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EduSuite: An Integrated Learning Management System with Smart Exam Features

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***Abstract*—The objective of EduSuite is to develop a web-based platform that propagates the main features and functionalities of Online Education System in order to manage and advance online literacy. Teachers and students can communicate, share resources, assign tasks, and monitor progress with ease. Students can submit assignments, give exams, quizzes and access literacy funds. The system allows teachers to set up classes, post assign-ments, grade them, and keep track of their students' progress. Teachers are forced to use puzzled third-party apps because many current platforms lack integrated, safe examination tools. This system offers secure, time-bound exams with automatic grading and teacher video upload functionality to support student learning. To build a responsive and scalable system, the platform makes use of contemporary web technologies like HTML, CSS, JavaScript, Node.js, Express.js, Axios, React.js, Tailwind.js, SQL, and XAMPP. The goal of this system is to increase student-teacher collaboration and participation by acting as a valuable teaching tool that can be used in a variety of learning settings.**

Index Terms—Online exams, smart assessment, EduSuite, Online Literacy, E-learning Platform, Student-Teacher Collaboration.

I. INTRODUCTION

The COVID-19 pandemic was a major factor in the sudden shift to online learning, which required educational institutions to quickly adopt digital teaching techniques. Because of their ease of use and accessibility, platforms like Google Class-room have gained widespread adoption. Google Classroom is excellent at communicating and delivering content, but lacks strong features to safely administer online tests. Due to this restriction, assessments are now conducted using a variety of tools, which complicates the user experience and introduces workflow inefficiencies.

We created EduSuite, a learning management system that mimics Google Classroom's features and includes a robustsmart exam module, in response to the growing demand for an all-in-one solution. Without ever leaving the platform, EduSuite enables teachers to oversee classrooms, adminis-ter safe, time-bound tests, and automatically assess student performance. EduSuite offers a smooth teaching and learning experience by incorporating assessment into the LMS.

II. LITERATURE SURVEY

Learning management systems (LMS) such as Blackboard, Moodle, and Google Classroom have developed into essential tools for facilitating online and blended learning. Particularly, Google Classroom is notable for its user-friendly interface and close integration with Google Workspace; however, a number of empirical studies show that it is deficient in important assessment features, particularly in the areas of automated grading, policy enforcement, and real-time exam integrity monitoring [1], [2].

The COVID-19 pandemic increased focus on safe online assessment and hastened the adoption of digital learning resources. To improve test security and fairness, researchers in the field responded by creating smart exam systems that incorporate features like automated result calculation, time-bound test controls, real-time webcam and screen monitoring, and behavioral logging [3]. The fact that most of these tools function as stand-alone programs, separate from well-known LMS interfaces, is a significant drawback, though, and it causes workflows that are disjointed for both teachers and students [3], [4].

Furthermore, the ethical and privacy implications of remote proctoring technologies have been a significant topic of dis-cussion among academics. The use of authority-driven surveil-lance techniques in classrooms is called into question by Lee and Fanguy's study [3], which examines how proctoring tools

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can erode student subjectivity and educational relationships. In a similar vein, Balash et al. [4] draw attention to educator worries about student privacy, invasive data collection, and the compromises between user trust and exam integrity. These studies highlight the fact that while proctoring technologies prevent cheating, they frequently do so at the expense of students' comfort and the reputation of the institution.

Research on smart education frameworks has started looking into AI and IoT-driven models for incorporating intelligent assessment into learning environments, which supports this critical viewpoint. Real-time feedback loops, adaptive testing based on student performance, and behavior tracking are all intended to be supported by these proposals. The majority of these frameworks, nevertheless, are still conceptual or demonstrative in nature and do not fully integrate with the popular LMS platforms that teachers currently utilize [5].

A comprehensive review of recent research indicates a glaring research gap: While smart exam tools provide sophisticated assessment features but do not interface with popular teaching platforms, learning management systems (LMS) platforms efficiently facilitate content delivery and assignment management but typically lack intelligent exam modules. Although AI/IoT frameworks offer encouraging paths, their complex-ity frequently makes them unfeasible for wider implementationBy expanding on the well-known Google Classroom model and incorporating a fully integrated smart exam module—including secure, timer-based testing, automated scoring, video uploads, submission, and evaluation—EduSuite directly fills this gap within an educator-friendly framework.

