



Connect-Ed: Enhancing Communication Platform

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Abstract- Educational institutions face significant challenges in maintaining effective communication between parents and mentors, which directly impacts student performance and engagement. ConnectEd is a web-based application designed to bridge this communication gap by providing a structured and efficient platform for tracking student progress, facilitating real-time interactions, and ensuring transparency between parents and mentors. Technologically, ConnectEd is built using ReactJS, HTML, CSS, and JavaScript for an interactive and responsive frontend, while the backend is powered by Node.js and MongoDB, ensuring scalable and secure data management. The system also incorporates Pinata for decentralized storage where necessary, reinforcing data integrity. Multi-language support is integrated to eliminate communication barriers, making the platform accessible to a diverse user base.

Keywords: Educational Communication, Parent-Mentor Interaction, Student Performance Monitoring, Web-Based Educational Platform, Academic Progress Tracking, Attendance Management, Timetable Scheduling, Secure User Authentication, Data Privacy, ReactJS Frontend, Node.js Backend, MongoDB Database, Multilingual Support, Admin User Dashboard.

I. INTRODUCTION

In today's educational landscape, the connection between parents, mentors, and students is essential for fostering student success. However, despite its importance, communication among these parties is often fragmented, resulting in a lack of transparency, delayed responses, and missed chances for timely intervention. Parents need consistent and prompt updates regarding their child's academic performance, attendance, and overall well-being. Similarly, mentors require an efficient system to share feedback, track student progress, and collaborate with parents in real time. Without a unified platform, managing this communication can become overwhelming and inefficient, leading to gaps that hinder student development and the support system around them.

To tackle the challenges of fragmented communication between parents, mentors, and students, ConnectEd provides a comprehensive solution that ensures smooth, efficient, and real-time interaction. The platform's design and features directly address the key pain points in educational communication. With features like attendance tracking, timetable management, and automated report generation, both parents and mentors can easily monitor and evaluate academic performance. These features eliminate the need for manual updates and streamline the process of sharing important information. ConnectEd also empowers mentors to identify areas of improvement quickly, enabling proactive intervention when needed.

ConnectEd is built using a robust and scalable technology stack to ensure seamless performance and user experience. The frontend is developed using React, HTML, CSS, and JavaScript, providing a responsive and intuitive interface for parents, mentors, and administrators. The backend is powered by Node.js with ExpressJS, handling data processing, authentication, and API integrations. MongoDB is used, offering a flexible and efficient NoSQL database structure to store student records, attendance, and reports. To enhance security and decentralization, Pinata is integrated for IPFS-based data storage. The system also includes real-time chat functionality, automated report generation, and attendance tracking.

The key advantage of ConnectEd: Enhancing Educational Platform lies in its ability to bridge the communication gap between parents and mentors, providing real-time updates on student progress, attendance, and academic activities. This transparency empowers parents to stay engaged while enabling mentors to deliver timely feedback. With features like automated reports, attendance tracking, and timetable management, efficiency, and structured monitoring. As a result, ConnectEd fosters better student performance, higher engagement, and a more collaborative support system for academic success.

This paper explores the implementation of ConnectEd: Enhancing Educational Platform, detailing its design, development, and functionality in improving communication between parents and mentors. It examines the technological stack, system architecture, and key features, such as real-time student monitoring, attendance tracking, timetable management, and automated report generation. Furthermore, the paper discusses the challenges faced during development, the solutions implemented, and the overall impact of the platform in fostering a more transparent and structured educational environment. Through this exploration, the paper highlights how ConnectEd enhances accountability, efficiency, and engagement in student learning.

II.LITERATURE SURVEY

Parental involvement in education has been widely recognized as a pivotal factor influencing student academic success, emotional development, and school engagement. A substantial body of research supports the idea that when parents are actively involved in their children's education, students exhibit improved academic performance, better behavior, and increased motivation [1]. Despite this, many schools continue to rely on traditional communication mechanisms such as occasional parent-teacher meetings, printed report cards, and one-way emails to keep parents informed. These methods are inherently limited, as they do not provide timely, structured, or interactive updates regarding student progress [2].

