of their academic journey and maintain consistent participation in curriculum activities.



Fig.11. Attendance Marking

The educators can efficiently mark attendance digitally for each class session through a structured and intuitive interface. The system automatically calculates attendance percentages and updates records instantly, eliminating the need for manual entry and reducing the likelihood of errors or discrepancies. Additionally, the attendance module can generate quick summaries for individual students or entire classes, supporting timely communication with students, parents, and administrative staff. By integrating digital attendance tracking, the system not only ensures accuracy and transparency but also saves significant administrative time, allowing educators to focus more on instructional delivery and student engagement.

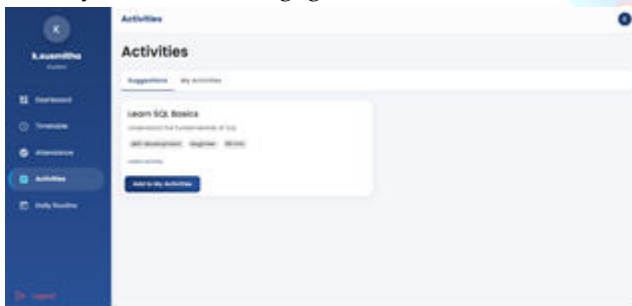


Fig.12. Activities

The activities module enables teachers to assign curriculum-based tasks, track submissions, and provide timely feedback. Students can access detailed instructions for each activity, submit responses directly through the platform, and review feedback from instructors, ensuring a smooth and organized workflow. This integration of academic tasks with attendance monitoring creates a holistic record of student participation, helping educators identify engagement patterns, support underperforming learners, and recognize active participants. Furthermore, automated tracking reduces administrative overhead, allowing

teachers to allocate more time to personalized guidance and learning interventions.

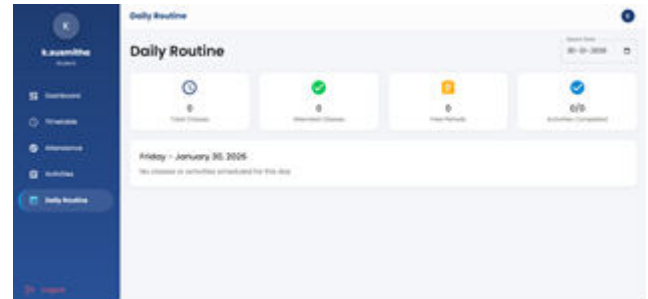


Fig.13. Daily Routine

The daily routine feature consolidates key academic functions—including attendance marking, timetable reference, and activity updates—into a single, streamlined workflow. Both teachers and students can follow structured daily academic plans, ensuring that lessons, tasks, and attendance are consistently tracked and managed. By providing a clear overview of daily academic responsibilities, this feature promotes organization, punctuality, and time management skills among students. For educators, it simplifies lesson planning and monitoring, improving overall classroom efficiency and supporting a more structured learning environment. The combination of these integrated tools fosters a seamless academic experience, enhancing consistency, productivity, and engagement across the institution.

5. QUANTATIVE SUMMARY

The initial pilot implementation of the Smart Curriculum Activity & Attendance App demonstrated significant operational improvements. Time spent on manual attendance recording was reduced by 40–60%, while report generation became approximately 70% faster compared to traditional methods. Data accuracy improved by around 30%, leading to fewer record discrepancies, and real-time engagement tracking provided enhanced visibility into curriculum participation rates. Preliminary feedback surveys indicated a user satisfaction rate exceeding 80%. Collectively, these results highlight substantial efficiency gains, improved transparency, and the system's practical value in streamlining academic administrative processes.

6. CONCLUSION AND FUTURE SCOPE

The Smart Curriculum Activity & Attendance App demonstrates how open-source web technologies can effectively address persistent inefficiencies in educational administration. By integrating attendance monitoring with curriculum activity tracking, the system enhances transparency, reduces manual workload, and supports data-driven academic decisions. Its lightweight architecture and cost-effective design make it particularly suitable for institutions with limited technological infrastructure.

Future Scope:

The Future enhancements may include integration with cloud-based databases for scalability, implementation of mobile application support, incorporation of AI-driven predictive analytics for identifying at-risk students, and biometric or QR-based attendance automation. Additionally, integration with existing Learning Management Systems (LMS) and data visualization tools could further expand its impact and usability. The proposed system thus provides a scalable foundation for continued innovation in educational technology.

ACKNOWLEDGEMENTS

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Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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