III. SYSTEM DESIGN

A. Architecture

The updated system architecture diagram illustrates the modular design of an online educational platform, with a focus on exam management and content interaction. At the top level, the User interacts with the system through a Web Interface, which communicates with the Server to process requests and data. The core functionalities are divided into three primary modules: Class Management, Exam Module, and Assignment Management.

The Class Management module enables the organization of classes and user enrollment, while the Assignment Management module handles the distribution and submission of tasks. The Exam Module has been extended to include three key sub-components: Exam Creation, which allows faculty to generate and manage online assessments, and Upload a Video, and Submission and Checking which offers educators the ability to share recorded lectures or supplemental video content. This addition enhances the learning experience by integrat-ing multimedia resources directly within the examination or learning flow, thereby increasing engagement and instructional flexibility.

B. System Architecture Overview

The EduSuite platform follows a modular and layered web-based architecture designed for seamless educational interaction and efficient content delivery. It is structured as follows:

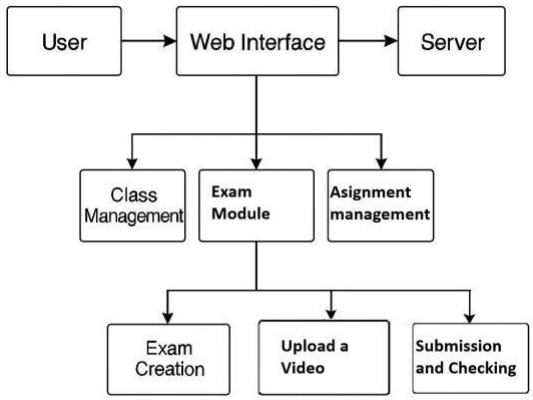

Fig. 1. System Architecture

1) User Layer
   - Represents all users (students, faculty, and administrators) who interact with the system via a browser or device.
   - Communicates exclusively through the Web Interface.
2) Web Interface
   - Built using React.js and Tailwind CSS for a dynamic and responsive UI.
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   - Acts as the bridge between users and the server.
   - Handles routing, user inputs, and displays results fetched from the backend.
3) Server
   - Powered by Node.js, Express.js, and Axios to handle business logic and API requests.
   - Processes data from the frontend and interacts with the database.
4) Core Functional Modules
   - Class Management
     – Facilitates class creation, user enrollment, and communication within class groups.
   - Assignment Management
     – Enables faculty to assign tasks and students to submit them.
     – Stores deadlines, feedback, and grading mechanisms.
   - Exam Module
     – Exam Creation: Allows teachers to design and publish tests.
     – Upload a Video: Lets faculty upload instructional or exam-related video content for students

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to view, enriching the learning and assessment experience.

– Submission and Checking

∗ Role: Sub-module for managing student exam or assignment submissions.

∗ Function:

· Collects submitted answers.

· Provides auto-grading (where applicable).

· Allows manual review and feedback by teachers.

· Shows results to students.

5) Database Layer
   - Managed using MySQL (via XAMPP stack).
   - Stores user data, class records, assignments, video links, exam details, and performance logs.