A number of studies have identified core inefficiencies in conventional educational communication systems. Johnson et al. (2018) emphasize that the continued reliance on static, periodic academic reports fails to meet the demand for real-time insights and continuous engagement in today's fast-paced digital environment [3]. As educational demands evolve, static reporting mechanisms are no longer sufficient to address the complex needs of students and their families. Similarly, Lee and Kim (2019) argue that the absence of centralized, unified communication platforms creates fragmented information channels between educators and parents, impeding coordinated efforts to support student success [4]. Carter and Singh (2020) expand this argument by noting that while many institutions have implemented digital student management systems (SMS), these platforms often operate in silos. Most lack advanced features such as customizable reporting tools, automated notifications, behavior tracking, or personalized feedback loops. This limits their effectiveness and often relegates them to record-keeping roles rather than proactive engagement tools [5].

The integration of modern technology into educational communication presents an opportunity to bridge these gaps. Recent advancements in digital platforms have enabled educators to provide real-time monitoring of academic performance, attendance, assignments, and behavioral trends [6]. Platforms like Google Classroom, Microsoft Teams, and Edmodo offer basic functionality such as file sharing, announcements, and messaging; however, they fall short of providing a holistic academic overview or a structured feedback loop between parents, students, and mentors [7]. These limitations have driven the development of advanced systems to better support student tracking and parental involvement. Patel and Mehta (2021) highlight that cloud-based solutions enhance data management and accessibility, allowing educators to automate reports and analytics while giving parents mobile access to important updates [8]. Such innovations support a paradigm shift from reactive to proactive communication, enabling earlier interventions and stronger collaboration between school and home.

Security and data integrity are also crucial considerations in educational platforms. Kumar and Das (2022) argue that conventional centralized database systems are vulnerable to data loss, security breaches, and administrative inefficiencies, making decentralized storage solutions like IPFS and Pinata an attractive alternative for secure and transparent data management [9]. Gupta et al. (2023) highlight that by leveraging blockchain-based or decentralized storage solutions, educational platforms can ensure data authenticity and prevent unauthorized alterations [10].

Furthermore, the usability and interface design of educational tools play a crucial role in their adoption and sustained use. Wilson and Thompson (2021) reveal that platforms featuring clean, intuitive user interfaces and mobile compatibility are significantly more effective in engaging parents and teachers alike. These features lower the technical barrier for entry, reduce resistance to change, and encourage consistent usage [11]. Singh et al. (2022) echo this sentiment, emphasizing that dashboards with visualized academic data, color-coded performance indicators, and real-time notifications lead to greater transparency and faster decision-making by parents and educators [12].

This review identifies the issues associated with traditional methods of educational communication and highlights the benefits of using technology-based solutions to improve parental involvement and student oversight. It points to the drawbacks of manual data handling, disjointed communication systems, and centralized storage models that limit timely updates and reduce transparency. In addition, research supports the implementation of cloud-enabled and decentralized platforms to enhance both data security and ease of access.

III. SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- Minimum Requirements (For Development & Testing)
- CPU Minimum: Intel Core i3 (8th generation or newer) / AMD Ryzen 3
- RAM: 8 GB
- Storage (ROM): 256 GB SSD (or 500 GB HDD)
- GPU: Integrated graphics (for basic development)

Recommended Requirements (For Smooth Performance & Smart Contract Compilation)

- CPU: Intel Core i5 (10th Gen) / AMD Ryzen 5 or higher
- RAM: 16 GB or more
- Storage (ROM): 512 GB SSD (preferably NVMe)
- GPU: Dedicated graphics (NVIDIA GeForce GTX 1650 or equivalent)

SOFTWARE REQUIREMENTS

- Operating System: Windows 10/11, macOS (Latest version), Linux (Ubuntu 20.04+ or equivalent)
- Development Tools: Node.js & npm/yarn for package management, VS Code or any modern code editor
- Frontend: React.js for building the UI, HTML, CSS, JavaScript for styling and interactivity.
- Backend: Express.js (Node.js) for server-side logic and API handling, MongoDB for storing user, student, attendance, and report data.
- Authentication & Security: JWT for secure user authentication, bcrypt for password hashing, CORS & dotenv for environment variable handling and security.
- Data Storage: Pinata (IPFS) for decentralized and secure storage of reports and documents, MongoDB for structured database management.