IV. MODULES

1) User Management Module :- It offers several features that allow teachers and administrators to manage users within the platform, primarily focused on class member-ship and permissions.
   - User registration (teachers, students, and adminis-trators).
   - Sign up/login via email and password.
   - Login and authentication.
   - Roles: Admin, Teacher, Student
   - Technologies: Authentication, JWT Auth
2) Classroom Management Module :- Google Classroom Clone's Classroom Management features enable edu-cators to efficiently organize, communicate, and assess student work within a digital learning environment. It offers tools for creating and managing classes, distribut-ing assignments, grading work, and providing feedback, ultimately streamlining the teaching process.
   - Create, edit, and delete classrooms.
   - Join or leave a classroom (with class codes)
   - Invite students via class code
   - Technologies: Cloud Firestore or a relational database.
3) Assignment Management Module :- The Google Classroom Clone's Assignment Management Module allows educators to create, distribute, grade, and return assignments paperlessly. It integrates with Google Drive, enabling teachers to attach files, control student access (view, edit, or make copies), and manage submissions directly within the platform. Students can access assign-ments submit work, and receive feedback, all within the Google Classroom environment.
   - Create, edit, and delete assignments.
   - Submission of assignments by students.
   - Set deadlines and attach resources.
   - Grading and feedback by teachers.
4) Course Material Management Module:- The Course Material Management module in Google Classroom Clone allows teachers to organize and share resources with students. Teachers can upload various materials like documents, links, and videos, and organize them into topics for easy access. This feature is distinct from assignments, as materials are generally for viewing and reference, not for submission.
   - Upload and share files (documents, videos, and links).
   - Technologies: Google Drive API for file storage.
5) Calendar and Scheduling Module:- Google Classroom Clone integrates with Google Calendar to help teachers and students manage classwork and schedules. Class-work items with due dates are automatically added to the class calendar, and teachers can create additional events directly within Google Calendar for the class. Students can view these events, including due dates, in the Google Classroom Clone calendar view or directly in Google Calendar.
   - We can add Notes.
6) Admin Dashboard:- It refers to the Google Admin console, which allows administrators to manage Google Workspace services, including Classroom. This console provides tools for controlling user access, setting up security features, managing devices, and monitoring usage data for Classroom and other services.
   - Manage users and classes.
7) Permissions and Roles Module :-The users are as-signed specific roles and permissions that determine what actions they can perform within a course. Teachers have the ability to manage courses, create assignments, invite students and other teachers, and manage student permissions related to posting and commenting. Stu-dents, on the other hand, have limited permissions, pri-marily focused on accessing course materials, submitting assignments, and engaging in discussions as permitted by the teacher.
   - Role-based access control (Teacher, Student, Ad-ministrator).
8) Exam Management Module:- It automates and stream-lines the entire examination process, from initial plan-ning to result generation. It helps manage various aspects of exams including scheduling, student registration, hall ticket generation, marking, and report card creation. This leads to increased efficiency, reduced manual effort, and improved accuracy in handling exams.
   - Exam Scheduling and Planning
   - Student Management
   - Marking and Grading
   - Result Generation and Reporting
   - User-friendly Interface
   - Submission and Checking
9) Resource Management
   - Upload and manage study materials

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V. FEATURES OF THE EXAM MODULE

A. Automated Grading

Multiple-choice, true/false, and short answer question formats are all supported by the platform's automated grading system. These are assessed immediately after submission, giving students feedback right away and relieving teachers of some of the grading burden. In order to guarantee accurate and equitable evaluation, the system intelligently flags more subjective responses—such as essay-style questions—for manual review by the instructor. This hybrid approach preserves academic integrity and fairness while improving grading efficiency.

B. Randomization

The platform has a strong randomization feature to protect academic integrity . This system makes sure that no two tests look the same by randomly assigning each student a different set of questions and answer choices. The system discourages cooperation or sharing of exam answers while establishing a fair testing environment by giving each participant a different version of the test.

C. Learning

By enabling students to examine their submitted responses and evaluate their performance on tests, the platform improves the educational process. This introspective method assists students in determining their areas of strength and subjects that need more research. Teachers can share interactive resources and instructional videos thanks to the system's support for multimedia content. By accommodating different learning styles and enhancing overall engagement, these visual learning resources help improve understanding and retention of difficult concepts.

D. Assessment and Student Interaction

Students can easily complete tests, quizzes, and other evaluation tasks thanks to the platform's extensive assessment system. After submitting, users can see their results right away, which helps them monitor their progress and pinpoint areas that need work. By enabling students to pose questions about the tests or course material, the system also promotes communication and creates a more engaging and encouraging learning environment.

E. Role-Based Portals

The Exam Module includes portals specifically designed for administrators, instructors, and students, each with their own roles and responsibilities in mind. System-wide settings, user management, and general exam monitoring are all accessible to administrators. Teachers have the ability to design tests, oversee questions, evaluate submissions, and assess student performance. Conversely, students have the ability to view their results, submit their answers, and access the exams they have been assigned. All participants are guaranteed a safe, well-organized, and easy-to-use experience thanks to this role-based separation.