IV. SYSTEM DESIGN

The ConnectEd: Enhancing Educational Platform is designed to provide a seamless and structured communication system between mentors and parents, ensuring real-time student progress tracking, attendance monitoring, and timetable management. The system follows a modular and scalable architecture, integrating frontend, backend, database, authentication, and security layers to deliver an efficient and user-friendly experience.

A. Frontend

The frontend of ConnectEd is built using React, providing an intuitive and responsive user interface that ensures seamless communication between parents and mentors, with features like chat, report generation, attendance tracking, and timetables. The design prioritizes usability and accessibility, ensuring a smooth experience across devices and platforms.



Fig 4.1 Home Page

The Home Page serves as the starting point, introducing users to ConnectEd key features. As shown in Figure 4.1, it provides an intuitive entryway for users to begin generating reports effortlessly.

B. Backend



Fig 4.2 Node.js Backend

The backend is powered by Node.js and Express.js, handling API requests, user authentication, and data processing as shown in Fig 4.2. It integrates Node.js.

C. Core Functionalities & Features:

- **Parent and Mentor Dashboards:** Personalized dashboards for easy access to relevant features like reports, chat, and attendance.
- **Attendance Management:** Mentors can mark and track student attendance. Parents can view real-time attendance records.
- **Report Generation:** Mentors can create and generate detailed progress reports. Parents can access and download these reports.
- **Timetable Management:** Display of interactive timetables for students. Mentors can update and modify timetables with new events or classes.
- **Notifications:** Real-time alerts for new messages, report updates, or attendance issues.
- **User Roles and Permissions:** Different access levels for parents, mentors, and admins.
- **Data Security:** Encrypted communication and secure data handling.
- **Analytics and Insights:** Performance analysis and trend tracking for student progress and attendance.

V.METHODOLOGY

The ConnectEd methodology follows a structured framework aimed at automating and optimizing academic report generation. This approach ensures enhanced efficiency, accuracy, and user experience by integrating advanced technologies. The implementation process is divided into key phases:

1. Requirements Analysis

Prior to development, an in-depth study was conducted to identify recurring challenges in academic report writing. The core requirements identified include:

- Ensuring standardized formatting to meet academic guidelines.
- Automating content structuring and generation for consistency.
- Enabling cloud-based storage for seamless document retrieval.
- Incorporating AI-powered assistance for content enhancement.

2. System Development Approach

The development follows an Agile methodology, allowing for iterative refinements based on user feedback. The system is structured into two primary components: Frontend and Backend.

Frontend Development

- Built using React.js and Tailwind CSS for a responsive and dynamic UI.
- Provides a structured input system for organizing report sections efficiently.
- Includes real-time preview and drag-and-drop functionality for seamless content management.

Backend Development

- Developed with Node.js and Express.js to manage API requests and user authentication.
- Uses RESTful APIs for efficient data communication and server interaction.
- Implements session handling and auto-save functionality to prevent data loss.

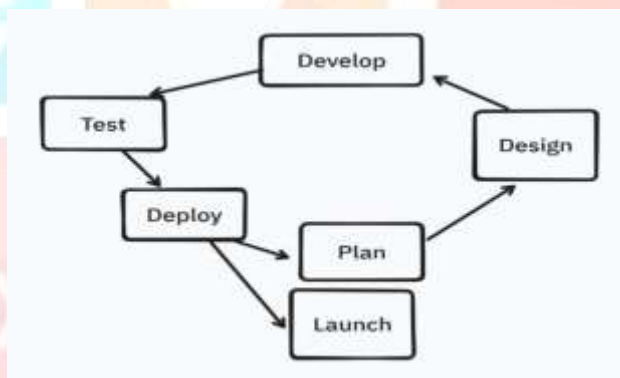


Fig 5.1 Agile Development

3. Testing & Validation

The system undergoes rigorous testing in multiple stages:

- Unit Testing: Each component (frontend, backend, AI features) is tested separately.
- Integration Testing: Ensures seamless interaction between frontend, backend, and AI services.

VI. IMPLEMENTATION

ConnectEd is a platform designed to improve communication between parents and mentors in educational settings, enabling mentors to monitor student progress and provide timely feedback to parents.