VI. IMPLEMENTATION

A web-based prototype was developed using:

- Frontend: HTML, CSS, JavaScript, React js and Tail-wind CSS.
- Backend: Node.js and Expressjs, Axios, XAMPP, PostgreSQL.
- Database: SQL, XAMPP

VII. RESULTS AND DISCUSSION

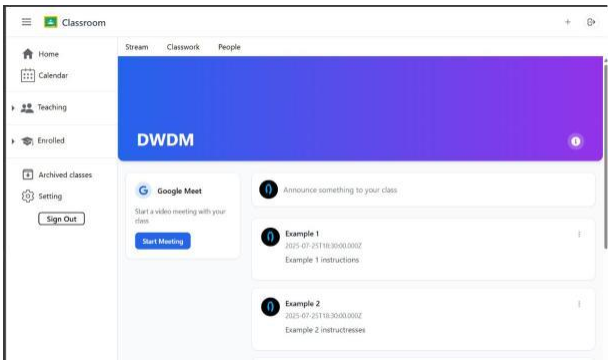

Fig. 2. Class Management

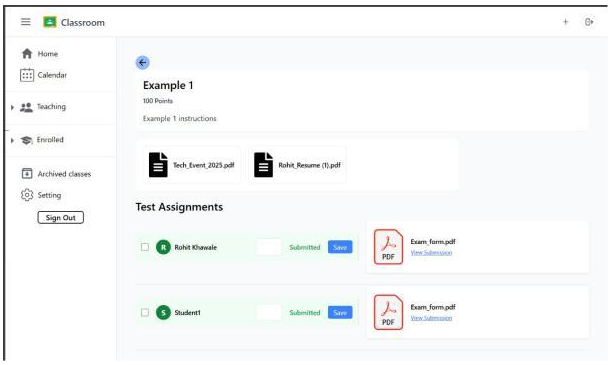

Fig. 3. Assignment Management

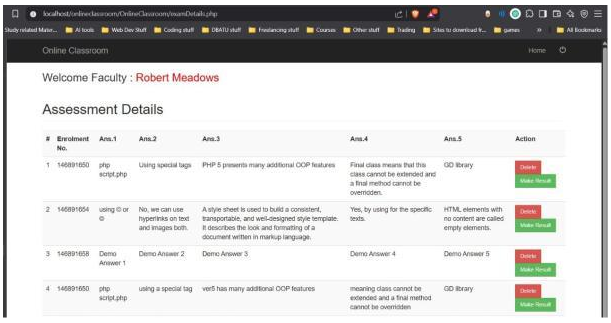

Fig. 4. Assignment Details

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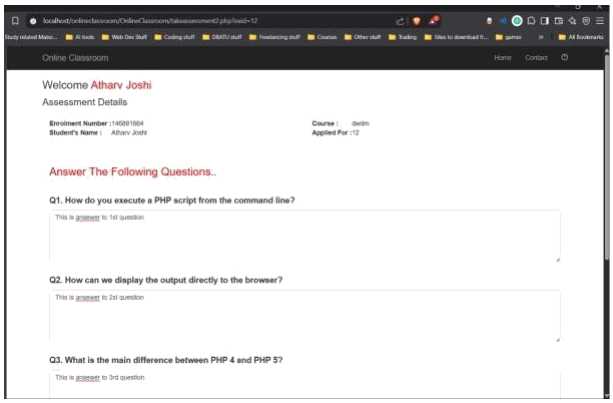

Fig. 5. Exam Module

The results demonstrate that by increasing assessment efficiency, reliability, and academic integrity, integrating an Exam Module with EduSuite greatly improves the learning process. The module simplifies the evaluation process for teachers by enabling flexible test scheduling, automated grading. Further-more, students gain from prompt feedback and a controlled exam setting, which encourages improved participation and readiness. However, drawbacks include reliance on consistent internet access, glitches during live sessions, and the possi-bility of false positives from AI-driven proctoring systems, which could lead to unnecessary anxiety or incorrectly classify honorable students.

VIII. CONCLUSION

The best way to characterize EduSuite is probably as a good beginning. It is easy to use, has many truly helpful features for both teachers and students, and may even reduce the amount of paper used in classrooms. With essential features like class management, assignment submission, and real-time communication, the creation of an EduSuite offers a stable and expandable online learning solution. This system improves the digital learning experience by utilizing contemporary web technologies, encouraging accessibility and collaboration. All things considered in this system shows how open-source and specially designed learning management systems can be used in contemporary education.This paper presented an Exam Module that complements Google Classroom's teaching tools with secure and automated assessment capabilities. Future work involves incorporating adaptive testing and full offline support.

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