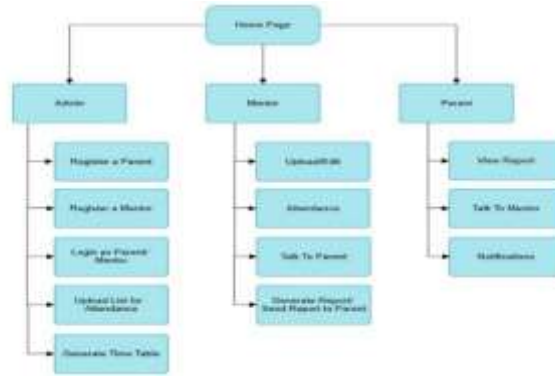


Fig 6.1 Workflow

User interaction in ConnectEd is designed to be intuitive and efficient, ensuring that parents, mentors, and admins can easily access and navigate key features. Users begin by securely logging in with their credentials, where role-based access controls grant them personalized views of the platform.



Fig 6.2 MongoDB

On the backend, Node.js and Express are used to create a robust server that handles API requests and serves dynamic content. The backend also integrates with MongoDB, a NoSQL database, to store user data, attendance records, reports, and messages. bcrypt.js is used to hash passwords securely before storing them.

The implementation of ConnectEd combines modern frontend and backend technologies to create a seamless, secure, and efficient platform that enhances communication and collaboration between parents, mentors, and admins, ultimately fostering better student progress and engagement.

VII. RESULT

ConnectEd was evaluated based on its usability, performance, and effectiveness in improving communication between parents and mentors by conducting user testing, analyzing feedback, and measuring system responsiveness, real-time updates, and feature accessibility across different devices.



Fig 7.1 Dashboard

Fig 7.1 shows that dashboard serves as the central hub for users, providing an intuitive and role-based interface for parents, mentors, and admins. It offers quick access to essential features such as messaging, attendance tracking, reports, and timetables. The dashboard ensures seamless navigation, displaying relevant student data and communication tools efficiently.



Fig 7.2 Attendance

Fig 7.2 shows that attendance tracking feature enables mentors to mark attendance digitally, while parents can monitor their child's attendance records in real time. This feature enhances transparency and helps parents stay updated on their child's academic participation.



Fig 7.3 Admin Options

Fig 7.3 shows that admins can manage user roles, monitor system activity, and ensure secure access to sensitive data. This feature streamlines platform administration by enabling the creation and assignment of mentor and parent accounts, updating institutional timetables, and overseeing report generation workflows.



Fig 7.4 Mentor Login

The mentor login grants educators secure access to a personalized dashboard tailored for academic monitoring and communication.



Fig 7.5 Parent Login

The parent login feature provides secure access to a personalized dashboard, enabling parents to monitor their child's attendance, academic reports, while also facilitating direct communication with mentors for consistent academic engagement.

VIII. CONCLUSION

ConnectEd serves as an innovative platform that enhances communication between parents and mentors in the educational sector. By integrating real-time messaging, attendance tracking, report generation, and timetable management, the platform ensures that parents and mentors are always in sync about a student's progress. The intuitive user interface, developed with React, offers a seamless experience for users across devices, while the robust backend built with Node.js and Express guarantees secure and efficient data management.

The core functionalities of ConnectEd, such as the ability for mentors to generate detailed progress reports, track attendance, and update timetables, empower both mentors and parents to stay informed and engaged in a student's academic journey.

In summary, ConnectEd is a comprehensive platform designed to improve communication between parents and mentors, facilitating a collaborative approach to student development.

IX. FUTURE SCOPE

The future of ConnectEd holds significant potential for further enhancing the platform's capabilities and expanding its reach. One key area for growth is the integration of AI/ML algorithms to analyze student data and provide predictive insights into academic performance, enabling mentors and parents to identify and address potential issues before they escalate.

The platform can also incorporate virtual classroom functionality, allowing mentors and students to engage in real-time video lessons, workshops, or meetings, which is especially valuable for remote or hybrid learning environments. Expanding the reporting and analytics features with more customizable templates, as well as data visualizations such as graphs and heatmaps, would offer deeper insights into student performance, attendance, and progress trends.

Future integration with Learning Management Systems (LMS) like Moodle, Canvas, or Google Classroom will enable smooth synchronization of academic data and provide a more holistic view of student progress. Introducing gamification elements—such as badges, challenges, and milestones—could increase student engagement. Finally, multi-language support will make the platform accessible to a global audience, ensuring its widespread adoption in diverse educational settings

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